AMPERE

REDUCE NOISE, AMPLIFY LIVES!

MARCH '24

PRESENTED BY ECE

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From the Desk of HOD

This is March, this is AMPERE time- a time to look forward to our students' multi-faceted faculties blooming. They can be story writers, can be poets, can be painters and what not but what is most gratifying for me is their spirit, their capability to work in teams and their resolve to meet the deadline.

I am sure this time also they are going to dish out exciting menu. AMPERE has become sort of synonymous with the ECE department and the entire team connected with each and every AMPERE edition deserves kudos.

I personally congratulate each member involved in the publication of the forthcoming issue of AMPERE.

I request all the readers to send their valuable feedback to the editorial team or me.

Before I wind up, let me remind my favourite students that the world of technology is undergoing a rather fast and furious change with the success of the concept of AI and more precisely Generative AI, LML etc. This situation will take some time to settle down.

I am confident that for the ECE stream, the prospects are quite positive with both communication domain and semi-conductor industries widening their horizons.

I once again congratulate team AMPERE for their excellent, thoughtful publication.

Prof. Prabir Banerjee

From the Mentor

Congratulations to everyone who has contributed to Ampere:March 2024. Your dedication, hard work, and passion to incorporate something new in every issue of Ampere demand special mention.I commend you for bringing this issue to life with your inventiveness, teamwork, and intellectual curiosity. I hope that your effort will work as sparks for more research, discussion, and action .I would like to extend my sincere appreciation to every individual in the outreach team for your priceless contributions. Your hard work does not go unnoticed, and it is because of your dedication that we make a positive impact on social media.

Once more, congratulations to TEAM AMPERE ! I'm excited to see how this issue contributes to the ongoing discussion about the dance of democracy!

Prof Sayantani Datta

MESSAGE FROM THE EDITORIAL BOARD

Amongst the many rigorous activities which the students of ECE department undertake, one activity which draws commendable praise is AMPERE. As a team we are so enthralled to see the student's eagerness to contribute to each and every issue and to see the growing popularity of the magazine in the department. The myriad articles, poems and photography simply portrays the creativity and is also the voice which holds the potential to 'Amplify Lives'.

We would like to extend our heartiest thanks to Prof. Sayantani Dutta ma'am, our mentor and our departmental HOD Prof.(Dr) Prabir Banerjee, to make this version of Ampere a success.

We would also like to extend our thanks to our OUTREACH TEAM, who work tirelessly throughout the year and has proved fruitful to uplift the quality of every edition.

We are sure that our collective efforts put together, have paid off and have done justice in providing before everyone another phenomenal issue of AMPERE.

Happy Reading!!

REGARDS
TEAM AMPERE

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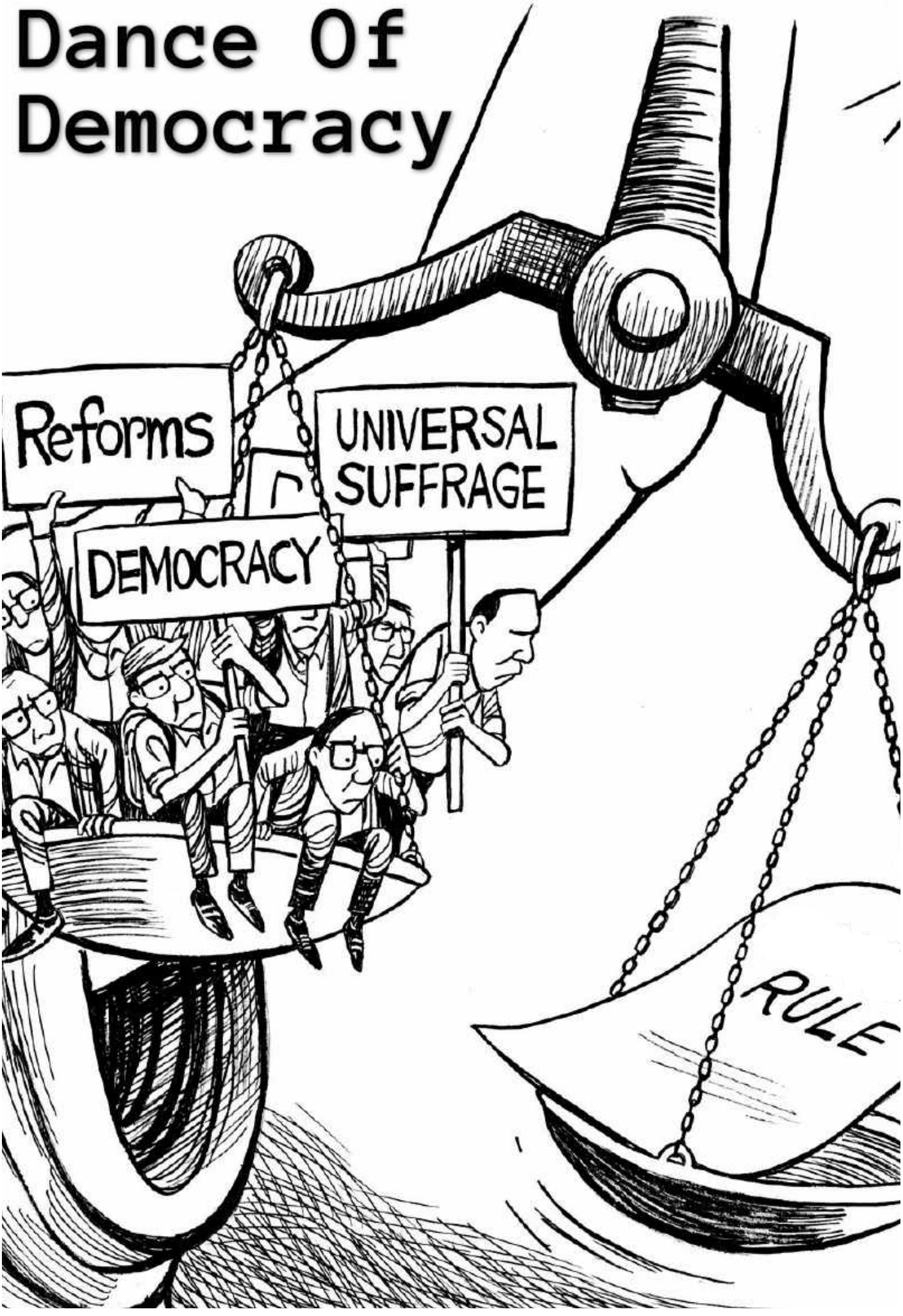


Dance as Communication

DANCE HAS ALWAYS BEEN & ALWAYS WILL BE A FORM OF COMMUNICATION, THIS IS IT'S LEGACY TO THE WORLD

Within the rich fabric of human expression, dance appears as a global language that cuts beyond political, religious, and cultural barriers. Dancing reflects the nature of democracy itself, with its expressive gestures and flowing movements—a symphony of voices coming together in harmony, everyone contributing to the collective narrative. This essay explores the complex link between democracy and dance, showing how dance can be a potent tool for social cohesiveness, political expression, and civic involvement.

Dance as a Form of Expression: At its foundation, dance is the physical manifestation of human expression, using movement to tell tales, communicate ideas and express emotions. There is a wide range of styles and traditions in dance, from the elegant ballets of classical repertory to the upbeat rhythms of hip-hop, all of which reflect the cultural ethos of their practitioners. Dance develops as a powerful medium for people and communities to express their identities, goals, and frustrations in a democratic setting that values variety of views.

Communal Building and Social Cohesion: Dancing is a vital component of communal life in many countries, promoting links of family and solidarity among participants. Dancing unites people, breaking down social boundaries and promoting a sense of belonging, whether it is through modern choreographies presented in metropolitan areas or traditional folk dances performed at festive occasions. In democratic societies, where social cohesion is essential to the smooth operation of civil society, dancing is an essential tool for fostering inclusive communities and fostering relationships.

Activism and Political Expression: Throughout history, dancing has been used as a forum for advocacy, protest, and dissent as well as political expression. Dance emerges as a potent tool for amplifying marginalized voices and challenging oppressive systems, from the American civil rights movement, where African-American dancers used their art to challenge racial segregation, to contemporary protests around the world, where dancers take to the streets to demand social justice. Dance gives people the ability to speak up, question authority, and effect change in a democratic environment that values freedom of speech.

Democracy on Stage: Dancing as a Social Mirror

Apart from its function as a vehicle for political expression, dance also mirrors society, reflecting its ideals, challenges, and goals. In order to create works that arouse emotion, prompt thinking, and start a conversation, choreographers and dancers frequently draw inspiration from current events, societal trends, and cultural issues. In this way, dance takes on the complexity, tensions, and dynamism of the human experience, becoming a microcosm of democracy itself.

In the vast fabric of human culture, democracy and dancing serve as cornerstones of originality and liberty, enhancing one another in an unending dance of invention and expression. Let us embrace the transformational potential of movement to inspire change, build solidarity, and preserve the values of justice and equality for all as we negotiate the difficulties of the modern world and acknowledge the intrinsic relationship between dance and democracy.

Sneha Mukherjee 2nd year

INDIA'S ELECTION EVOLUTION

In the wake of the recent conclusion of India's general elections, Abhimanyu Chandra (The University of Chicago) argues that the term "dance of democracy", commonly used for India's election seasons, is now an out-dated and overly romantic term. Election seasons in India today instead are escape-from-reality, public relations-driven periods of mania. This transformation in the nature of India's election seasons is a cause for concern, and may be of disservice to the voter.

We are less than one year away from the biggest dance of democracy, the Lok Sabha elections of 2024, which will bring most Indian adults to the polling booths. Given India's size and scale, anybody serious about forming the government in 2024 should not wait to get into LS election mode.

In some ways, election season never really stops in India, with frequent state assembly polls, municipal polls etc. TV debates and social media are a permanent political battleground for various parties, with 24×7 praise and criticism. But more of our public debate goes into shouting about who should be running the country, rather than how they should be running the country, rather than how they should be running it. As citizens, our ideologies may be varied, our beliefs at loggerheads with each other; but if the democratic process is followed in true spirit and practice, then we shall all have the right to vote for whomever we trust.But do remember dear readers, that this time we vote not only for the next government that will come to powerbut also for the very idea of India. It is absolutely possible that that idea of India with

its secularism, tolerance, and universal brotherhood, may not be wholly acceptable by the majority, but it sure is something worth fighting for. If you desire a change in that idea of India that has been our foundation since independence, that has been our foundation since Independence, that has formed the backbone of our thinking, then so be it. But do be well aware of what you're signing up for and the future trajectory of the nation.

~Ahana Sen 4th year

A GLIMPSE OF THE DEMOCRATIC WAVE

Democracy, is a matter of course, acceptable by most of the nations of the globe. The motive behind this stratagem is to promote equality and prioritize the decisions of most of the citizens of a particular nation.

At the forefront of this democratic spectacle, is India, home to a billion people. The Lok Sabha Election 2024, is one of the significant moments of the country's democratic history. Candidates of different political parties have started their campaigns and propagandas, each contending to articulate India's future. Now, it is to be witnessed whether the current Prime Minister, Shri Narendra Modi, is re-elected or a new leader comes to power, to re-shape the country's morals and ethics.Meanwhile, across the Pacific, the United States Presidential Elections are to be held this year. The decision residing in the hands of the US citizens, will impact global politics, because it is one of the most powerful nations of the world. Moreover, the Russian presidential election is also a major event. Russia is a strong nation. Therefore, watchers from all around the world are interested in learning about its election and the path it will take to go forward.

Aside from these countries, many more are set to use the democratic process to make their voices heard, thus 2024 ends up being one of the busiest years for democracy.

Voting rights will be exercised by citizens from Indonesia to Bangladesh, Georgia to Cambodia, Taiwan to Croatia, influencing the fates of their individual countries.The world will see, firsthand, the intricate and diverse democratic fabric, as 2024 progresses. Every event, from the boisterous campaign rallies to the solemn act of voting, serves as a reminder of democracy's ongoing ability to influence the path of history.

-Sukanya Bose,2nd year

CELEBRATING THE RHYTHM OF CIVIC PARTICIPATION

In the grand symphony of governance, democracy emerges as a vibrant dance where citizens play the lead role. Just like in a captivating performance, democracy thrives on participation, rhythm, and harmony. Let's delve into the essence of this dance of democracy, exploring its steps, melodies, and the power it bestows upon the people.

The Rhythm of Participation:
At the heart of democracy lies the pulsating rhythm of citizen participation. Every eligible individual is not just an audience member but an integral part of the performance. Through voting, activism, and engagement in public discourse, citizens contribute to the beat of democracy, shaping the direction of their society.

The Dance Floor of Diversity:
Democracy embraces diversity, offering a stage where voices from all walks of life can be heard. Just as a diverse ensemble enriches a dance performance, varied perspectives enhance the tapestry of democracy. It's on this inclusive dance floor that ideas clash, compromises are made, and progress is achieved.

Choreography of Checks and Balances:
In the dance of democracy, power is not concentrated in a single performer but distributed among institutions and individuals. Like skilled choreographers, these checks and balances ensure that no one entity dominates the stage. Through separation of powers, accountability mechanisms, and the rule of law, democracy choreographs a graceful balance of authority.

The Tempo of Transparency:
Transparency acts as the tempo of democracy, keeping the dance honest and accountable. Just as a well-lit stage reveals every movement, transparency in governance illuminates the actions of those in power. Access to information empowers citizens to scrutinize, question, and hold their leaders accountable, ensuring a dance free from shadows.

Celebrating Civic Virtuosity:
In the dance of democracy, each citizen is a virtuoso performer, wielding the instrument of civic responsibility. Whether through peaceful protests, community activism, or volunteering, individuals showcase their commitment to the common good. Their collective actions compose the melody of progress and resilience in the face of challenges.

As we celebrate the dance of democracy, let us remember that it is not a static performance but a dynamic journey. Its rhythm evolves, its steps adapt, but its essence remains unchanged – the empowerment of the people. So, let us continue to embrace our roles as active participants, choreographing a future where democracy's dance resonates with justice, equality, and freedom.

In this grand performance of governance, let democracy's dance be forever vibrant, inclusive, and resounding with the voices of the people.

-Barunangshu Bhowmik, 2nd year

RULE OF DEMOCRACY

”Democracy is not the law of the majority, but the protection of the minority.”
- Albert Camus.

The word democracy comes from the Greek word dēmokratia where "demos" means people, and "kratos" means power. It was coined in the middle of the 5th century BCE to denote the political systems then existing in some Greek city-states notably Athens. Wikipedia defines democracy as: ‘Democracy is a system of government in which state power is vested in the people or the general population of a state’.According to the United Nations, democracy "provides an environment that respects human rights and fundamental freedoms, and in which the freely expressed will of people is exercised”.

So, democracy can be thought of as "power of the people": a way of governing which depends on the will of the people. It is widely understood to mean ‘rule by the people’ and is often defined as people choosing their leaders in free and fair elections. Democracy gives citizens the right to influence important decisions over their own lives and allows them to hold their leaders accountable. Democratic countries seem better governed than autocracies and they grow faster as well.

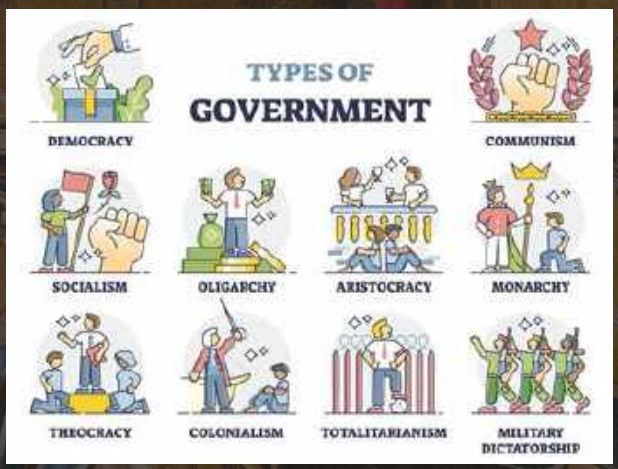
The idea of democracy derives its popular appeal through the principles of individual autonomy and equality. The ancient Greeks are credited with creating the very first democracy. The Greek model of democracy was established in the 5th century BC, in the city of Athens. Among a sea of autocracies, which was the normal form of government at the time, Athenian democracy stood out. This Athenian model had two important differences compared to what we call a democratic government in the present day :

1. It was a form of direct democracy – in other words, instead of electing representatives to govern on the people's behalf, "the people" themselves met, discussed questions of government, and then implemented policy.

2. This was possible partly because "the people" was a very limited category. Those who could participate directly, were a small part of the population, since women, slaves, aliens – and of course, children – were excluded. The numbers who participated were still far more than in a modern democracy: perhaps 50,000 males engaged directly in politics, out of a population of around 300,000 people.

Today, there are many different forms of democracy as well as democratic nations in the world. No two systems are exactly the same. There are:

1. Presidential democracies
2. Parliamentary democracies
3. Federal or unitary democracies
4. Democracies that use a proportional voting system
5. Democracies that use a majoritarian system
6. Democracies which are also monarchies and so on.



The only thing that unites all modern systems of democracy and also distinguishes them from the ancient model is the use of representatives of the people. Modern democracies use elections to select representatives who are sent by the people to govern on their behalf. In this modern model, people do not directly take part in law-making. Such a system is known as a representative

democracy. It is still a democracy even though people do not directly take part in it, at least to some degree, based on the two principles above: equality of all (one person – one vote), and the right of every individual to some degree of personal autonomy.

Over the last two centuries, the world has become much more democratic. It has played a vital role in the story of civilization transforming the world from power structures of monarchy conquest into peaceful co-existence. A direct form of democracy was initially practiced in ancient Greece which then vanished; until it re-emerged as 'representative democracy' in the late 18th century. Since then it has been generally understood that modern human history follows a trend towards greater democracy, with some scholars describing the phenomenon taking place in three waves.

The first wave, between the late 18th century and 1918, saw the American, French, and Haitian revolutions, the gradual emergence of democracy in Britain, Bolivarian revolutions establishing democracies in South America, and the break-up of German, Ottoman, and Austro-Hungarian empires after World War I into democratic republics. The second wave, between 1945 and 1960, saw the reorganization of the defeated Axis powers Germany, Italy, and Japan into strong democracies, and decolonization unfolding across the world, creating independent and largely democratic nations. The third wave, from 1975 to 1991, saw the end of dictatorships in Portugal, Spain, and Brazil, democratic transitions in Taiwan and South Korea, and the eventual collapse of the USSR, creating free, democratic, Eastern European states.

Electoral and liberal democracies then spread to many countries in the 20th century. By the end of the century, they had become a common political system that could be found across all world regions. Today, the world is about evenly split between autocracies and democracies. Most non-democracies are electoral autocracies. Now, more than a third of all democracies have the additional individual and minority rights that characterize liberal democracies.

The most popular question being asked regarding democracy now is:

'Why do we need democracy?'

Liberal democracy, theoretically, provides a mechanism of some form of rule by proportionate representation, with citizens being empowered to bring about change through participation and the powerful being persuaded to act for the greater good. However, democracy is a process and its transition period can be relatively long. Countries such as the UK and the US were not true democracies until very recently. Britain's democratic franchise was gradually extended from 1830. It was only in 1918 that women were given the right to vote. In the US, it was not until 1965 that African-Americans in the south gained a guaranteed right to vote.

Lately, non-democratic, authoritarian governments such as China have been praised for enduring the COVID-19 pandemic better than democracies, because they are better able to compel specific behaviour from citizens without concern for individual liberties, or dissent from a free press.More recent events in democracies indicate that there is a need for further renewal and evolution of democratic systems. This may question the need for democracy. Some commentators have concluded that the system is broken. Many thinkers have also argued that democracy can only be detrimental to a free and just society, thus, characterizing a rule by the majority as inherently unstable, irrational, and a threat to private property.

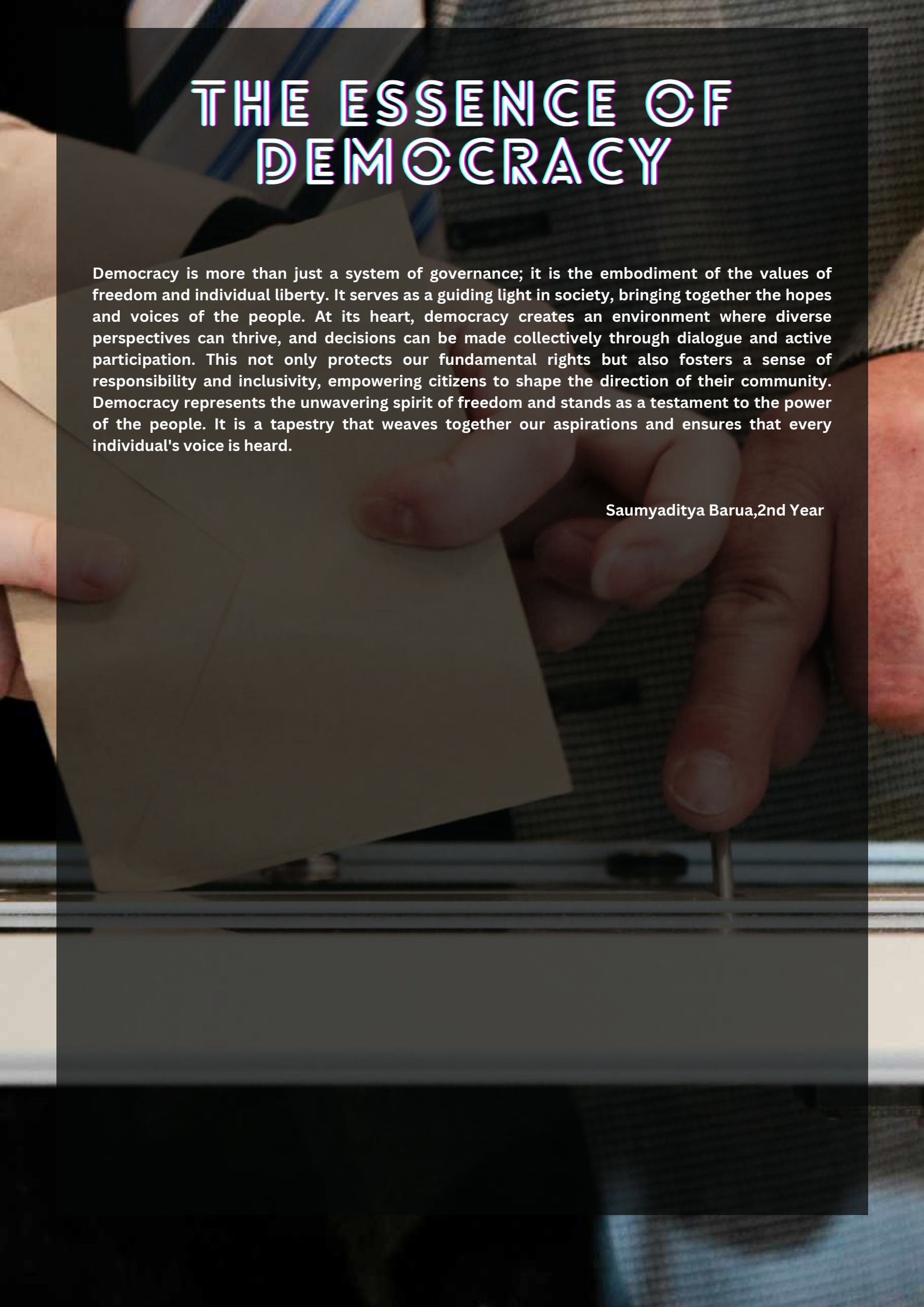
“The rich shall pay all the taxes, and the poor shall make all the laws.”
- Lord Salisbury criticising democracy in 1860.
“Democracy doesn't mean much if you are hungry or homeless, or have no health care or your children can't go to school; even if you have a vote, democracy is not effective.”
- Susan George, President of ATTAC

However, when we question its positives and seek out its flaws, we should be very aware of the fact that we live in a society that permits us to criticise, and that this is in itself a crucial right which in the current world scenario is a privilege to many. Despite this, the more averse to change democracies become, the more likely it is they will wither. Democracy has the ability to accommodate changes from below(common people) through expansion of voting rights, and greater protection of civil liberties. By contrast, authoritarianism is centralized and limiting of free thought and expression. It can accomplish rapid change, but only ordained from above(people in power).

Thinkers argue that democratic values are essential for successful development. For eg: Amartya Sen pointed out that no substantial famine has ever occurred in an independent and democratic country with a relatively free press, citing the example of India, where the last famine in 1943 took place under British colonial rule. This perception that there is a link between democracy and development has ebbed and flowed over the last century, as communism rose and fell and the economic balance of the world shifted from West to East.

A 2019 study had estimated that countries switching to democratic from authoritarian rule had on average a 20% higher GDP after 25 years than if they had remained authoritarian. The study examined 122 transitions to democracy and 71 transitions to authoritarian rule, occurring from 1960 to 2010. It was concluded that this was because democracies tended to invest more in health care and human capital, and reduce special treatment of regime allies.

-Meghna Bose (3r year)



THE ESSENCE OF DEMOCRACY

Democracy is more than just a system of governance; it is the embodiment of the values of freedom and individual liberty. It serves as a guiding light in society, bringing together the hopes and voices of the people. At its heart, democracy creates an environment where diverse perspectives can thrive, and decisions can be made collectively through dialogue and active participation. This not only protects our fundamental rights but also fosters a sense of responsibility and inclusivity, empowering citizens to shape the direction of their community. Democracy represents the unwavering spirit of freedom and stands as a testament to the power of the people. It is a tapestry that weaves together our aspirations and ensures that every individual's voice is heard.

Saumyaditya Barua,2nd Year

DANCE OF DEMOCRACY

Truly the caption would initially startle the reader, that how can a system of governance can be personified? However, though it sounds bit funny and comical, yet the whole intention is to HAIL the test system of governing a country. Democracy as we know is a term where the citizen has been given to absolute authority to choose a cabinet or council of ministers who would really look into the welfare of his/her fellow countrymen. Year 2024 in that respect bears a special significance where the biggest democracy in the world is going to have her general election. It is further more important because certain important neighbouring countries who are going to have their presidential or sPrime ministerial mandate in this year. Today India internationally stands on that victory stand where globally she has been acknowledged by the superpower of the Western world. The evaluation has changed its way as it how been during the fifties and sixties. Diplomatically today we stand at the vertices of INTERNATIONAL RELATIONS. Undoubtedly INDIA can proclaim that SHE today stands as the idol of “DANCING DEMOCRACY” who in near future would be PIONEER to HUMANITY.

-Agnik Chakraborty,2nd Year

TEACHERS' SECTION

6G Mobile Communication – Some Critical Challenges

Let us go back about 50 years. Mobile communication or communication between two stations, on the move, was an exclusive facility. Only some departments like Police or emergency services or some very rich industrialists had access to this facility. The systems and the networks were using Frequency Division Multiple Access (FDMA) scheme. Then, in a matter of a just 10 years, Global System for Mobiles (GSM) was there for public use. It was based on FDMA/Time Division Multiple Access (TDMA) scheme. The floodgate to mobile communication was literally opened.

The next few decades saw the emergence of a number of generations of standards – starting from 1G to 4G- at almost a regular interval of nearly 5 years. We also saw in-between emergence of 2.5G and 3.5G standards. The demand for more data at more speed and the birth of the new application domain- IoT- forced the communication scientists and engineers to strive for more advanced technologies. The 4G or LTE generation became very successful globally and it was followed by 5G as the next step in mobile communication standard.
The world saw the development of the Fifth-generation new radio (5G-NR)systems. It is a commercial reality now. Third generation partnership project (3GPP) Releases 16 and 17 aim to serveas key enablers for the evolution of 5G-NR, capturing the inter-working capabilities of enhanced mobilebroadband (eMBB), massivemachine-type communication (mMTC), and ultra reliable low-latency communication (uRLLC). In parallel, a leap into the future is being taken by the international telecommunications union (ITU-T) to develop a focus group called Network 2030, which studies the capabilities of networks for 2030.

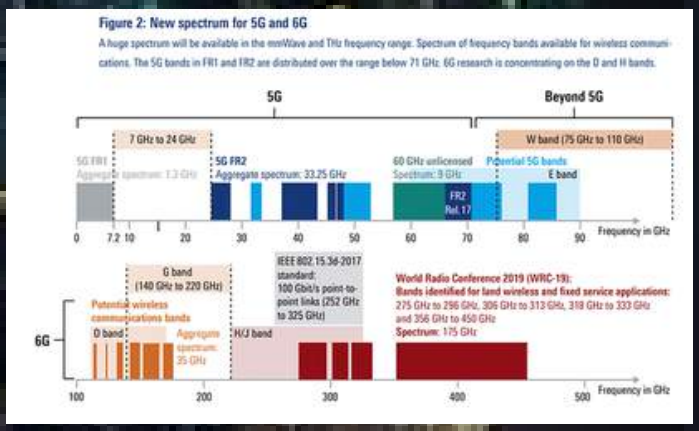
It is referred to as the sixth-generation (6G) of wireless systems. In response to lifestyle/societal changes, quite a few disruptive practices are predicted when 6G will be introduced. These include:

- A holographic society where holograms/immersive reality will form a preferred means of communications;
- Connectivity for all things at much higher rate and bandwidth than with 5G; and
- Time-sensitive communications where sensors will form the end-points of communication. In this article, I will dwell upon a couple of the challenges.

In the Table 1, I have compared some Key Performance Indicators (KPI) for 5G-NR and 6G.

KPIs	5G-NR	6G
Operating Bandwidth	Up to 400 MHz for sub-6 GHz bands	Up to 400 MHz for sub-6 GHz bands
(Spectrum Band Ranges)	(band dependent)	Up to 3.25 GHz for millimeter-wave (mmWave) bands
	Up to 3.25 GHz for mmWave bands	Indicative value: 10-100 GHz for THz bands
Carrier Bandwidth	400 MHz	≥ 400 MHz
Peak Data Rate	20 Gb/s	≥ 1 Tb/s (Holographic and immersive applications)
User Experience Rate	100 Mb/s	1 Gb/s
Connection Density	106 devices/km2 (mMTC)	107 devices/km2 (Connectivity for all things/ultra mMTC)
User Plane Latency	4 ms (eMBB) and 1 ms (uRLLC)	10 µs to 1 ms (Interactive holography, immersive, and time-sensitive applications)
Control Plane Latency	20 ms	≤ 20 ms
Mobility	500 km/h	1000 km/h Handling multiple moving platforms (terrestrial, satellites, etc.)

[Anticipated requirements of 6G systemsand a comparison of the 6G performance indicators relative to 5G systems. Note that the 5G KPIs are obtained from ITU-R M.2410(Minimum Requirements for Technical Performance of International Mobile Telecommunications-2020 Radio Interfaces) and 6G KPIs are derivedfrom ITU-R M.2410,the user experience rate is one which is obtained at the 5% point of the user throughput cumulative distribution function (CDF), CourTesy:IEEE]



Challenge #1: Bandwidth Utilization at Sub-THz Frequencies:

The expectation of going up in carrier frequencies towards the sub-THz bands brings the implicit expectation of much higher bandwidths relative to 5G. This is particularly the case if one wantsto maintain gain and phase uniformity at the RF front-end. Even 5G-NR systems operating in the mm Wave bands have a maximum carrier bandwidth of 400 MHz. Along the same line, close proximity services are now being discussed to have 1 GHz bandwidth limitation at sub-THz bands. This is remarkable since in the first

place, the adoption to such high bands has been driven by the fact that orders-of-magnitude larger bandwidths can be utilized. Yet in practice, this rarely seems to be the case.

Majority of current commercial base stations (BSs) from 24.5-29.5 GHz is made up of aggregating carriers ranging from 2 to 4, i.e., each carrier is 100 MHz wide (in case of 4 carriers). Compared to a 100 MHz carrier, the noise floor of a receiver using 1 GHz bandwidth is 10 dB higher, yielding a signal-to-noise ratio (SNR) degradation by a factor of 10.

This happens because the moment the bandwidth is enhanced, the noise present within the wider band will also increase as the noise density function is constant. Therefore, in practice, the bandwidth of a single carrier could be limited to say 100 MHz, and higher bandwidths could be obtained by aggregating component carriers providing the needed diversity in frequency. Continuing this notion, if 5 GHz of bandwidth is desired, one needs to aggregate 50 such 100 MHz carriers. A direct consequence of this is the radio transceiver (and radiating elements) need to be in calibration across the 50 carriers. This presents a formidable challenge at sub-THz frequencies, irrespective of the antenna array architectureand size, as effects of phase noise starts to become more pronounced. As such, maximum number of carriers and maximum operable bandwidth will be a compromise based on the ability to maintain RF front-end linearity, antenna integrated RF circuits and effective isotropic radiated power limits for safe operation. This will serve as a significant research challenge in time to come.

CHALLENGE #2: PUSHING THE LIMITS OF Semiconductor Technologies:

To optimize involved performance trade-offs, heterogeneity in semiconductors will be important together with three-dimensional integration and packaging having antenna "in-package" capabilities. For digital processing, existing sub- 10 nm CMOS and future technologies with logic transistors which can deliver extreme speeds at reduced supply voltages and cost are required. In analog design, a sufficiently high operating frequency, fmax is necessary, in conjunction with consistent output signal power, quality of on-chip components, noise issues and robustness to process and temperature variations. While 28 nm or below CMOS can offer fmax above 250 GHz, continuous gate-length scaling leads to deterioration of gate resistance and hence limits a further increase of fmax. The process options relevant to window W1 (additionally to bulk CMOS) includefully depleted siliconon insulator (FD-SOI)and fin field effect transistor (FinFET). Relative to bulk CMOS, FD-SOI yields higher performance, while FinFET primarily has advantages in gain, sub-threshold slope and in shrink capability to 5 nm. Simultaneously, process development with bipolar semiconductor technologies of CMOS and SiGe have seen increasing adoption for beyond 100 GHz RF design utilizing 90 nm process

lithography. This gives rise to extended temperature range, higher reliability, longer process lifetimes. More critically, SiGe bipolar technology yields a 4× higher breakdown voltagerelative to CMOS for a given fmax, whichis of high significance in circuits like power amplifiers (PAs) and voltage controlled oscillators to achieve low phase noise. To strike the right balance between cost and performance, SiGe-BiCMOS technologies may be the best trade-off. To efficiently maintain high output powers within window W1, GaAs or other type III-V devices could be considered with unique properties of high sheet charge, high electron mobility and wider bandgaps.

This is in contrast to the limited output powers on offer by silicon-based technologies. For efficient implementation, there are ongoing efforts to co- integrate GaAs and III-V devices with CMOS or BiCMOS. This co-integration can be enabled either by using monolithic processes, wherethe III-V devicesare placed next to CMOS in the same substrate or by employing heterogeneous integration to develop modules that incorporate microwave elements, as wellas antennas in-package. In practice, a multitude of factors need to be taken into account, such as re-configurability, efficiency, and cost, among others. Therefore this area also needs lots of research for 6G.

Prof. Prabir Banerjee
ECE Department

Dance of Democracy or Dancing Democracy

2024 – An The Election Year

2024 will be the most significant election year in history. In 2024, more than 60 countrieswill vote in presidential, legislative, and local elections, representing half of the world's population (four billion people). These elections will range in size from the largest in the world,the multi-day parliamentary elections in India,to the smallest presidential election in North Macedonia, as well as the world's largest single-day vote, the presidential poll in Indonesia.

The Greatest Election Year Ever Worldwide: Countries having elections in this year are highlighted in red.

Some Countries going for Election in 2024

Country	Expected Election date	Country	Expected Election date	Country	Expected Election date
India	May - June	Mexico	June 2	Ukraine	Mar. 31
European Union	June 6-9	Russian Federation	March 15-17	Venezuela	Dec.
USA	Nov. 5	United Kingdom	End 2024	Maldives	March - May
Pakistan	Feb. 8	South Africa	May - August	Romania	Nov. - Dec.
Bangladesh	Jan. 7	South Korea	Apr. 10	Cambodia	Feb. 25
Belgium	June 9	Jordan	Dec.	Portugal	Mar.10

The concept of democracy is not a very 'modern'thinking. Rather in the primitive age when people was practicing a simpler life and was in hunting and food gathering society, they used to distribute the collected food among all the members as per the need. They were fortunate not to

have the concept of 'Private Ownership'. Rather the progression to the sedentary agricultural societies which primarily depend on growing crops and rearing domesticated animals, stand in contrast to the values of Hunter-gatherer societies. In addition to guaranteeing a comfortable life with minimal labor, this new society stimulated the idea of 'private ownership'. Gradually, the individuals were tempted to obtain the possessions of others to increase their level of comfort and influence over society. This gave birth to Monarchy, followed by Feudalism and Capitalism. Thus, with the adoption of self-possessions, people shifted away from the concept of a core sense of democracy, towards individual governance and these individuals started to deprive the common people by the name of religion, caste. In the 17th century, a number of revolutions were observed, started in Europe, against Monarchy or Feudalism and the new philosophy of liberalism came in. The English philosopher John Locke is recognized as one of the most influential thinkers of the Liberalism and father of modern parliamentary democratic system (parliamentary democracy).He was the first person in history to propose that if people disapprove of their government, they should have the authority to alter it as they see fit. This notion developed the fundamental idea of parliamentary democracy that we are practicing today. However, this form of liberalism apparently gives us the power to choose our government but it remains silent about the 'private ownership' which ultimately sets the agenda for the government. I am confident that you will be able to provide multiple instances to back up the above remark.

Before we talk about some significant elections, let's take a look at the "Free and Fair Elections Index," which measures the likelihood of large irregularities, government intimidation, fraud, and vote buying are in a scale of 0 to 1(most free and fair).

Based on expert assessments by the Swedish think-tank (V-Dem) (Varietiesof Democracy)

Flamenco -Salsa – Old School –New School: Some Head Turning Elections at a Glance

Mexican Presidential Election:

Mexico is preparing to elect a female president for the first time in June 2024 -- either a scientist and former Mexico City

mayor Claudia Sheinbaum, or a former opposition senator, Xóchitl Gálvez. In Mexico, the "war on drugs" was started three presidential terms ago, and the ongoing one is the most deadly one and failed to stop the violence associated with it. It will be a test to see if the next government will stick to its militarized approach or look into less harsh alternatives.

U.S. General Election

The elephant in the room is the presidential race which is about to be a repetition of the 2020, with Joe Biden squaring off against Donald Trump. The race is gaining popularity not because it will give fodder for trivia contests, but because it can potentially disrupt American democracy and upend the world order.

UK General Election

The US contest is by far the most unpredictable of the big three vote contests in the upcoming year. In Britain, if there's no change in governing party that would be an even bigger surprise – Rishi Sunak's Conservatives appear to have an electoral death wish, and after fourteen years in the wilderness, the Labour Party is heading towards a return to power.

Russian Presidential Election:

This is going to be the first significant election since the invasion of Ukraine began in February 2022.Even though Vladimir Putin might be starting a surefire campaign for reelection, the outcome of the March presidential election— assuming the actual vote distribution is made public—may be seen as a potential barometer of the strongman's support and whether the Russian people will continue to support his seemingly endless battle.

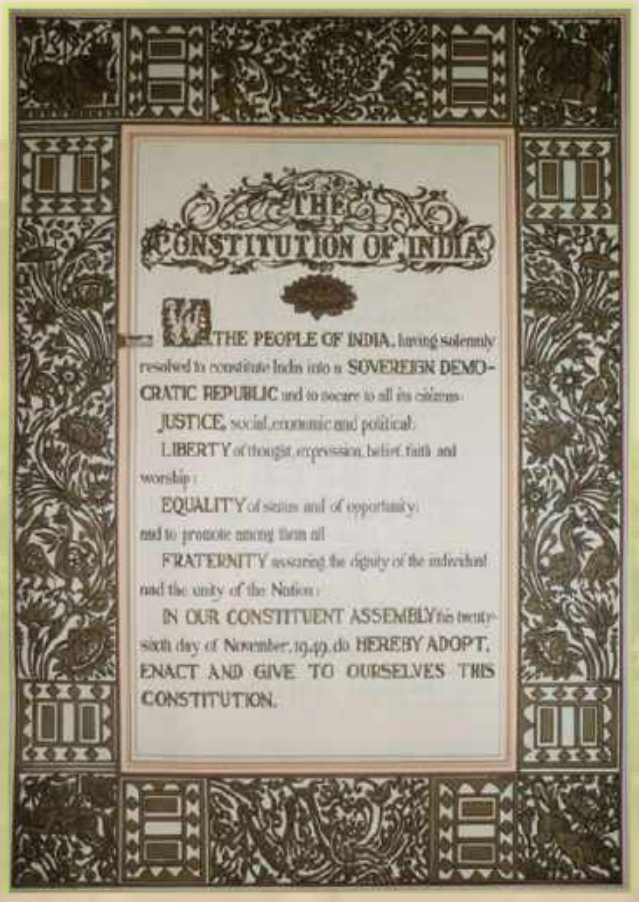
Bharatanatyam : India - the biggest democracy in the world

India is the world's largest democracy, a title it proudly bears with its vast population and diverse cultural fabric. Democracy means government of the people, by the people and for the people. One of the best examples of a country that respects democracy, appreciates pluralism, and gives its people liberty to choose their representatives is the democracy in India. The eyes of 1.4 billion Indians turn to the country's general elections, expected to be held between May–June 2024. I lack the knowledge necessary to evaluate the judgments of this nation. I would rather like to recall the preambles of the only 'Holy Book' for an Indian: the constitution which sometime get bothered by some uncivilized and barbaric peopleon earth, but isnevertheless magnificent. As noted by historian Ramachandra Guha,

unlike its European equivalents, Indian nationalism is distinct in that it is not predicated on a particular religion or language. This demonstrates how Indian nationalism is inclusive and can overcome competing social identities to establish the political citizenship that is essential to the country's overall development. Indian constitution is the longest-written constitution of any sovereign country in the world.

Once Dr. B.R. Ambedkar said,
"*Constitution is not a mere lawyers' document, it is a vehicle of Life, and its spirit is always the spirit of Age.*"

The goal of the architects of the Constitution was to create the best possible form of governance that would prioritize the needs of its people. While the Preamble does not constitute law in and of itself, it does serve as the broad ideological framework upon which the Constitution was built. It declares India to be a Sovereign, Socialist, Secular, and Democratic Republic committed to Justice, Equality and Liberty for the people. The final draft of the Constitution was completed on 26th November 1949, was signedon 24th January 1950 by 284 members of the Constituent Assembly and came into effect on 26th January 1950. We are celebrating the glorious 75th anniversary of the Republic day this year as well.


THE CONSTITUTION OF INDIA

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN DEMOCRATIC REPUBLIC and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

Key words from the Preamble:

Preamble begins with the words "We,the People of India", highlighting the theme of democracy in India.
We, the people of India: It makes a clear announcement that the people of India are the source of all authorityin the constitution. It emphasizes on the sovereignty or the ultimate power of the people. It is the people of India on whose authority the Constitution rests.
Sovereign: It means India has control over every subject and no other authority or external power has control over it. Additionally, the word

implies total political freedom. The legislature in our nation has the authority to enact laws; however there are some restrictions on their use.

Socialist: Several provisions in our Constitution make it abundantly evident that our country has a responsibility to advance social order —a state in which political, social, and economic fairnesssupersedes all othernational institutions. The term 'Socialist' was added after the 42nd Amendment, 1976, during the emergency. As articulated by Mrs. IndiraGandhi, Socialism is about 'equality of opportunity' or 'better life for the people'. The main motive of socialism is providing "a basic minimum to all".

Secular: The term means that all the religions in India get equal respect, protection and supportfrom the state.The people are free to select any religion they wish and everybody has their own unique perspective on life. The government has no power to restrict a person's ability to practice their chosen religion, belief, or idol of worship.

Democratic: The term 'Democratic' originates from the Greek words where 'demos' means 'people' and 'Kratos' means 'authority'. It implies that the Constitution of India has an established form of Constitution which gets its authority from the will of the people expressed in an election. In a democratic system of government, everyonehas the right to vote regardless of gender, caste, or religion.

Republic: The term 'Republic' is obtained from 'res publica' that means public property or commonwealth. The term indicates that the head of the state is elected by the people. The word, as specified in our Preamble, clearly indicates that the country will be ruled by the people, not by the wills and whims of those elected.

To achieve the primary goal of the Indian Constitution, the Preamble further affirms that all citizens of the country would be guaranteed 'justice', 'liberty', 'equality', and 'fraternity'.

Justice: The term 'Justice' includes three parts that complete the definition: social, economic, and political.

Social justice indicates that the Constitution aims to build a society free of discrimination based on caste, creed, gender, religion etc. Government should ensure that all people must have the same social standing, by helping the less privileged people.

In order to establish economic justice, people cannot be treated unfairly because of their financial situation, income,or wealth.

Political justice is the idea that everyone has the same, unrestricted, equal freedom to engage in politics without facing intolerance.

Liberty: The word "liberty" refers to the ability of individuals to freely select their lifestyle, political beliefs, and social conduct. Liberty ensures freedom or liberty of thought, expression, belief, faith, and worship. It does not mean freedom to do anything; it means acting responsibly and within the bounds of the law.

Equality: The word "equality" refersto the idea that everyoneis treated equally and that no group in societyis given preferential treatment. In the eyes of the law, everyone is equal.

Fraternity: The term fraternity refers to the retention of the nation's unity and integrity, as well as promise to protect the dignity of all individuals.

The Dancing Democracy:

Our achievements:

India has achieved numerous milestones throughout its more than 75-year independence. This success story is not only about some individuals, it is of every Indian. The unity in diversity, integrity, and strong bonding among the people, nurtured in Indian citizens through the concept of the constitution, are key contributors to the nation's success. Let us appreciate a few fresh recollections.

gets its authority from the will of the people expressed in an election. In a democratic system of government, everyone has the right to vote regardless of gender, caste, or religion.

First Country to Reach Moon's South Pole

In 2023, India's Chandrayaan-3 spacecraft helped the country achieve the significant landmark of being the first nation to reach the Moon's South Pole.

Space Diplomacy: India has continuously shown that it is dedicated to diplomatic and cooperative peaceful space exploration. One of the most notable partnerships in space history was the successful launch of 104 satellites in a single mission, underlining India's standing as a trustworthy associate in the international space community.

Fastest 5G Rollout

India also had the fastest 5G rollout in the world. Figures released by the Government of India show that one new site was installed across every minute.

World's Fastest Growing Economy

India surpassed the UK to take fifth place and emerge as the major economy with the fastest rate of growth internationally. The opening quarter of the financial year 2023 saw

a staggering 7.8 per cent growth in India's real GDP, reaching an estimated INR 40.37 trillion (USD 484.94 billion). After becoming a trillion-dollar economy, India is now focusing on a sustainable future, with a particular emphasis on technology and renewable energy.

Topped Digital Payments
According to MyGovIndia data, the country ranked first in digital payments last year, with 89.5 million transactions.

Green Energy Initiatives:
India has committed to reducing its carbon footprint by investing extensively in renewable energy. Its solar and wind energy projects have not only expanded access to renewable energy, but have also established global sustainability standards.

The other side of the Coin: Areas which require further attention
The foundation concept of the constitution, combining liberalism and social justice in the form of social liberalism, is gradually being defeated, as we have already diverged significantly from it. The words 'justice', 'liberty', and 'equality' in the preamble are gradually losing their meaning and have become ritualistic words during times of celebration, such as Constitution Day.

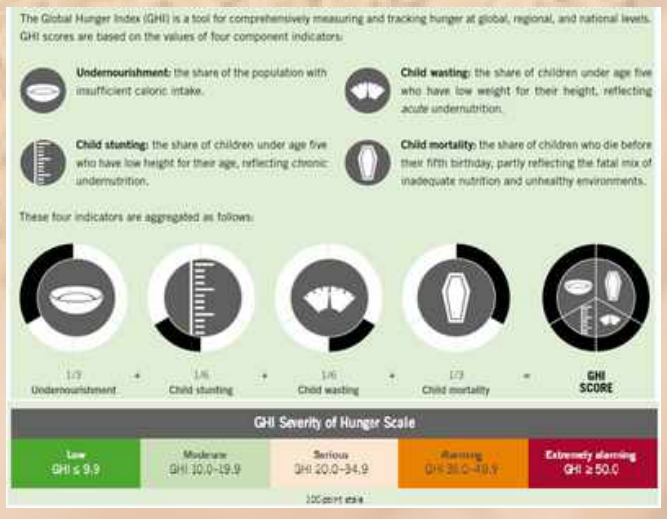
Injustice & Intolerance towards rational/ liberal thoughts
The government is also accountable for preserving the principles and ideals of the constitution. The killings of journalist Gauri Lankesh, writer M.M. Kalburgi, activist Govind Pansare, and rationalist Narendra Dabholkar, and no exemplary action against the murderers, however, contradict the belief that we are functioning by the guidelines of our constitution. .

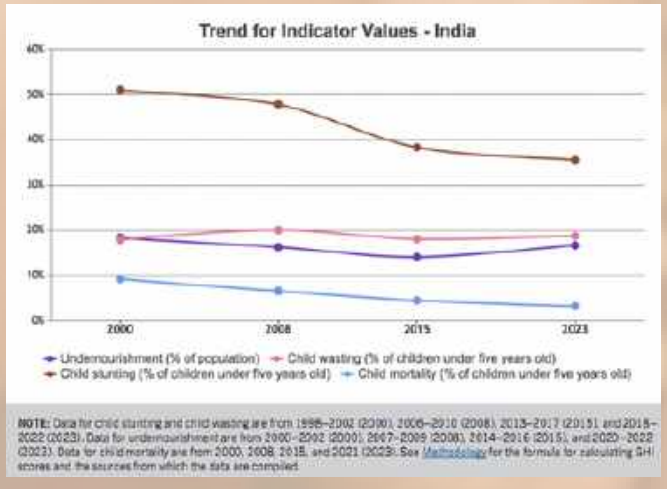
Narendra Dabholkar of Maharashtra and MM Kalburgi from Karnataka were both rationalists while Govind Pansare, who lived in Kolhapur, was a vocal critic of the superstitions in Hindutva agenda. Similar to Lankesh, they infuriated a lot of people with their outspoken opinions before being silenced by assassins' bullets. The ideology responsible for the assassination of Mahatma Gandhi was behind the killing of personalities such as journalist Gauri Lankesh, scholar M M Kalburgi, and activists Narendra Dabholkar and Govind Pansare, as

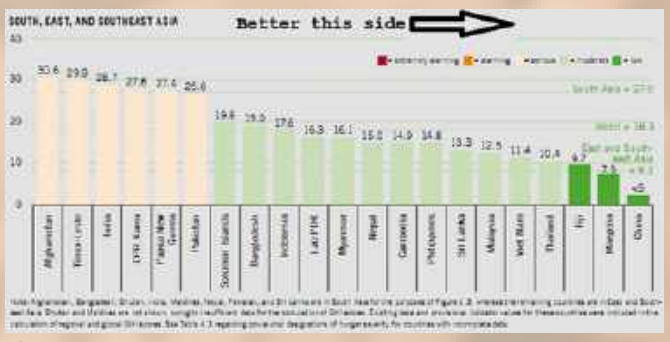
Inequality:

Global Hunger Index 2023: India

With a score of 28.7, India ranks 111th out of 125 nations in the Global Hunger Index (GHI) 2023, indicating a 'serious' level of hunger in the country. Compared to India, neighboring nations like Bangladesh (81st), Nepal (69th), Sri Lanka (60th), and Pakistan (102nd) performed better. India was at the 55th position in 2014 out of 76 countries and 100th position among 119 countries in 2017. The high rate of malnutrition among women, children, and other vulnerable populations is a contributing factor to our country's falling GHI ranking.







Courtesy:
https://www.globalhungerindex.org/pdf/en/2023.pdf

The most unfortunate part is, as reported by 'Sunday Guardian' in 2022, that the Ministry of Consumer Affairs, Food and Public Distribution has revealed that more than 25,000 Metric Tonnes (MT) of food grains were wasted in the last five years. The data also reveals that every year, more than 1500 MT of food grains gets wasted in the godowns of the Ministry of Consumer Affairs, Food and Public Distribution due to lack of storage facilities and unscientific methods of storing food grains, but 16.6% of the population remains undernourished.

Disparity of income & wealth

The 2024 Asia-Pacific Human Development Report, presents a sophisticated picture of long-term progress but with significant income and wealth inequality. This is one of the most unequal income distributions, with the top 1 % receiving 22 % of the national income and the top 10 % receiving 57 %. There are similar gaps in wealth: the top 10 % of the

population controls 65 % of the nation's total wealth. A study (oxfam-inequality-report-2023) in 2023 showed that the richest one per cent in India now own more than 40 per cent of the country's total wealth, while the bottom half of the population together share just 3 per cent of wealth(https://frontline.thehindu.com) According to Thomas Piketty and Lucas Chancel, in their research paper titled 'Indian income inequality, 1922-2014: From British Raj to Billionaire Raj?', the period after the 1980s, since India began implementing a neoliberal political economy (officially in 1991), the income share of the bottom 50% has significantly decreased, while that of the top 1% has soared.

How to Dance in this Democracy: Our Expectation

We cannot afford further weakening of constitutional values. Dilution of these fundamental values will harm the idea of India that evolved from a complex mix of cultures, religions, regions etc, with social justice, secularism, liberty and equality as its core principles. Government should improve the access to public services like health and education for the common people. Increment in job opportunities, as well as minimum wages and the concept of a universal basic income, all aim to offer a minimal level of social security to those in most dire situations. The aim of democracy will be defeated unless and until the government seizes control of the nation's financial assets from private to public ownership. It is not building any castle in the air. The top 1% received approximately 21% of total income in the 1930s, decreased to 6% in the 1980s due to the nationalization of important industries including banking, insurance, and coal mining, and returned to 22% by 2014, reaching the highest level. We should not limit ourselves by criticizing the system only. Democratic citizens should recognize that they're endowed with not just rights, but also responsibilities. In free societies, there is a phrase that goes, "You get the government you deserve." To thrive, democracies require more than just an occasional vote from their citizens. We, the citizens, do require paying consistent attention, time, and dedication to preserve our rights and freedoms. In any situation in life, we always have two choices, stated in one statement - "Vaag loo", interpretation of which is entirely up to us.

Bored with the above stuff ????

Follow the video link: https://www.youtube.com/watch?v=c4KtXbgPeOI

Acknowledgement:
I'm extremely grateful to Prof. Santanu Banerjee, Associate Professor, Department of History, St. Paul's Cathedral Mission College and Prof. Sandipan Ganguly, Assistant Professor, MCA Department, Heritage Institute of Technology for their constant support & suggestions and our very own Prof. Sayantani Datta for constant encouragement.

Online Information Sources:
I have only gathered the information from the sources listed below. I must admit that my contributions to this paper are minimal.

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Prof. Shounak Dasgupta

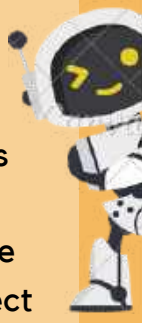
TECHNOLOGY FOR MANKIND

Man versus machine or man with the machines? A big and significant question that we never ask. This question remains from the dawn of human civilization, and is becoming more significant with the advent of Artificial intelligence (AI), as a few people think that AI can be a great threat to mankind. Lots of debates on this topic have surfaced with some happenings examples; a robot broke finger of its human chess partner at the moment it found to lose the game by the next move of its partner. Many professions like coding, delivery, teaching, doctoring, film editing etc., can be taken over by the AI machines. Even fine arts, like acting, painting, singing seem not challenging for such advanced machines with increasing accuracy in future. Do we stop developing AI, then? Many labours and engineers well equipped with steam engineering systems became jobless during the transition into electrical engineering systems that opened new job opportunities, but developments never stopped, a valid argument, indeed. A similar argument holds when computers were generating jobs for a new class of people abandoning a wide class of people who could not survive that technological transition. What about now! Should we stand for development or against it? The answer lies in the question itself; "Man versus machine or man with the machines?"

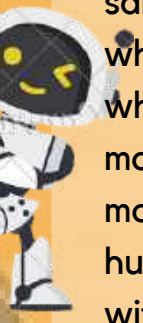
What is a machine? Probably, the shortest and simplest answer was given by **Rancho in the movie "3 Idiots"**; "Anything that reduces our labour in doing works is a machine." Therefore, machines are invented to help us. But who are this **"us"**? Are they the inventors inventing the machines, the workers making use of it or that few people who are owning the machines? Hands may be raised for the second categories.

But a worker can use it only if he/she gets employed by the owner. Such a relation between the owner (employer) and the employees is called a production relation. We see it as a "JOB" and "SALARY". An employer employs employees to do some work to generate surplus, called a profit, which is simply the selling cost less the production cost. The production cost includes the cost of raw materials, establishments and salaries for the employees. In a competitive market, the owner, who can not increase the selling price abruptly,

has only option in making more profit in quarter to quarter or round the year is by hiring under paid workers, increasing duty hours without overtime, laying off and even salary deductions, because the costs of raw materials and establishments are not largely negotiable. You may have noticed that discount in labour charges are generally offered during purchasing gold ornaments, servicing your cars etc. However, the essence of the discussion is that machines are invented by some workers for the use of other workers but to help the owners in gaining profits. Clearly, these owners are creating job markets and also controlling the equity and currency markets. Therefore, the ideal expectations of such owners are highly efficient workers without demands like salary, gratuity, leave, promotions etc., where the AI fits exactly well. That's why the phrase "man versus machine "is more popular than the "man with the machine", because more profit demands human replacements. The phrase "man with the machine" would be significant if a state creates jobs 'for the people, by the people and of the people'. Therefore, controlling everything by private owners is a disaster, while controlling by a state may not be favourable at the present socio-economic environment. Targeting the overall development of the state collaboration between private and public (government) would be the most suitable way out, where jobs, leaves, gratuity, provident fund would be secured for the employees of that state, whilst sustainable profits could be ensured for the company. All the advanced tools like AI would also serve for the state and would reduce the workload of human workers enriching the state in further dimensions like ethics, culture and brotherhood in addition to the economical growth. An overall socio-economic growth would have been ensured as all the technologies would be for mankind. Otherwise, a higher GDP may be portrayed but the general people will suffer from inflation resulting in increasing market price of essential goods like food, petrol, gas, edible oil etc. Therefore, seeking for a good governance we should always stand together to protect our rights imposed by our constitution, that says:



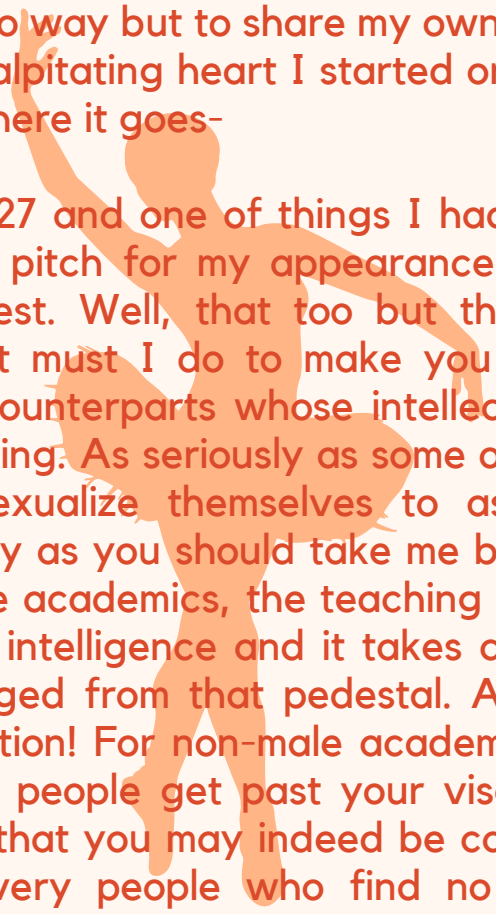
"WE, THE PEOPLE OF INDIA having solemnly resolved to constitute India into a **SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC** and to secure to all its citizens: **JUSTICE**, social, economic and political; **LIBERTY** of thought, expression, belief, faith, and worship; **EQUALITY** of status and of opportunity; and to promote among them all **FRATERNITY** assuring the dignity of the individual and the unity and integrity of the Nation; IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, **do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION."**



Dr. Susovan Mandal

DRESS CODE

It was 8 th of March and the entire college was all set to celebrate The International Women's Day. All female teachers and staff were decked up in saree and oozing brilliance from every pore. There were greetings of the day pouring in from all counters. After all it was just a single day out of the 365 that could easily be spared to celebrate womanhood. I gathered in the auditorium like many others to take part in the celebration that had agenda like song, dance performances and speech from eminent personalities. The role of compering was assigned on me and I raised the curtain with my own thoughts and being a novice in public speaking I had no way but to share my own experiences in front of the audience. With a palpitating heart I started orating on my journey as a 'female' teacher and here it goes-



"I started teaching at 27 and one of things I had the most trouble with was locating the right pitch for my appearance. Not appearance as - how can I look my best. Well, that too but that is for another day. Appearance as - what must I do to make you take me seriously. As seriously as my male counterparts whose intellect is never tied to their physical form and clothing. As seriously as some of my female colleagues who are told to desexualize themselves to assert their ability and intelligence. As seriously as you should take me because I take my work very seriously. For male academics, the teaching experience begins with an assumption of their intelligence and it takes considerable failures on their part to be dislodged from that pedestal. And their clothes rarely make it to their evaluation! For non-male academics, the scale starts at zero till at some point, people get past your visage, temperament and wardrobe to conclude that you may indeed be capable. The faith has to be earned from the very people who find no difficulty in ascribing brilliance to the men simply by virtue of their staid class presence. For the longest time, this uncomfortable chip on my shoulder would weigh heavy. In all that I would wear, I would look for a hint of earnest and sincere so that no part of me could be undermined because of what one chose to see (and not to see in equal measure). It has taken time, fantastic friends, avowed faith in my feminist politics and an intrepid foray into 30s to decide that I no longer care. I will wear what I will and no part of my appearance can possibly have any bearing on the perception of my intellect and rigor.

They have never been mutually exclusive and if you had thought so then you probably missed an opportunity to learn from me and here is why it is important - in addition to my unfettered right to sartorial experiments, I am also pretty good at what I do!! So, if you missed the boat because the male teacher "looked more serious" then you are welcome to come back and learn again".

-Prof Amrita Banerjee

Future of Artificial Intelligence

In this era of Artificial Intelligence, it seems that Artificial intelligence (AI) is dominating in every aspect of life starting from agriculture to education, healthcare to e-commerce, transportation to banking, manufacturing, designing and many more. Technologies like voice recognition, facial recognition, deep learning accelerate the socialization of artificially intelligent machine that show personal characters. Chatbot, assistances are such developed with the help of learning algorithms that they can answer every query and reply to the conversation with their own intelligence. The intelligence is not limited only to comprehension, analyse and response accordingly, the level has been rise up to such extent that now a machine can synthesis by its own. Chat GPT using generative AI is an example of it. It can create new content like new images, videos, essay all using deep learning and pattern recognition technologies. Research level is such extended that a machine even can read one's personality in other way it can read opposites' mindset and then can act accordingly through analysis. Through generation by generation development, a machine has achieved almost all the cognition level of a human brain. Now as we know the highest cognition level of human brain is thinking and making decision judging the fact what is wrong or right. It is not far, when a machine can achieve this level with the learning data of good or bad, right or wrong. But It will be interesting to see the extreme cases when a machine has to take decision against the flow though it is listed in wrong for human welfare. That much thinking power can a machine achieve? That is the future research of the coming years. Knowing the facts (knowledge), in a new situation (application), does it has the capability to comprehend and analyze to figure out its own new solution (synthesis) and does it has the capability of judging and choosing the best (evaluation)? This level is to be reach in near future.

Though we can make a machine such intelligent that it can reach all the cognition level of human brain, but the question is that "can a robot have a heart full of love and affection?" Can they have the feeling as a human being feels? May be through research we will be able to achieve this in future...

- Prof Prativa Agarwalla

PARTHASARATHI DAS


SPARK
AND
SPECTRUM

TECHNOLOGICAL INVENTIONS THAT HAVE CHANGED THE WORLD

Technological advancements have profoundly transformed the world, impacting our way of life, work, and interactions. The internet has connected billions of people globally, while smartphones have further accelerated connectivity. Innovations in healthcare, renewable energy, artificial intelligence, and transportation have saved lives, mitigated environmental damage, and enhanced decision-making processes. These transformative innovations continue to drive progress and foster innovation across all aspects of society, shaping human life from ancient expeditions to the current era of technology.

Let us take a quick look at the innovations that have transformed human life, starting from the invention of wheels during the expedition, to the current era of the internet, smartphones and AI.

The steam engine:

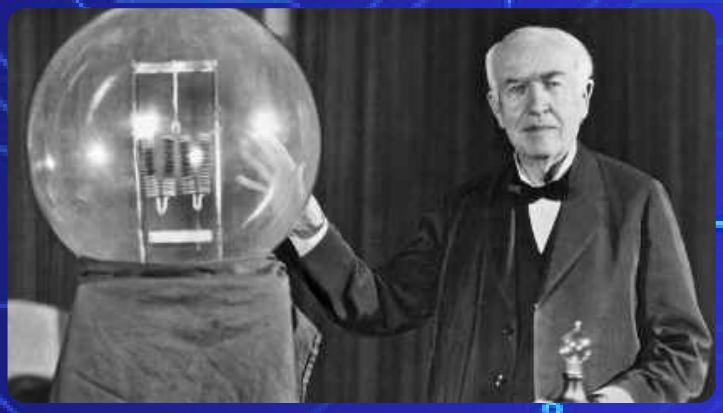
The steam engine invented by the Scottish engineer James Watt (in 1775) revolutionised transport and machinery in the 19th century and drove the First Industrial Revolution, rapidly moving from an economy based on agriculture and trade to an industrialised one with much greater production capacity.

This technological invention gave rise to locomotives, steamships and even the first automobiles. And the way was paved for the emergence of various types of combustion engines and aircraft. The effect on employment was immediate, and the middle classes and urban centres were born.

The light bulb:

Before Thomas Edison many others tried incandescent lamps or bulbs. He is considered the inventor (in 1880), but it was not exactly so, but he improved on the innovations of others in electric lighting, such as Humphry Davy, Matthew Evans, Warren de la Rue or Joseph Wilson Swan (with the latter Edison disputed the title of inventor).

It is considered the greatest invention since the discovery of fire: light entered homes and workplaces, becoming a necessity and an engine for economic growth (working hours were extended, electricity generating plants and household appliances were developed, among other advances).



The telephone:

The Scotsman Alexander Graham Bell worked as a speech and hearing expert (his mother and wife were both deaf) and, seeking to improve the telegraph, researched voice transmission until, in 1876, he patented the telephone. This device revolutionised communication by allowing instant speech even over long distances. In its early days, to establish a call, a person had to manually connect the wires, and this continued until the creation of the telephone network.

It is one of the most significant advances of the Second Industrial Revolution, to the extent that it marks the beginning of modern society. Without it, the world would not exist as we know it today: it laid the foundations for mobile telephony.

The aeroplane:

In 1903, the Wright brothers created the first human-piloted motorised aeroplane, the Wright Flyer. The flight lasted only 12 seconds, but with this experiment, which defied gravity, they laid the foundations of aeronautical engineering. Their designs inspired others to develop commercial aviation. In 1927, Charles Lindbergh became a hero for his non-stop crossing of the Atlantic.

This technological ingenuity boosted trade, culture, tourism and, today, the air transport industry is key to global economic prosperity.

Internet:

As with most technological inventions that have changed the world, the birth of the network of networks would not be understood without earlier experiments and technologies. The connection of four university computers to ARPAnet in 1969 was the seed for the birth of the Internet. In the late 1970s, Vinton Cerf developed the “transmission control protocol” or TCP for sending files between computers. This breakthrough was key to Tim Berners-Lee’s introduction of the World Wide Web in 1991, transforming society.

It continues to evolve today, bringing new forms of interaction and economic, social and cultural growth. The launch of Telefónica’s Infovía service in 1995 popularised the Internet in Spain and introduced it into Spanish homes.

The mobile phone:

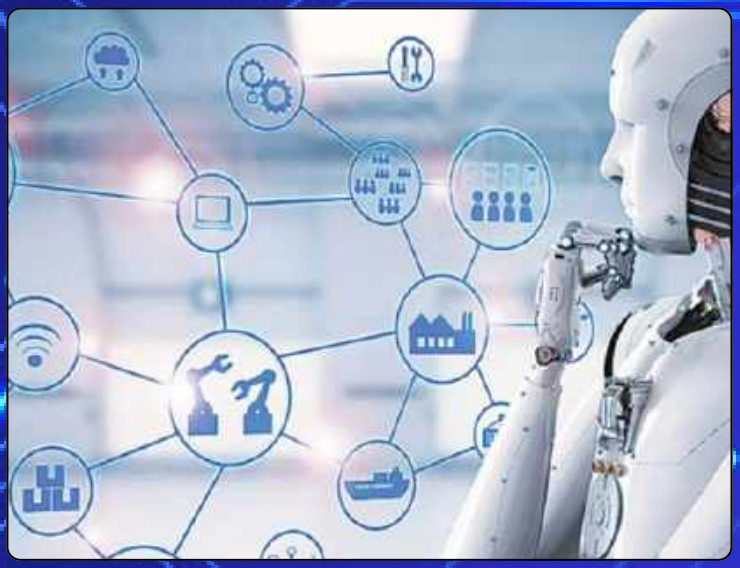
In 1983, the first mobile phone small enough to be portable was launched: Motorola DynaTac 8000X, designed by engineer Martin Cooper, with a 30-minute battery life.

The first generation of mobile phones was only for talking, but as it evolved, the terminals provided new functions, such as sending SMS or email, paving the way for smartphones capable of browsing the internet, capturing photos, listening to music, guiding via GPS or updating social networks, among many other functions.

Today it is one of the essential technological inventions in personal and professional life.

Artificial intelligence:

The precursor of modern computing, Alan Turing, is also the father of artificial intelligence. However, the term was not coined until 1956, when the first artificial intelligence programme, Logic Theorist, was presented at a historic conference.



Today, this technological invention has crept into our lives in the form of chatbots, voice assistants, autonomous vehicles, real-time translators, artificial vision, ChatGPT, the Internet of Things.

Machines capable of reasoning will further transform the world of the future with applications and uses that we cannot even imagine today. Generative artificial intelligence is becoming increasingly important.

Technological breakthroughs define our society's progress, revolutionizing every aspect of human life. From the printing press to the internet, these advancements surpass boundaries and bridge gaps. Inventions like electricity, the telephone, and the smartphone shape history, reminding us of our potential for innovation and a brighter future. With artificial intelligence, renewable energy, and space exploration on the horizon, these achievements inspire optimism for endless possibilities.

Aishik Paul
(ECE A 2nd)

GUIDED WAVE RADAR(GWR) TECHNOLOGY

GWR is based on the Time Domain Reflectometry (TDR) principle.

Guided wave radar is among the leading technologies for measuring the level of bulk liquids, solids and slurries. Lower-dielectric materials, such as molten sulphur, or other fluidized solids, are often stored in tanks for commercial use.

In general, such products are extremely harmful to humans, and tricky to measure with any degree of accuracy. When an individual needs to take an accurate measure of harsh materials stored in such tanks, she or he may use guided wave radar.

Radar works by measuring transmitted signals; the process involves sending microwave pulses through a liquid, solid or slurry. Naturally, the pulses reach the bottom of the vessel in which the liquid, solid or slurry is being stored eventually. As a pulse travels through a product, it undergoes a change (the nature of the change a pulse undergoes depends upon the product's dielectric). A fraction of the pulse is then reflected back to a receiver, which is able to measure the exact amount of time which has elapsed between the signal's departure and its return.

Radar technology is also known as time domain reflectometry. When it comes to guided wave radar, the radar beam is controlled by a "waveguide" or probe, which has been specially designed, and has to be inserted into the product. This device prevents the dispersion of the radar signal, offering a greater degree of accuracy.

Microwave sensors are especially useful in unusually vaporous, dusty or moist environments, since they are capable of penetrating temperature and haze layers that may cause issues for other technologies, such as ultrasonic devices. As microwave sensors do not require physical contact in order to measure the product, they can be mounted at a safe distance. In addition to this, guided wave radar can be used to measure products in narrow, low or other difficult to reach spaces.

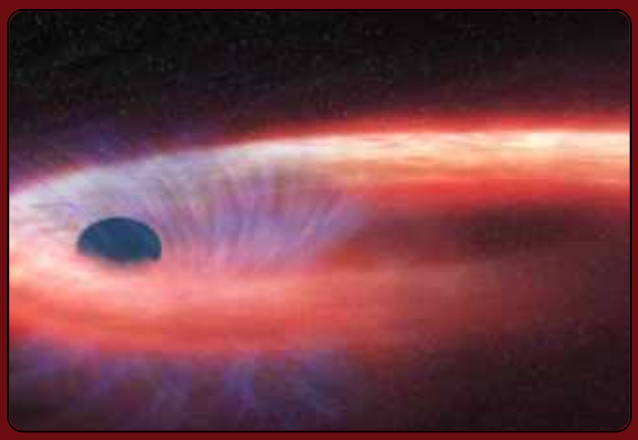
The major disadvantage of guided wave radar technology is its relative costliness. It can also prove rather complex to set up. However, the price of guided wave radar technology has dropped a great deal over recent years, and such technologies are also becoming more user friendly as more and more companies seek user-friendly precision measuring devices.

Limitations: While guided wave radar works in many conditions, some precautions need to be taken with respect to probe choice. Several probe styles are available and the application, length, and mounting restrictions influence their choice. Unless a coax-style probe is used, probes should not be in direct contact with a metallic object, as that will impact the signal.

Nabakumar Pal
(ECE A 2nd)

SEVERAL AMAZING FACTS ABOUT BLACK HOLE

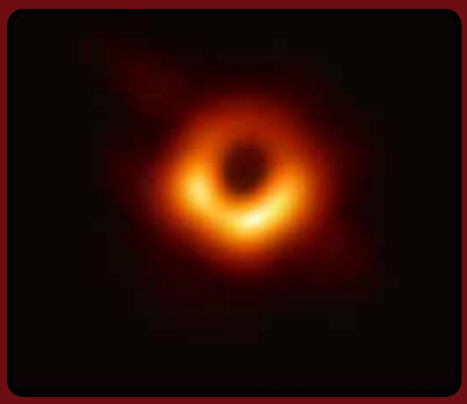
1.Our sense of sight relies heavily on either seeing the light emitted or reflected from the surface of objects, a black hole does not let that happen as it has such a strong gravitational pull that nothing can escape it not even light.



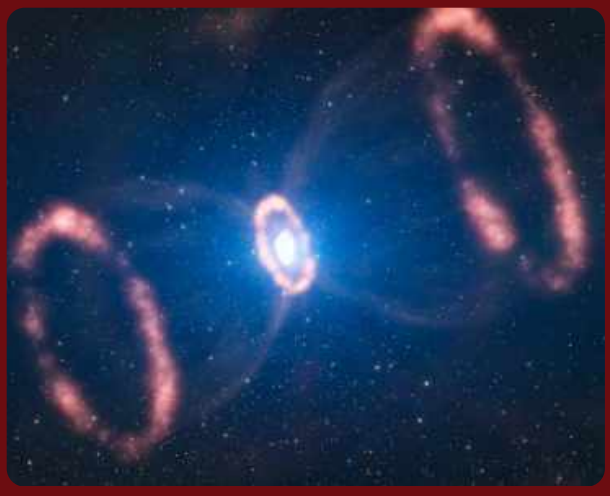
2.Once a person enters a black hole, after passing the event horizon the process of “spaghettification” takes place in which the tidal effect caused by the strong gravitational field stretches the person’s toes towards the black hole and also compress his body perpendicularly.

3.The spaghettification process gets faster, the smaller the black hole.

4. Nearing the end moments of a star, it is unable to balance out the forces of its own gravity as its energy content gets unstable. Thereby it will cause a giant explosion called ‘Supernova’, creating a black hole.



5. The black holes are measured in Solar Masses where it is equal to 2x10^30 kg, and that is just a bare minimum of the heavenly bodies like the Sun.



6. According to a 2018 study, black holes can contribute to both annihilating as well as creating new stars and galaxies with the help of fragments escaping from a black hole, they determine how many stars and galaxies can be formed.

7. The biggest black hole discovered yet is ‘Phoenix-A’ which is 5.8 billion light years away.

8. In the upcoming few hundred thousand years later, the outer space will majorly be dominated by black holes as the universe will keep expanding and all the stars will move far away from each other, thereby reducing the temperature to absolute zero.

Trishit Kundu
(ECE A 2nd)

GREATEST HACKS FROM HISTORY

We all have heard of computer viruses, and all have made fun of our grandmother for being scared of getting infected. In this article we will discuss two of history's most famous cyber-attacks. Before starting I would like to explain why we all need to know about these attacks. The more you understand a crime the better you will be at avoiding it, an idea of past attacks will give you the foresight that 'PYQ' gives before an exam, as a cyber-security professional.

LOVELETTER ATTACK:

Commonly known as Lovebug or ILOVEYOU was a computer worm that infected over ten million personal computers on and after May 5, 2000. It started spreading as an email message with the subject line "ILOVEYOU" and the attachment "LOVE-LETTER-FOR-YOU.TXT.vbs".

The computer was infected as soon as someone clicked on the email to open it. You can just imagine how effective it was on software developers.

Here the attackers used the human element to exploit their target. This is commonly known as social engineering. This attack was one of the first examples of social engineering. Coming back to the attack. First, the worm inflicts damage on the local machine, overwriting random files (including Office files and image files however it hides MP3 files instead of deleting them) then it copies itself to all addresses in the Windows Address Book allowing it to spread rapidly.

Onel de Guzman, a then-24-year-old resident of Manila, Philippines, created the malware. Because there were no laws in the Philippines against making malware at the time of its creation

MORRIS WORM:

Think of the Morris worm as the grandfather of every single worm out there. At the time of the attack, in 1998 there were fewer than 100,000 connected machines, and most organizations that were online seemed to trust one another. According to Morris he wanted to make a program that estimate the size of the internet. His vision was a code that would install in every computer and thus count how many computers are connected in a system.

The Morris worm was made to:

Query: The worm asked each computer it encountered if it already had a copy of the code.

Respond to "No.": If the computer wasn't infected, the code would execute

.

Respond to "Yes.": If the computer was infected, the worm wouldn't copy

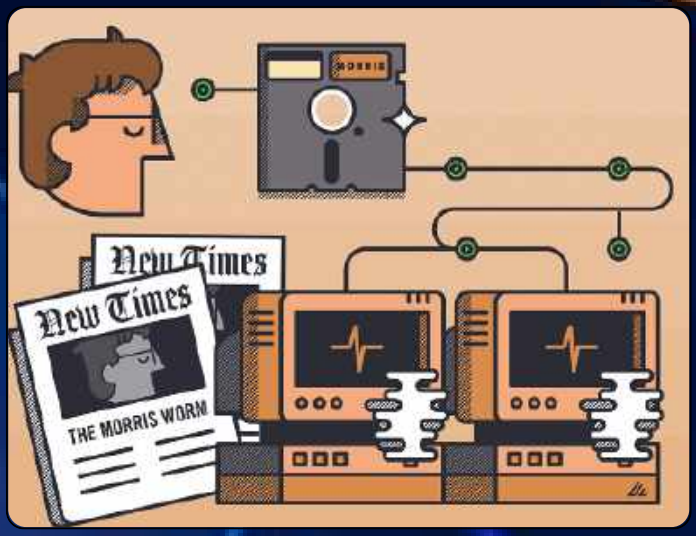
.

The code seemed innocent, but Morris didn't want clever programmers to work around him and prompt all of their computers to respond "Yes" to every copy.

After seven "Yes" responses, the code duplicated anyway.

This flaw devastated computers. Many had several versions of the code running at the same time, and performance slowed to an absolute crawl. Some systems crashed altogether. Almost 6,000 computers were affected by this virus.

The outcry was swift and severe, and Morris was the first person convicted under the Computer Fraud and Abuse Act. He was sentenced to probation lasting three years and a fine.

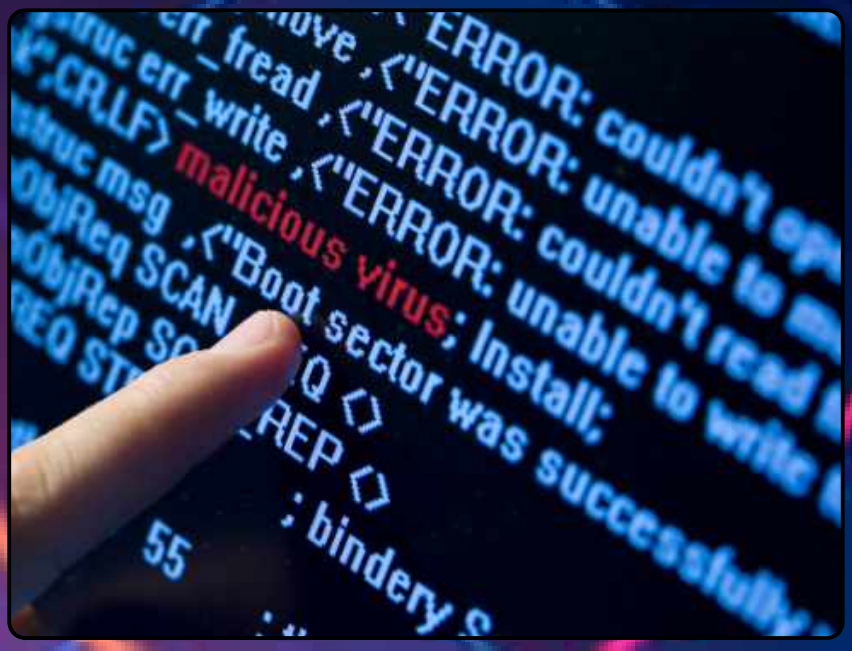


OCTOMOM vs MOD:

Last one I would like to share is a story where a website was hacked by a group of vigilante moms calling themselves Mothers of Disappointment (MOD), we all would be in trouble if this organisation was still recruiting.

Nadya Suleman came to international attention when she gave birth to octuplets in January 2009. She was given the nickname “Octomom”, she opened a website to solicitate donations to help her raise her children. This site was immediately hacked by the vigilante group (They would have done great work in Gotham).

Nadya’s website had pictures off all eight octuplets and their toys. The main feature of the website was the big donation button and the thank you note from Sulemans. The website also had her address so that people could send her items like diapers. The site was hacked within hours and the site was left defaced. This mysterious group had a history of attacking personal sites they disapproved of.

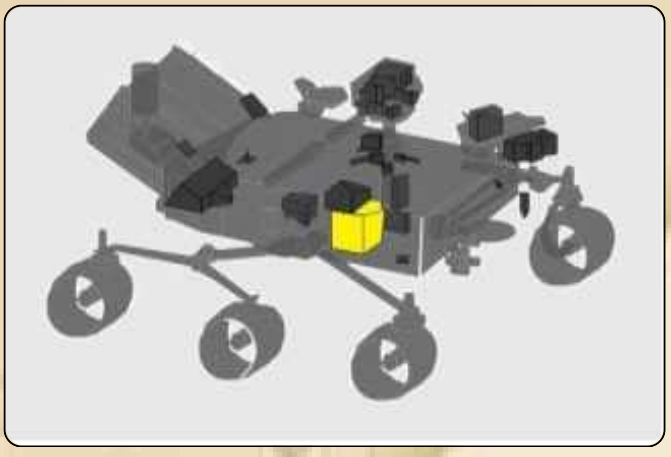


Sagnik Dutta
(ECE B 1st)

MOXIE
(MARS OXYGEN IN-SITU RESOURCE UTILISATION EXPERIMENT)

The Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE) was a technology demonstration on the NASA Mars 2020 rover Perseverance investigating the production of oxygen on Mars.

MOXIE stands for the Mars Oxygen ISRU Experiment. ISRU is another acronym, In Situ Resource Utilization, which is a technical way of describing what most of us call “living off the land”. The technology may be scaled up for use in a human mission to the planet to provide breathable oxygen, oxidizer, and propellant; water may also be produced by combining the produced oxygen with hydrogen



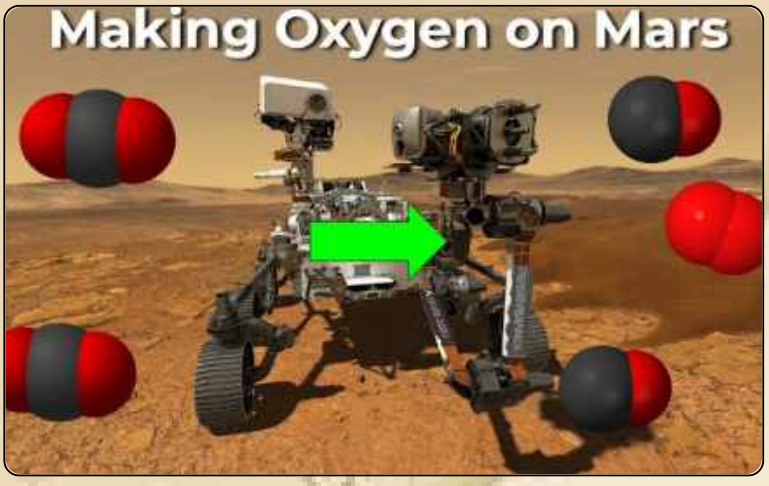
The word “moxie,” used to describe someone with spunk and audacity, came from the soft drink of the same name. Compared to what we’re used to on Earth, the air on Mars is very thin. In fact, there is less than 1% as much air on the surface of Mars as on Earth, and visiting Mars would be like flying in a balloon 100,00 feet up in the air. And not only is the air thin, but it’s made almost entirely out of carbon dioxide (CO_2).

On Earth, we can thank the myriad forms of life for the oxygen in our atmosphere. Mars isn't so fortunate, so if we want oxygen on Mars we'll have to make it ourselves. That's what MOXIE does.

Oxygen production was first achieved on April 20, 2021, in Jezero Crater, producing 5.37 grams (0.189 oz) of oxygen, equivalent to what an astronaut on Mars would need to breathe for roughly 10 minutes.MOXIE was designed to safely generate up to 10 g/h (0.35 oz/h) of oxygen, with theoretical production limited to 12 grams per hour (0.42 oz/h) of oxygen due to the limited capacity of the 4-ampere flight power supply.

Principle:

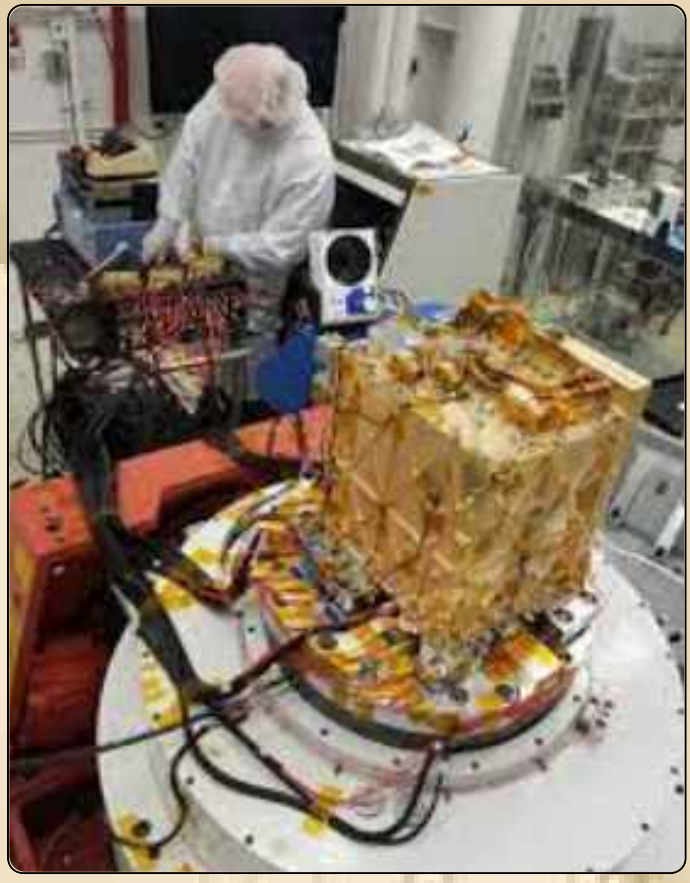
MOXIE acquires, compresses, and heats Martian atmospheric gases using a HEPA filter, scroll compressor, and heaters alongside insulation, then splits the carbon dioxide (CO 2) molecules into oxygen (O) and carbon monoxide (CO) using solid oxide electrolysis, where the O atoms combine to form gaseous oxygen.

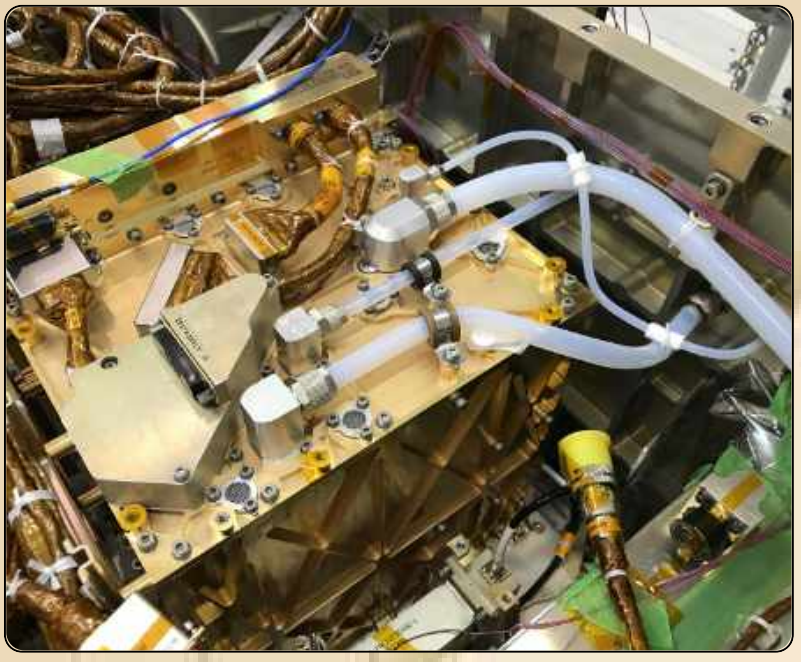


The conversion process requires a temperature of approximately 800 °C (1,470 °F). A solid oxide electrolysis cell works on the principle that, at elevated temperatures

The net reaction was thus 2 CO_2 → 2 CO + O_2. Inert gases such as nitrogen gas (N_2) and argon (Ar) are not separated from the feed, but returned to the atmosphere with the carbon monoxide (CO) and unused CO_2.

NASA states that if MOXIE worked efficiently, they could land an approximately 200-times larger, MOXIE-based instrument on the planet, along with a power plant capable of generating 25–30 kilowatts (34–40 hp). Over the course of approximately one Earth year, this system would produce oxygen at a rate of at least 2 kilograms per hour (4.4 lb/h) in support of a human mission sometime in the 2030s. The stored oxygen could be used for life support, but the primary need is for an oxidizer for a Mars ascent vehicle.





Anudipan Pal
(ECE A 2nd)

SUPER EARTH:
A POTENTIALLY HABITABLE ZONE DISCOVERED BY NASA 137 LIGHT-YEARS AWAY

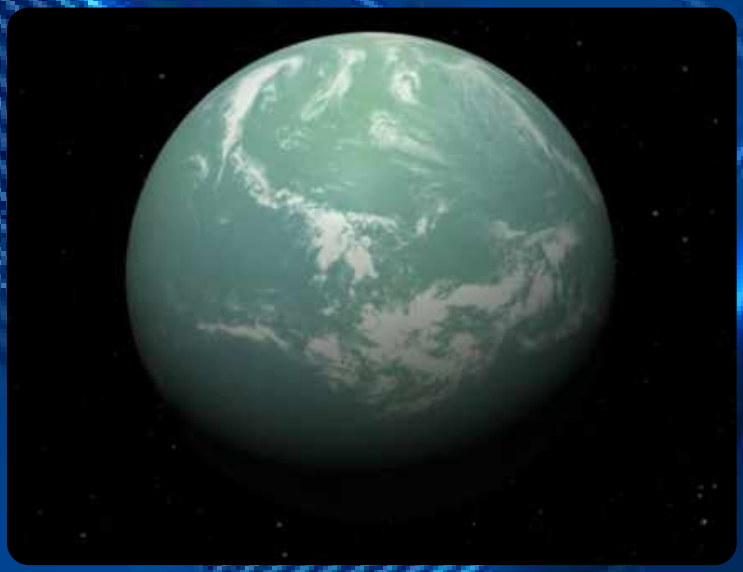
This illustration shows one way that planet TOI-715 b, a super-Earth in the habitable zone around its star, might appear to a nearby observer. (Source: NASA/JPL-Caltech)

What is a Super-Earth?

Super-Earths, a class of planets unlike any in our solar system, are more massive than Earth yet lighter than ice giants like Neptune and Uranus. These celestial bodies can be made of gas, rock or a combination of both, and are between twice the size of Earth and 10 times its mass.

The discovery:

A “Super-Earth” ripe for further investigation orbits a small, reddish star that is, by astronomical standards, fairly close to us – only 137 light-years away. The same system also might harbour a second, Earth-sized planet.



Key facts:

The bigger planet, dubbed ‘TOI-715b’, is about one and a half times as wide as Earth, and orbits within the “conservative” habitable zone around its parent star. That’s the distance from the star that could give the planet the right temperature for liquid water to form on its surface. Several other factors would have to line up, of course, for surface water to be present, especially having a suitable atmosphere. But the conservative habitable zone – a narrower and potentially more robust definition than the broader “optimistic” habitable zone – puts it in prime position, at least by the rough measurements made so far. The smaller planet could be only slightly larger than Earth, and also might dwell just inside the conservative habitable zone.

Details:

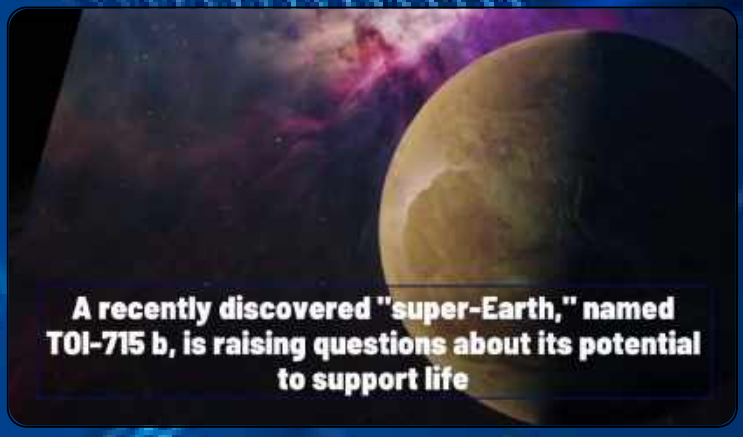
Astronomers are beginning to write a whole new chapter in our understanding of exoplanets – planets beyond our solar system. The newest spaceborne instruments, including NASA’s James Webb Space Telescope, are designed not just to detect these distant worlds, but to reveal some of their characteristics. That includes the composition of their atmospheres, which could offer clues to the possible presence of life.

The recently discovered super-Earth, TOI-715 b, might be making its appearance at just the right time. Its parent star is a red dwarf, smaller and cooler than our Sun; a number of such stars are known to host small, rocky worlds.

At the moment, they're the best bet for finding habitable planets. These planets make far closer orbits than those around stars like our Sun, but because red dwarfs are smaller and cooler, the planets can crowd closer and still be safely within the star's habitable zone. The tighter orbits also mean those that cross the faces of their stars – that is, when viewed by our space telescopes – cross far more often.

In the case of planet b, that's once every 19 days, a "year" on this strange world. So these star-crossing ("transiting") planets can be more easily detected and more frequently observed. That's the case for TESS (the Transiting Exoplanet Survey Satellite), which found the new planet and has been adding to astronomers' stockpile of habitable-zone exoplanets since its launch in 2018.

Observing such transits for, say, an Earth-sized planet around a Sun-like star (and waiting for an Earth year, 365 days, to catch another transit) is beyond the capability of existing space telescopes.



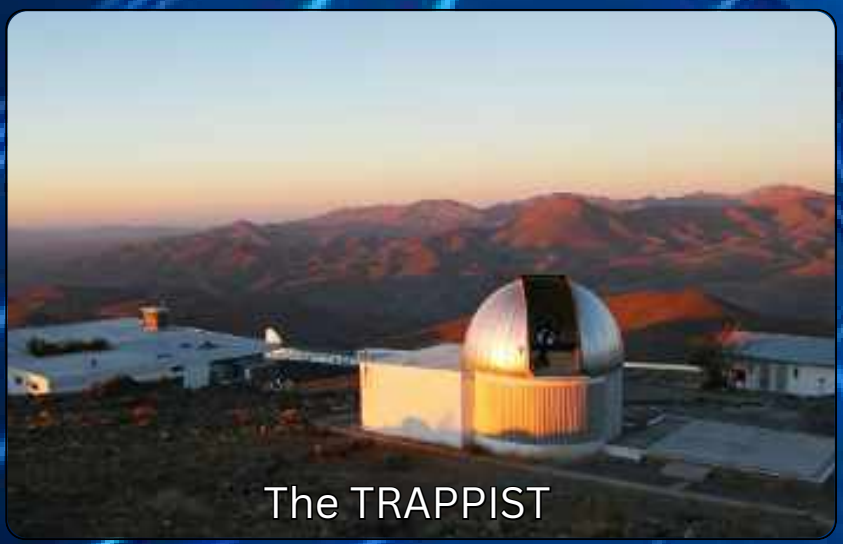
Planet TOI-175 b joins the list of habitable-zone planets that could be more closely scrutinized by the Webb telescope, perhaps even for signs of an atmosphere. Much will depend on the planet's other properties, including how massive it is and whether it can be classed as a "water world" – making its atmosphere, if present, more prominent and far less difficult to detect than that of a more massive, denser and drier world, likely to hold its lower-profile atmosphere closer to the surface.

The discoverers:

An international team of scientists led by Georgina Dransfield of the University of Birmingham, United Kingdom, published a paper in January 2024 on their discovery, “A 1.55 R⊕ habitable-zone planet hosted by TOI-715, an M4 star near the ecliptic South Pole,” in the journal, “Monthly Notices of the Royal Astronomical Society.” An international array of facilities used to confirm the planet included Gemini-South, Las Cumbres Observatory telescopes, the ExTrA telescopes, the SPECULOOS network, and the TRAPPIST-south telescope.

The ExTrA telescope

The SPECULOOS network



The TRAPPIST

Souryob Ghosh
(ECE A 2nd)

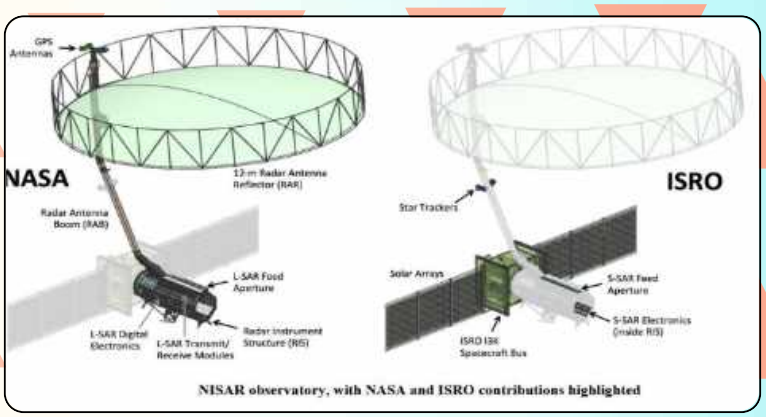
The Indian Space Research Organization (ISRO) has several upcoming missions. Here are some of them:

1.INSAT-3DS:

This is a communications satellite, part of the Indian National Satellite System (INSAT) series. It will provide meteorological imaging and data relay services, aiding weather forecasting, disaster management, and other related activities. It is expected to be launched on 26 January 2024.

2.NISAR:

NASA-ISRO Synthetic Aperture Radar (NISAR) is a joint project between NASA and ISRO to co-develop and launch a dual-frequency synthetic aperture radar satellite for remote sensing. It is expected to be launched on 30 March 2024.



NISAR observatory, with NASA and ISRO contributions highlighted

3.Gaganyaan:

This is the first crewed Gaganyaan mission, expected to occur in 2026. If successful, India would become the fourth country in the world (after the US, Soviet Union, and China) to independently send humans in space.

New technologies being developed for Gaganyaan:

Human safety is of paramount importance in Gaganyaan mission. In order to ensure the same, various new technologies comprising Engineering systems and Human centric systems are being developed and released.

a)Gaganyaan 1:

This is an Indian crewed orbital spacecraft intended to be the basis of the Indian Human Spaceflight Programme. The spacecraft is being designed to carry three people, and a planned upgraded version will be equipped with rendezvous and docking capability. This will be the first of two flight tests prior to the inaugural of crewed mission.

b)Gaganyaan 2:

This is the second of two flight tests prior to the inaugural crewed mission, expected to occur in mid-2025.

4.Venus OrbiterMission(Shukrayaan):

This is a planned orbiter to Venus by the Indian Space Research Organization (ISRO) to study the atmosphere of Venus. It is expected to be launched in December 2025.

5.Mars Orbiter Mission 2 (MOM 2):

Also known as Mangalyaan 2, this is India's second interplanetary mission planned for launch to Mars by the Indian Space Research Organization (ISRO) in the 2021–2022 timeframe.

6. Lunar Polar Exploration Mission:

This is a concept mission by JAXA and ISRO to explore the south pole region of the Moon in 2025. The mission concept has not yet been formally proposed for funding and planning.

7.Chandrayaan-4:

This is a planned lunar sample-return mission of the Indian Space Research Organisation (ISRO) and will be the fourth iteration in its Chandrayaan programme. It is expected to be launched in 2028.

8.Bharatiya Antariksha Station:

This is a planned space station to be constructed by India and operated by ISRO. The space station would weigh 20 tonnes and maintain an orbit of approximately 400 kilometres above the Earth, where astronauts could stay for 15–20 days. The construction period is expected to be 2028–2035.

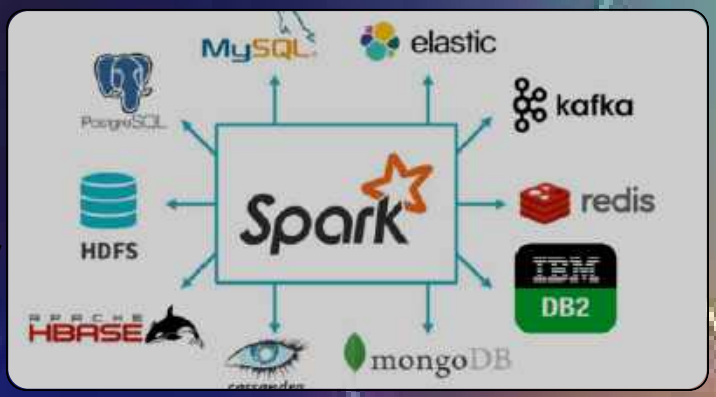
Trisha Sengupta
(ECE C 2nd)

UNLOCKING THE POWER OF SPARK AND SPECTRUM

In the dynamic landscape of data analytics and processing, technologies like spark and spectrum analysis have emerged as crucial tools for organisations seeking to harness the potential of big data.

These platforms enable business to sift through vast amounts of information, extract valuable insights, and make informed decisions. Understanding the capabilities and applications of spark and spectrum analysis is essential for enterprises looking to stay competitive in today's data driven world.

Apache spark has revolutionised the way big data is processed and analysed. It is an open-source, distributed computing system that provides an interface for programming entire data parallelism and fault tolerance. Spark's versatility and speed make it a preferred choice for a wide range of data processing tasks, including batch processing, real time analytics, machine learning, and graph processing.



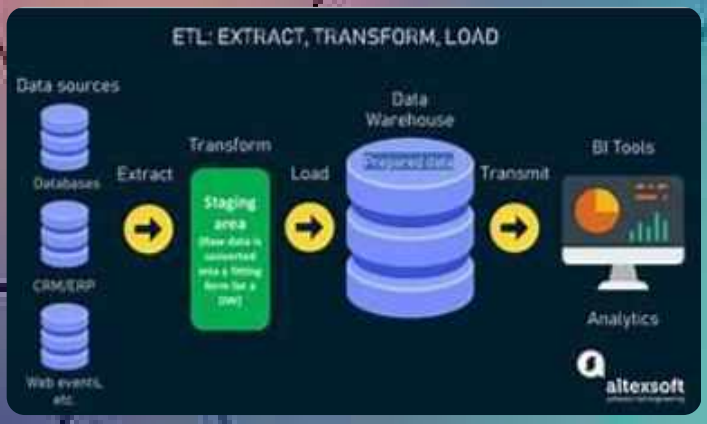
Application of Apache Spark:

1. Data Transformation and ETL:

Spark is commonly used for Extract, Transformation, Load (ETL) processes, where it efficiently processes and prepares data for analysis

2. Machine Learning:

Spark's MLlib provides scalable machine learning algorithms that can train models on large datasheets, enabling predictive analytics.



Spectrum analysis is a powerful technique used in various fields, including telecommunications, radio astronomy, and signal processing. It involves analysing the frequency spectrum of a signal with valuable information about its characteristics, such as frequency components, amplitudes, and phases. By leveraging spectrum analysis, organisations can gain deeper insights into complex signals and optimize their operations and processes accordingly.

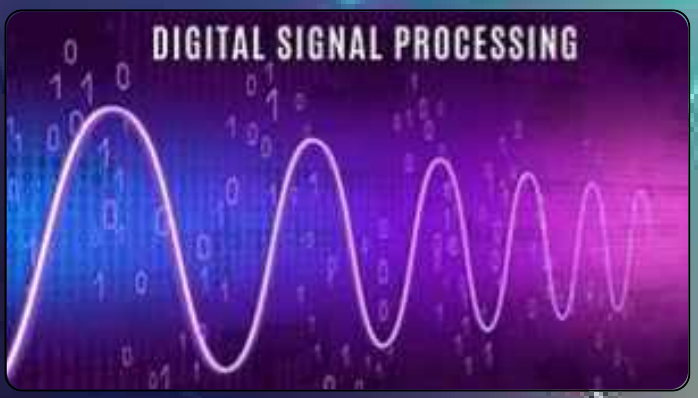
Application of Spectrum Analysis:

1. Wireless Communication:

Spectrum analysis is essential for characterizing wireless channels, optimizing signal transmission, and detecting interference in wireless communication systems.

2. Signal Processing:

In fields like audio processing and radar systems, spectrum analysis enables the extraction of meaningful information from complex signals, leading to improved signal quality and performance.



Annu Kumari
(ECE A 1st)


SURYA
63
SPORTS

Nil-Nil: Navigating the Crisis in Indian Football

In 2006, former FIFA President Sepp Blatter called India the "Sleeping Giant" of world football. Former Arsenal boss and legendary manager, Arsene Wenger called India a "Gold mine" in undiscovered footballing talent. However, looking at the recent picture of Indian Football in 2024, things are not as promising as they once were.

In the 2023 AFC Asia Cup hosted by Qatar, India had one of its worst performances in international tournaments, scoring 0 goals and conceding 6 goals while failing to secure a single point. Football is perhaps one of the most followed sports in the world and a billion-dollar industry, and the absence of a country like India raises the pertinent question: Why does a country of 1.4bn people fail to put up a team of 11 people? Is it because we lack talent? Or are there deeper causes?

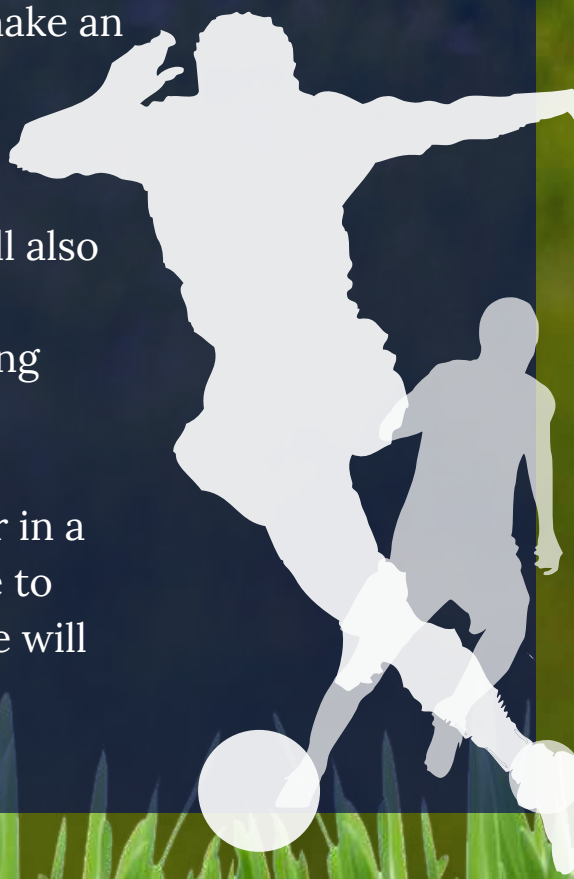
The period between 1951-1962 is considered the golden period in Indian Football. India won Gold at the 1951 Asian Games, reached the semis of the 1956 Melbourne Olympics, and won another gold in the 1962 Asian Games. India also won the Merdeka Cup and the Quadrangular Cup. However, the decision to not participate in the 1950s FIFA World Cup in Brazil is considered by many to be a massive blunder by the AIFF, despite having an automatic qualification. Many reasons such as the banning of barefooted players, lack of finances for sea travel and training, and a lack of popularity of the World Cup are cited as an excuse. Since then it has always been a tough road for Indian football to follow.

Challenges faced by Indian football are immense, the first issue is a lack of an ecosystem to nurture young talents from grassroots levels, European football academies play a huge role in developing world-class players. Likes of academies like La Masia in Spain are responsible for creating players such as Messi, Xavi, Iniesta, and Busquets, and top managers such as Pep Guardiola. Unfortunately, such an ecosystem is lacking in India or is very exclusive to the upper middle class of society. Even the local clubs lack support in terms of finances and resources.

Secondly, India is a cricket-crazy nation and football gets very little attention here. Indian football fans mostly care about European Football and support clubs like Barcelona, Real Madrid, Bayern Munich, etc. A proper fanbase is yet to develop in this country.

The lack of popularity also stems from a variety of reasons, for example there was no proper League structure in India until 1996 when the National Football League (later rebranded to I-League) was introduced. There also was no regular system of promotion or relegation like in Europe or the rest of the world till the ISL was introduced, which later became the first division and the I-league became the second division.

Another reason worth mentioning is a lack of games against quality opponents. Experts have always suggested that the Indian Football Team needs to play against top-ranking teams in Asia, who regularly make an appearance in the World Cup. Playing against teams like Qatar, South Korea, Japan, Iran, and Saudi Arabia will add to the much-needed experience of the youngsters in the squad. This will also lead to an increase in the viewership of games. Insufficient game time is yet another factor stopping Indian players from performing in foreign leagues. Players such as Sandesh Jhingan have come out discussing the difficulties faced by an Indian player in a foreign league, and how little effort has been made to mitigate these issues. A growing footballing culture will also prompt parents to send their kids to play the beautiful game.



Football in India has a massive scope. It has a tremendous following in states such as West Bengal, Kerala, Goa, and in the Northeast as well. The Kolkata Derby played between East Bengal and Mohun Bagan is Asia's biggest derby and one of the fiercest to ever exist. It has a rich history ingrained in our socio-political landscape.

Foreign Leagues such as La Liga and EPL have sparked interest among people, which in turn has led to the creation of content around football, namely YouTube channels.

Channels such as YJRreviews, Talk Football HD, Markoni, and Drogbaba have done an amazing job in bringing world football to the Indian audience, even going to the extent of discussing nuances such as the transfer market, player profiles and tactical analysis of games. This trend shows an increased appetite among the public for a deeper understanding of the sport.

In conclusion, while Indian football faces challenges related to infrastructure, youth development, lack of viewership, and quality games, there has been a significant rise in interest among the public in the past couple of years and more people want to see Indian football succeed. The ISL has done its bit and now AIFF needs to work to actively seek feedback from players, coaches, and fans, and work to mitigate the issues that persist. Improving the quality of referees and introducing Video assistant referees (VAR) could be the first step.

Everyone is rooting for India to present itself on the biggest stage of world football, the FIFA World Cup.

Soham Dutta
ECE, 2nd Year

From Chaturanga to Checkmate: A Journey Through the Centuries

Unveiling the Evolution of Chess: The Game of Kings

The game of chess has a rich history that spans over a thousand years, transforming from its ancient origins to become one of the most beloved board games in the world. Its earliest roots can be traced back to the Gupta Empire in India during the 6th century AD, where it was known as "chaturanga." Chaturanga was a strategic game that represented the four divisions of the Indian military. As it spread to Persia, it underwent significant changes and became known as "shatranj," introducing new pieces and rules. With the Muslim conquest of Persia, shatranj made its way throughout the Islamic world and eventually reached Europe through the Moors in Spain.

During the Middle Ages, chess gained popularity in Europe and underwent further modifications. The game board transformed into an 8x8 grid, and new pieces such as the queen and bishop were introduced. Chess became a favourite pastime among the nobility and royalty, leading to the establishment of chess clubs and the publication of numerous treatises on strategy and tactics. The 19th century marked significant developments in chess, including the creation of standardized rules and the emergence of legendary players like Wilhelm Steinitz. Steinitz laid the foundations of modern chess theory with his emphasis on positional play and strategic planning.

In the 20th century, World Chess Championships became prominent, and players like Emanuel Lasker, José Raúl Capablanca, and Mikhail Botvinnik dominated the game with their innovative strategies and analytical prowess. The advent of computers revolutionized chess in the latter half of the century, culminating in IBM's Deep Blue defeating reigning world champion Garry Kasparov in 1997. As we entered the 21st century, chess continued to evolve. Online platforms, computer-assisted analysis, and the popularization of rapid and blitz formats have shaped the game's landscape. Today, chess stands as a timeless game that transcends boundaries, cultures, and generations, captivating millions of enthusiasts worldwide with its enduring appeal.

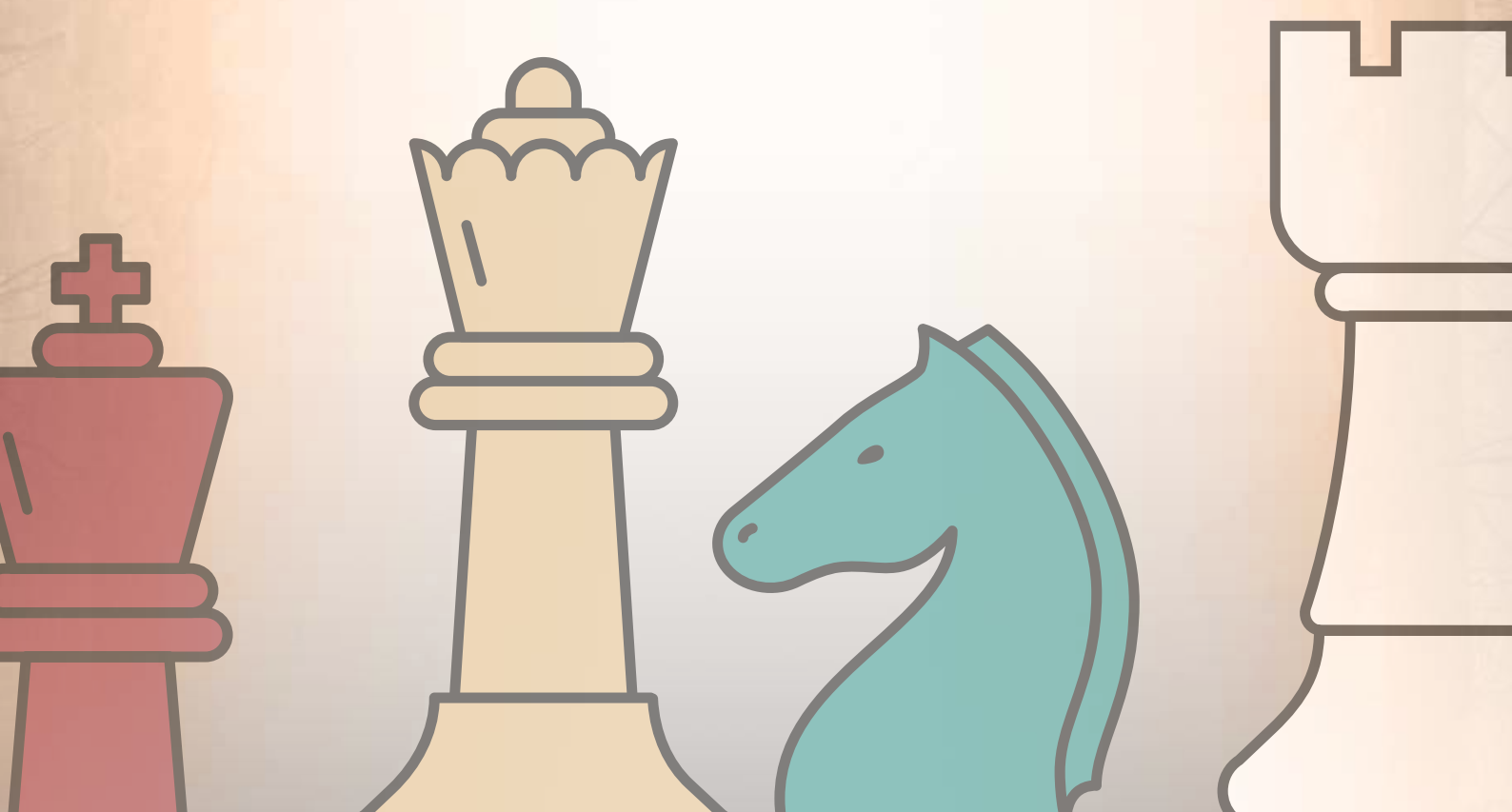
Chess has experienced significant changes in recent times due to advancements in technology and the emergence of exceptionally talented players. One of the most remarkable figures in the late 20th and early 21st centuries is Garry Kasparov, whose intense rivalry with Anatoly Karpov and subsequent reign as the World Chess Champion solidified his position as one of the greatest players in history. Kasparov's strategic brilliance and unparalleled analytical skills propelled him to legendary status, culminating in his historic match against IBM's Deep Blue in 1997, which marked a crucial moment in the convergence of chess and technology. After Kasparov's retirement, a new generation of chess prodigies emerged, including Vladimir Kramnik, Vishwanathan Anand, and Magnus Carlsen. Carlsen, in particular, has dominated the chess world in recent years, claiming the title of World Chess Champion in 2013 and successfully defending it in subsequent title matches. His intuitive style, exceptional endgame abilities, and knack for converting even the smallest advantages into victories have drawn comparisons to the game's greatest masters. Furthermore, the rise of online platforms and computer-assisted analysis has made chess more accessible, fostering a vibrant community of players and enthusiasts worldwide. The recent history of chess serves as a testament to its enduring appeal and ongoing evolution, with players like Carlsen leading the way into a new era of competitive play and innovation.

The history of Indian grandmasters in chess is a testament to the country's increasing prominence in the global chess community. While Viswanathan Anand serves as the pioneer, paving the way for future generations, he is accompanied by a group of talented players who have made significant contributions to the sport. Trailblazers like Manuel Aaron, India's first International Master, and Dibyendu Barua, who played a crucial role in popularizing chess across the nation, laid the groundwork for the rise of Indian chess. The late 20th century witnessed the emergence of a new wave of Indian talent, with players such as Vishwanathan Anand, Krishnan Sasikiran, and Pentala Harikrishna achieving international recognition. Anand's victory in the World Chess Championship in 2007 marked a historic moment for Indian chess, inspiring a new generation of players to strive for excellence in the sport. Presently, India boasts a formidable group of grandmasters, including Vidit Gujrathi, Harika Dronavalli, and Koneru Humpy, who continue to make a splash on the global stage. Their collective accomplishments highlight India's growing influence in the world of chess and serve as a testament to the country's rich chess heritage and promising future in the sport.

In recent times, the realm of chess has experienced a significant enrichment with the emergence of exceptionally talented individuals alongside seasoned champions. Notably, Viswanathan Anand, who is often referred to as the "Tiger of Madras," has made an indelible impact on the sport. Anand's remarkable career witnessed his ascent to becoming India's first Grandmaster in 1988 and subsequently the undisputed World Chess Champion in 2007. His mastery of diverse styles and unparalleled tactical prowess has served as a source of inspiration for chess enthusiasts across generations on a global scale. Alongside Anand, the ascent of younger talents like Rameshbabu Praggnanandhaa, commonly known as Praggnanandhaa, has captivated the imagination of the chess community. Hailing from India, Praggnanandhaa's rise in the chess rankings has been meteoric, as he became the youngest International Master in history at the tender age of 10 and achieved the Grandmaster title at a mere 12 years old. His exceptional talent and fearless approach to the game have drawn comparisons to the likes of

Anand himself, indicating a promising future for Indian chess on the global stage. As these players continue to push the boundaries of the game, their contributions serve as a testament to the enduring allure and ever-evolving nature of chess, captivating audiences worldwide. The history of Chess, a captivating journey spanning centuries and continents, showcases human intellect, strategy, and creativity. Originating in ancient India and gaining global popularity, it stands as a timeless testament to strategic thinking and competitive gameplay. Its intricate tapestry of narratives, advancements, and cultural importance reminds us of its profound influence on societies worldwide, inspiring generations to partake in the ultimate test of wit on the checkered battlefield.

Aishik Paul
ECE, 2nd Year



THE RECORD-BREAKING MINI AUCTION

Every year (from 2008-inauguration year of IPL) during the months of March-May, a cricket lover's heart fills with joy because of a t20 cricket league popularly known as IPL (Indian premier League). Though IPL starts from the month of march, its hype starts building up right from the day the players auction is held. This time the players auction was held on December 19 (2023). Though this time it was a mini-auction, its hype was at an all time high because of many reasons. One of the main reasons definitely was the recently finished ODI world cup which had brought a lot of players into the limelight. Also, this was the first time the IPL auction was held outside the country. It was held at the Coca-Cola Arena in Dubai with a live audience cheering for their favourite franchise. In terms of amount of money this was the biggest mini auction ever with a combined purse of INR 262.95 crore. This auction also marked a historic moment as Mallika Sagar stepped in as the league's first female auctioneer.

A total of 77 slots were filled by the 10 teams and 333 players went under the hammer. Now let's look how each team performed at the IPL auction and which players made it to the headlines for each team.

1.Chennai Super Kings (CSK): The defending champions had a purse of ₹31.4 crore. They ran after the kiwi batting all-rounder Daryl Mitchell and took him for ₹14 crore which made him their biggest buy this time. They also took the young sensation Rachin Ravindra, who is another kiwi as well. Their main headlines, though, was an uncapped Indian player Sammer Rizvi who they brought for ₹8.4 crore.

2.Gujarat Titans (GT): The runners up had the biggest purse in this mini auction. They had a purse of ₹38.15 cr. Their big buy were Shahrukh Khan for ₹7.4 crore and Australian pacer Spencer Johnson for ₹10 crore. They were in the headlines though for trading their captain Hardik Pandya with Mumbai Indians for ₹15 cr.

3.Kolkata Knight Riders (KKR): It was a nostalgic moment for KKR fans as their ex-captain Gautam Gambhir returned to the auction table after quite a few years. They created headlines as they broke their bank for veteran Australian left- handed pacer Mitchel Starc for a whooping ₹24.75 crore making him the most expensive player in the history of IPL.

4.Royal Challengers Bangalore (RCB): They entered the auction with a purse of₹23.25 crore. Their big buys were Alzarri Joseph for ₹11.50 crore and Yash Dayal for ₹5 cr.

5.Mumbai Indians (MI): The 5 times IPL winners had a purse of ₹17.75 cr. Their main buys were Gerald Coetzee for ₹5 crore and Sri Lankan pacers Nuwan Thushara and Dilshan Madushanka for ₹4.8 and ₹4.6 crore respectively.

6.Delhi Capitals (DC): They went to the auction with a purse of ₹28.95 crore along with their skipper Rishab Pant. Their big buys were uncapped Indian Wicket-Keeper Kumar Kushagra for ₹7.2crore and Jhye Richardson for ₹5 crore.

7.Sunrisers Hyderabad (SRH): They went to the auction with a purse of ₹34 crore. They were in the headlines for buying Australian pacer and current captain Pat Cummins for ₹20.5cr and WC final star Travis Head for ₹6.8 crore.

8.Rajasthan Royals (RR): They had a purse of ₹14.5crore. Their big but was Rovmann Powell for ₹7.4crore.

9.Punjab Kings (PBKS): They had a purse of ₹29.10crore. They made headlines for Harshal Patel(₹11.75crore) and
Rilee Rossouw(₹8 crore).

10.Lucknow SuperGiants (LSG): They had the lowest purse among the teams (₹13.15crore). They bought Shivam Mavi for ₹6.4crore.

This mini auction was record-breaking in its true sense. The 2024 pre-season mini auction preceding the Indian Premier League (IPL) cricket competition became the most-watched edition in history. The six-hour annual event drew 22.8 million domestic viewers in India on the Star Sports channel. This resulted in a 29% increase than the last edition and made it the most-watched “mini” IPL auction recorded by India’s Broadcast Audience Research Council. Also, the record of the most expensive player in IPL history was broken and currently it is being held by Mitchell Starc as mentioned above. Thus, all in all the mini auctioned lived up to the expectation of the audience.

Shounak Ray Chaudhuri
ECE, 2nd Year

UPDATES OF CHESS

If you have read my last article on Ampere September 2023 which was about the ‘Chess Boom in India’ you already know about the rapid advancement of chess in India and the reason behind it. In this article I am going to update you about the current scenario of the chess world.

In order to know the present, you need to know the past. So, let me give you some prior information about the chess world. Magnus Carlsen who was the world champion for about ten years after defeating Vishwanathan Anand in 2013 has left his title of world champion, himself saying that he is no more motivated defending the title. Probably he wanted any newcomer to win the ‘Candidates’ and challenge him. So, when Ian Nepomniachtchi won the Candidates for the 2nd time and became the challenger it was just a formality. This is how Ding Liren got a chance to fight for the World Championship as he got the 2nd position in ‘Candidates’ and he won it to become the World Champion.

By now, you must have understood that in order to challenge the World Champion you need to win the ‘Candidates’. But let me tell you, getting a chance to play Candidates is not a joke. You need to win a prestigious tournament ascertained by FIDE. Till 2023 Vishwanathan Anand was the only player who played ‘Candidates’ from India. This time the scenario will change, 3 players from India had qualified for the candidates this time. The first person is Indian prodigy GM Praggnanandha Rameshbabu who got it by being the runners up in 2023 FIDE World Cup. The second is GM Vidit Santosh Gujrathi who got it by winning the ‘Grand Swiss’ tournament. He almost got it through World Cup but a loss at the semifinal to Azerbhaijan Grandmaster Nijat Abasov deprived him that. Third is another prodigy Dommaraju Gukesh. He got the qualification by a complicated method through FIDE circuit. In fact, he became the third youngest player after Bobby Fischer and Magnus Carlsen to play the ‘Candidates’.

Let's not forget about women section where GM Koneru Humpy got the qualification through FIDE rating. GM Vaishali Rameshbabu elder sister of Praggnanandha also got her qualification by winning the Grand Swiss tournament. So probably this is the first time a brother sister duo will be playing 'Candidates' together. This is how a total of 5 players are representing India this time. This shows how India has improved in the field of chess in the recent years. Let's pray for the upcoming 'Candidates' in April 2024. Hopefully we will get the next challenger from India and the next World Champion as well.

Srinjoy Ray Chaudhuri
ECE, 2nd Year

GLORIOUS JOURNEY OF MEN IN BLUE

The World Cup in India was indeed a colourful one with its fair share of controversies, records and thrillers.

After 10 successful matches, our Men in Blue finally came short at the final hurdle, losing to Australia in the Final of the ICC Cricket World Cup 2023 at the Narendra Modi Stadium in Ahmedabad. But they gave our nation plenty of reasons to smile. Winning 10 matches on the trot is no mean feat and the Men in Blue achieved it at a canter. Such was their dominant performance that it was difficult to believe that at the end of the World Cup, it would not be Rohit Sharma's men picking up the trophy.During the course of this tournament, many records were shattered and many memories were created by our brigades.

Let us start with Virat Kohli. Throughout this tournament, Kohli showcased his dominant form, resulting in a run total that could remain unparalleled in World Cups for decades. Leading the overall run tally, he amassed an impressive 765 runs in 11 matches, including three centuries and six half-centuries. His prowess propelled him past Sachin Tendulkar, securing the record for the most ODI centuries in history — achieving a remarkable 50th century. This monumental feat occurred during India's victorious semi-final match against New Zealand.

For his majestic performance, Kohli won the Player of the Tournament award.

Now Talking about the captain Rohit Sharma, he played his fearless cricket throughout and adopted a selfless approach. He gave our team excellent starts in almost every match that allowed the middle order to take their time and played their natural game. Against Afghanistan, he broke the record of the fastest century in ODI World Cups by an Indian; a record that was later broken by KL Rahul in the match against Netherlands. The captain might have missed out on personal milestones, but he always put his team first and that made the nation really proud.

The debutant Shreyas Iyer and experienced KL Rahul too were not left behind. Both returned from long injury layoffs just before the World Cup began, but came into their own, scoring crucial runs at various points. Shreyas clobbered back-to-back centuries, including one in the semi-final. Rahul was at his best right from magnificent 97* against Australia in India's opening game of the World Cup and he continued his form. From playing a mature knock to scoring the fastest ton in ODI World Cups by an Indian, Rahul came a long way.

The debutants of the 2023 World Cup Shubman Gill, Shreyas Iyer, and Suryakumar Yadav showcased their resilience and batting skills on the international platform, on the bowling hand debutant Mohammed Siraj contributed well especially in the high-stakes match against Pakistan.

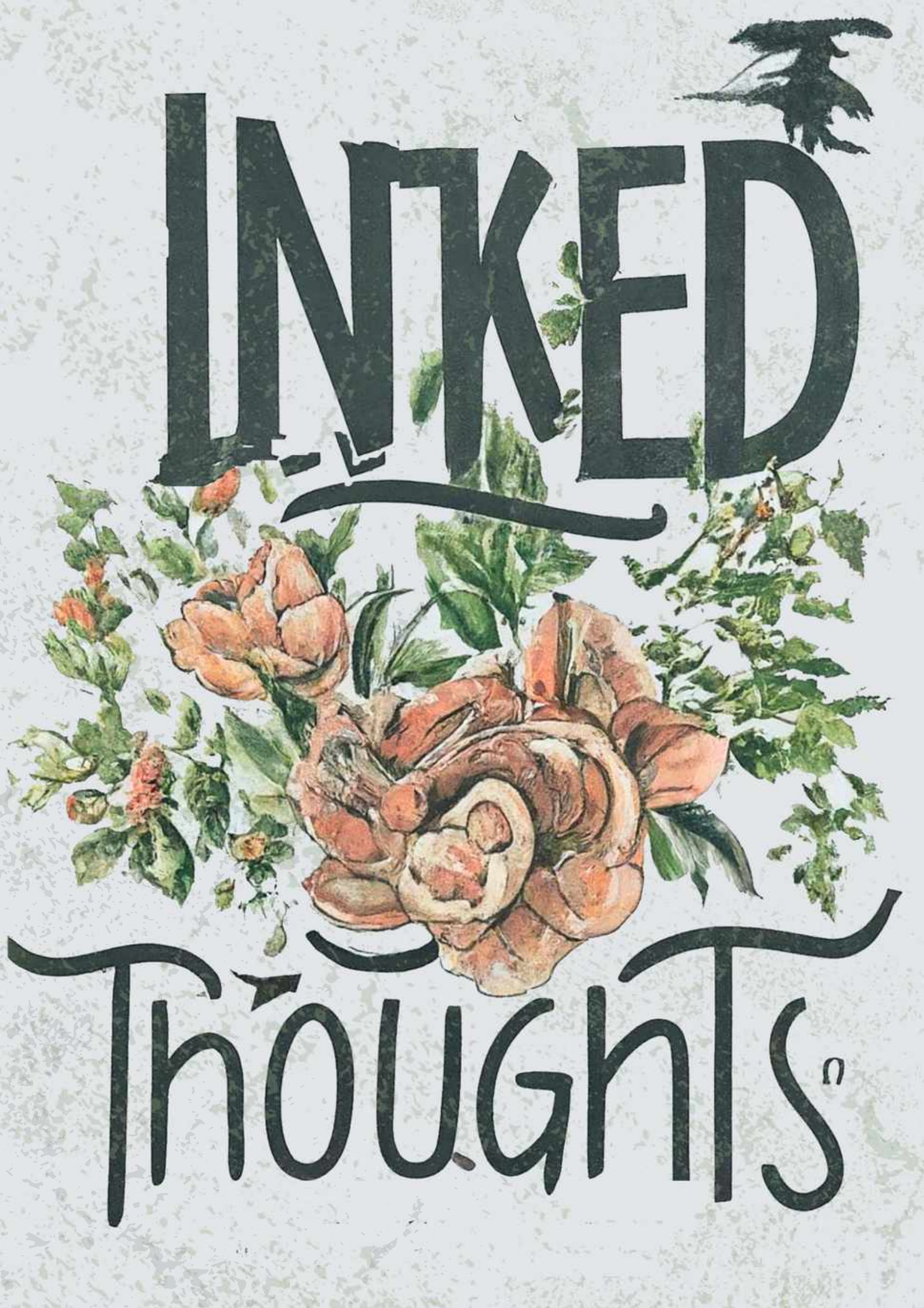
As outstanding as India's batting was, it was the bowling that really set fire to the tournament. After missing out on international action for over a year, Jasprit Bumrah was at his very best, taking 20 wickets and being absolutely unhittable throughout the tournament. But it was Mohammed Shami who stole the show. He entered the squad following Hardik Pandya's injury, and since then, he was exceptional. His arrival elevated India's already formidable pace attack to the best in the tournament. He finished as the leading wicket-taker, taking 24 wickets which included 3 five-wicket hauls. His sensational 7-wicket haul against New Zealand in the Semi-Final was the cherry on top of a scrumptious cake. The left-arm wrist-spin duo Kuldeep Yadav and Ravindra Jadeja played an instrumental role that effectively stifled opposition batting line-ups during the middle overs.

While players often get the spotlight, the behind-the-scenes work of ground staffs, cameramans and specially continues support of the fans are crucial for the smooth operation of such a large-scale event. Ground staff ensure impeccable playing conditions, vital for fair matches. Their meticulous work behind the scenes guarantees a seamless tournament. Camera operators capture every thrilling moment, preserving history for fans worldwide. Their dedication and skill elevate the viewing experience, making the World Cup truly unforgettable.

Thank you for the joy and the unforgettable moments. Here is to the Men in Blue – true champions in every sense. The journey may have ended, but the pride and love for our team will resonate forever.

Arijit Mukherjee
ECE, 2nd Year

INKED THOUGHTS



Blossoms And Melodies

In springtime's grace, the earth revives,
A tapestry of life, where beauty thrives.
Cherry blossoms blush in soft delight,
Nature's palette, a painter's flight.

Robins trill a melodious tune,
Underneath the crescent moon.
Daffodils nod in the warming breeze,
A symphony of rustling leaves.

Emerald buds unfurl with grace,
Whispers of renewal, a tender trace.
April showers weave a silver thread,
Awakening the dormant flowerbed.

Springtime's dance, a joyful spree,
A celebration of rebirth, wild and free.

- Rohan Das
(ECE-C 2nd)

প্রেমাবেগে মুগ্ধতা

রূপের রহস্যে বন্যার মতো ভেসে যায় আমি,
তোমারই তো আমি, সেই প্রেমের স্বপ্নের স্বামী!
এইযে প্রিয়! ভাবনায় যে তুমি কতখানি
স্নেহের কূলে দুলে দুলে থাকো তুমি মোর জীবন-অক্ষির মণি।

দাও ভরিয়ে মোর রত্ন কোঠা
রাখবো আমি আটকে দিয়ে আঠা,
তুমিই তো আমার রত্ন, লুকিয়ে রাখবো সিন্দুকে,
এত্তখানি মিটমিটে ভালোবাসা জানাই তোমাকে।

ওহে মোর রত্নখচিত মণি!
তুমিই তো শৌখিনবান রাজার অতি মিষ্টি সুন্দরী-রূপসী রাণী।
তোমার নয়নের ঘোরে আমি যাই হারিয়ে
পারি দিই স্বপ্নের মায়াবী পাতায় সুদূরে।

শুধু প্রেমে নইকো হে প্রিয়তমা..
ভাসি আমি অন্য এক জাদুজনিত অক্ষরে,
উড়ে যাই দূরে দূরে অতি দূরে এক স্বর্গত্তম সমাবেশে,
তুমি আছো মোর ব্রহ্মাণ্ডে অত্যাধিক প্রজ্জ্বল্যমান স্বরে।

মোর প্রাণ ভারাক্রান্ত পলকে পলকে...
মুক্তমনা, তুমি রেখো মোরে তোমারই হৃদয়ের আলোকে,
নূতন সৃষ্টিতে দৃশ্যমান হও কেনো তুমি বারে বারে!
তোমার এই অপূর্ব সৃষ্টিতে তুমি কম্পিত হও মোর এই ক্ষুদ্র হৃদয় জুড়ে॥

-Subhajit Paul
(ECE-B 2nd)

Running Train of Thoughts

In the silence of the night, a train of thoughts
depart, whistling through the corridors of my
wandering heart. Tracks of memories intertwine,
a journey undefined,
echoes of emotions, destinations hard to find.

As carriages of dreams race, clickety-clack in my mind,
each compartment holds a story, intertwined.
Windows frame the fleeting scenes of hopes and fears,
a kaleidoscope of thoughts, as the train perseveres.

The rhythm of contemplation, a gentle hum,
a symphony of musings, where introspection's drum.
In the carriages of reflection, whispers softly converse,
philosophies and ponderings, each thought a universe.

Through tunnels of uncertainty, into landscapes
unknown, the train of thoughts ventures, where seeds of
wisdom are sown. Passengers of introspection embark
on this ride, a poetic pilgrimage on the boundless
mental tide.

- NITAI SANTRA
(ECE-C 2nd)

SEASHELLS AND COFFEE

I knew I grew up when songs didn't remind me of people,
I knew I grew up when perfumes reminded me of the last day I wore them.
Memories fade, but the fragrance stained,
The corner of my shirt like a token of the day; I knew it was time.
Now songs remind me of emotions and feelings,
Not the kind they write books about,
But the kind they cherish like the icy cold coffee on an even snowy day.
You are my iced coffee, but it's no longer snowing;
It's raining, and that's all I ever wanted.
Washing away the pain,
Like sand on the shore,
They remain, but you're the seashell that caught my eye.
Grains of sand in every curve of the shell,
But I dust it away just for it to stay on my hand.
The sand won't leave like my memories did,
Though you're the part I choose to keep.

-Suparna Banerjee
(ECE-B 1st)

জীবন তরী

হৃদয় আজি শূন্য করে দিলাম তোমায় উজাড় করি;
হে অনন্ত দাও মোরে আজ অন্তর ভরি।
দুয়ার দেখি শূন্য চোখে, মন্দ্র তালের চমক
দীপের আলো বুঝায় মোর ক্লান্ত চোখের পলক।
তোমার চরণ কেবল মাগি, পাইনা যে তাও ধরতে;
পায়না যে তাই অন্তরালের বিধুর ব্যথা সরতে।
প্রাণের জ্বালা জুড়ায় কেবল তোমার সুরের গান;
চাইছি প্রবল করতে কেবল তোমার অমৃত পান।
তাও তোমারে দিলাম আজই অন্তর মোর শূন্য করি;
দাও মোরে আজ অন্তরে শান্ত করি।

রুদ্রণাথের বাজাও বাঁশি, জগৎ সুরে নাচে
তোমায় যে আজ চাইছি ছুতে তোমার প্রাণের মাঝে।
যাক সরে যাক মৃত্যু ব্যথা, নবপ্রাণ আনন্দে ভরি;
পারাবার পূর্ণ করুক প্রেমে আমার জীবন তরী।

-Anudipan Pal
(ECE-A 2nd)

EMPTY NIGHTS

Her Epiphanies
Are the nights filled with love?
Or, filled with the echo of her sobs?
Are the nights filled with her attempts to get fit in everywhere?
Even though she knows she weren't made to get aligned with this perfect world-she tries in despair!
her feet tied beneath, even though all she wants is to escape.
She pines for the hope, she could never see in herself,
and wrestles with time, hoping the nights will end.
What has she perfected? nothing but her imperfections!!
She is empty she knows,
"When will being alone feel blissful?", she asks herself with a sigh,
she wants to drown,
But then she breathes, breathes, and breathes....

-Taniya Banerjee
(ECE-A 3rd)

স্মৃতি

কুয়াশাচ্ছন্ন শীতের সকালে লেপ মুড়ি দেওয়া অলস রোদ্দুর উঠতে বড়ো দেরি করে।শীতের ভোর গুলো হাঁপিয়ে যাওয়া বয়সের ব্যারামের মত, জীবনকে শীর্ণকায় করে তোলে।

ভোরের ট্রেনটা খানিক হেলতে দুলতে, কুয়াশার বুক চিরে বেরিয়ে এলো, আলোর শীর্ণ রেখা গুলো লোহার পাতের ওপর জ্বলজ্বল করে উঠেছে, খানাগড় স্টেশনের শান্ত নির্জন প্লাটফর্মে আমি ছাড়া আরো কোনো প্রাণী নেই, ট্রেনে উঠে দাঁড়াতেই ট্রেন আস্তে আস্তে এগোতে শুরু করলো, নতুন এক দিনের শুরু হলো।

এবারে একদিন পিছিয়ে যাওয়া যাক, খানাগড় এ হন্তদন্ত হয়ে ছুটে আসা খানিকটা আবেগের টানেই, আমাদের পুরনো বাড়ির টানে, পুরনো মানুষের টানে যাদের বহুদিন দেখা হয়নি ।এরাই আমার শৈশবের দোসর, কৈশোর বয়সের সঙ্গী।কিন্তু সময় আমাদের বারবার টেনে নিয়ে এক অজানা পথে, এক অচেনা সফরে।কেবল ক্ষমতার লড়াই, টিকে থাকার লড়াই ।

খানাগড় এ আমার মামাবাড়ী।একটি ছোট গ্রাম, অতি সাধারণ, কোনো বাহ্যিক বিলাসিতা চোখে পড়ে না। মামাবাড়ির জনসংখ্যা বর্তমানে আট জন এবং সেটা ক্রমশ কমছে, একেকজন করে শহরমুখী হচ্ছে কাজের আশায়।মামাবাড়িতে এলে আমার ফুরিয়ে যাওয়া দিন গুলোকে আবার ফেরত পেতে বড়ো ইচ্ছা করে, শীতের দুপুরে মাঠে এলিয়ে থাকা রোদে আড্ডা, রাতের গল্পের আসর ।ছোটবেলায় কতই না কাল্পনিক ভূতকে ভিলেন সাজিয়ে সবাই মিলে ভয় পেয়েছি।গ্রামের পথ, পুরনো বাড়ি, সেইসব দিন গুলো আস্তে আস্তে হারিয়ে গেল॥গ্রামের পথে যখন শঙ্কর বাঁশিওয়ালা বাঁশি বাজিয়ে ফেরি করতো তখন আমি অবাক হয়ে শুনতাম।একবার শখ করে একটি বাঁশি কিনেছিলাম বটে বাজাতে পারিনি সেইভাবে।বাড়ির বড় পুকুরে সবাই মিলে খেলতে নামতাম , আর দাদু বসতেন পাহারায়।বেশি দেরি করলে মামাদের ডেকে নিয়ে এসে বকাও দিয়েছেন বহুবার ।দাদু, দিদিমা আজ দশ বছর নেই।তাদের রেখে যাওয়া জগৎটা আজ অনেকভাবে বদলেছে, আকারে আয়তনে।দালানের পাশের ঘরগুলো এখন পরিচর্যার অভাবে ভেঙে পড়েছে প্রায়।তবে এখনো সেই বাড়ি গেলে কেন জানি বড়ো ভালো লাগে, নিজের অজান্তেই বুঝতে পারি কেউ যেন আমায় দেখে আড়াল হতে, রক্ষা করে চলে সর্বদা।

মামাবাড়ী পৌঁছে বেশ থমথমে লাগলো বাড়িটাকে, মামা মামীদের দেখতে পেলাম না সেইভাবে, ছোটমামার ফোন পেয়েই আমি পৌঁছাই।ছোটমামাই দোতলা থেকে নেমে এসে খবর দিল, বাড়ি বিক্রি করে দেওয়া হবে, সবাই সিদ্ধান্ত নিয়েছে।প্রত্যেকেই শহরের দিকে আসার চেষ্টা করছে ধীরে ধীরে, তাই বাড়তি বোঝা রাখার নাকি মানে হয় না।নিজেকে কিছুক্ষণ বড়ো একা লাগল, মনে হলো সব হারিয়ে ফেলেছি, আমার মা, শৈশব সবকিছুই বড় মিথ্যে।কাউকেই দেখলাম বুঝিয়ে লাভ হবে না।কেউই বুঝল না নাড়ির টান, মাটির টান।সুতো গুলো আলগা হতে হতে যেন ছিঁড়েই গেল এবার।অগত্যা সকাল হতেই বেরিয়ে পড়লাম, আর হয়তো কখনো আসব না এই খানাগড় এ।

মানুষ পরিযায়ী পাখির মতো কেবল উড়ে বেড়ায় এদেশ থেকে সেদেশ, মস্ত দৌড় মাটির টান কে ভুলিয়ে দেয়, বেঁচে থাকার তাগিদ কখন লোভের জন্ম দেয় সেটা বুঝেও আমরা বুঝি না।নিজেদের বারবার পরীক্ষা করতে চাই আমরা।শেষে কেবল নিজেদের সজন খুঁজে বেড়াই চোখের জলে।

-Anudipan Pal
(ECE-A 2nd)

TEAM COMEBACK : A JOURNEY TO REMEMBER

It is not going to be a monotonic ink of thoughts, but a brief of our sinusoidal journey for SIH 2023. We call it "sinusoidal" because you are going to experience a beautiful roller-coaster ride that we have experienced as team Ice-spies (or call it team Electro-idk or team Comeback, your choice). So, as per tradition, fasten your seat belts and prepare for a captivating recount of our remarkable voyage.

We embarked on journey on 23rd August of 2023, just with an email from Prof. Joydeb Hazra (the SPOC for SIH 23). The email contains the announcement of Smart India hackathon for this year. According to the given rules, the college decided to organize an internal hackathon. It was Hack-Heritage 2023. Teaming up with Srijita, Sampriti, Soumyadeep, Monojit and Rito, I, Sourjya registered for it. Being passionate in electronics, we opted for hardware-based problem statements. We chose PS1327, developing a system for Patient Care in the Health sector. We ideated and started working (not getting into technical stuff).
On the 14th every team got a letter from the SPOC, seeking an update on our project within 18th Sep. There was a rush. We documented the project 5 minutes prior to the deadline and submitted it. On 20th September 2023 we received the mail **"selected for Hack-Heritage"**. After many sleepless nights, we were able to complete around 40 to 50% of our idea before the hackathon.

And then D-Day came. It was 22nd September. We reached college and after all formalities, we were sent to the jury panel for a ppt presentation. Soumyadeep presented and we demonstrated. Mr. Arijit Hajra was evaluating our idea. After listening to our idea with great interest, sir rejected it and suggested no improvement. We got demotivated. Around 3:00 pm our hackathon started. We gave our best in those 24 hours. Next day final judgement started. Jury member visited our desk. After listening to our work finally, he suggested an improvement that is to be done then and there. Soumyadeep worked on it and finally we succeeded. On 25th September, we were invited for the Hack-Heritage results announcement. Winner, 1st and 2nd runner up were announced. We were not there. Top 30 teams from college were announced. We were also not there. We thought our SIH journey for this year ended here.

But the story didn't end there. On 29th September, scrolling WhatsApp status randomly I saw Ekam's update. "Internal Hackathon is optional from now!". And I called SPOC again and again and again. Finally, he confirmed and again the team reunited. This time we reviewed our mistakes. Time also became a factor then. We decided then to proceed with software and chose PS 1422. This was on avalanche victim detection using AI algorithms. Soumyadeep was chosen as our leader and Prof. Jhalak Dutta and Prof. Poulami Das as our mentor.

We brainstormed on our idea and after giving our best in ideation we submitted our PPT. On 25th Nov the first list came out. Our problem statement was not there. We had to wait, wait and wait. On Day 4th, final results for SIH 1422 came out. We didn't get selected.

It was a normal morning; we are busy with our semester studies. Soumyadeep got a call. "When you're arriving at the venue?". He checked the website. It was the final list for the SIH Grand Finale 2023. And there was team Ice-spies!

Packed up our bags and got ready for the trip to Chandigarh! Not just kidding. The nodal centre was in CGC Landhran, Mohali, Chandigarh. Four of us (Sampriti, Soumyadeep, Sourjya, Srijita) boarded our train on 17th December from Sealdah but the journey became more fun from Delhi Station to airport metro to Chandni Chawk metro to Kashmir gate to having no bus to finally choosing the ultimate option-Cab. Monojit and Debanjan joined us one day later and we six along with our mentor Jhalak Sir went to the college and finished our tiring and confusing (as the people there had no distinct idea about whether to put the signature or not) registration there but guess how we got back to our hotel?- no cabs, no buses, just a random open truck having our Prime Minister's banner on it was our saviour that day we had a hilarious drive on that and reached our hotel safely. That night all of us could barely sleep, our project was not organized at all. We were confused too but all we were left with was a strong idea and a team that didn't want to lose hope.

Regardless of the freezing weather of Mohali we all had to get ready by 8:30 in the morning and reach the college on time. After the inaugural ceremony the actual event began- **The Smart India Hackathon 2023**. The first mentoring session started around eleven. One of the jury members (DRDO) came to see our project and gave us ideas on how to improve our work. We kept working and working but there were still some sort of loose endings we were unaware of. Time, the biggest competitor to us in that journey. Each and every evaluation round occurred and somehow, we again lost the track. After sleepless 36+ hours on 20th of December the final submission timing came. The whole afternoon we focused on multiple research papers and modifying our project at best we could in that short span of time. Even on the submission time another problem got added when our app exceeded the size of the submission, but yeah finally we made it to submission.

Later that evening we were taken to a hall for the final prize distribution ceremony. They arranged some entertaining programmes to cheer us up but honestly, we were too tired to keep our eyes open even. Clock kept ticking and the final hour came. The winner of PS1422 was announced and again we were not called. What is even more saddening is that the winners were sitting right behind us which gave the feel of we were too close but not close enough to give it success!

Just when you think that is how it all ended. Hold your horses the movie is yet to end. During January when all of us were busy preparing for our semester Soumyadeep got an email from SIH- a invitation for participating in a Bootcamp organised by AICTE, MOE and Wadhwani Foundation in the end of January for 5 days only for the SIH finalists. On 29th January 4 of us (Soumyadeep, Monojit, Sourjya, Srijita) as the two others (Sampriti and Debanjan) were out of station, went to Swami Vivekananda University, Barrackpore where the boot camp took place. We learnt a lot about business and how to proceed with our project further from a marketing prospect throughout the lessons we've got for the straight four days. On the last day we ended up submitting our final presentation in a hurry as we had an incubator visit the day before and were tired as hell to work overnight.
We had our lunch and then were called for a presentation; we were all a little bit nervous but still ended up giving the best possible. The judges appreciated us but still they needed more clarification on the business aspect which we were completely new to. Just after we got out the panel Sir S.K.Jain, one of the judges came and handed one book of his addressing that we had the best presentation till then. We were happy but not overwhelmed anymore. It reminded us how our overwhelming mindset ended up in grief in both Hack-Heritage and SIH. We felt happy and hopeless at the same time. Then, again the prize distribution time came and we were casually sitting with a very prepared mind of whatever may happen will consume, but exactly then one volunteer asked where team Ice-Spies is and we responded and one of them came and told us we ranked second. The very next moment another one came and said that might not be true too. The emotions rushing through our minds back then can never be explained. We were too scared to keep our fingers crossed. Then the announcement began and yes, this time we were called on stage.

Team IceSpies bagged their first ever trophy and got 2nd rank.

The little pause we had right after we're called was something unforgettable. We went and received the trophy. Finally, we won.

All we know at the end of the day is not the win or loss but the journey that has taken us this far. The team who never lost hope. A huge thanks to Jhalak Sir for supporting us, for renaming us as **IceSpies** (**Rest, Restart, Refocus**). We are still working on our project and will continue to do so. The Ice spies are on board again!

-Sourjya Mukherjee & Srijita Chatterjee
(ECE-B 2nd)

FASCINATING 2-DAYS AT JADAVPUR UNIVERSITY

Stepping into Jadavpur University's Salt Lake campus for a 2-day IoT training was a plunge into a world of connected possibilities. Organized by the WBST and sponsored by Tata Steel, the course, led by the insightful Mr. Sandip Sarkar (Xconics), unfolded the magic of the Internet of Things (IoT) through theory and hands-on practice. Among 160 applications 30 were selected to attend the course. But students of Heritage Institute of Technology made their way through this, there were 10 participants from HITK only getting the chance to emerge in the world of IoT.

With the ESP32 microcontroller as our canvas and Arduino IDE as our brush, we painted a vibrant picture of IoT's potential. From the basic blink of an LED to the dynamic dance of sensor-controlled lights, each project was a building block, solidifying our understanding. The thrill of using LDR sensors to adjust light intensity, measure temperature and height, and translate that data into glowing LEDs was invigorating.

However, the learning extended beyond the technical. The course was a gift, thanks to Tata Steel's sponsorship, making knowledge accessible to all. Nourishing meals fuelled our minds and fostered a collaborative spirit among participants. The WBST's certificate was a token of our accomplishment, but the true reward was the knowledge and the network we gained. The organizers didn't just open doors; they held them wide open. Their offer of future support empowered us to continue our IoT explorations, confident that help was just a reach away. This wasn't just a course; it was a launchpad, propelling us toward exciting areas where software meets hardware.

At the end, this experience condensed into a journey of discovery, fuelled by knowledge, collaboration, and the unending potential of IoT. The seeds sown at Jadavpur University are ready to blossom, and we, armed with the tools and guidance, are eager to cultivate them.

- Nikkan Das
(ECE-A 1st)

A memorable trip to Shantiniketan

Shantiniketan is one of the world's famous tourist attractions located in the Birbhum district of West Bengal. The place is deeply connected to the life of Kaviguru Rabindranath Tagore in the 20th century.

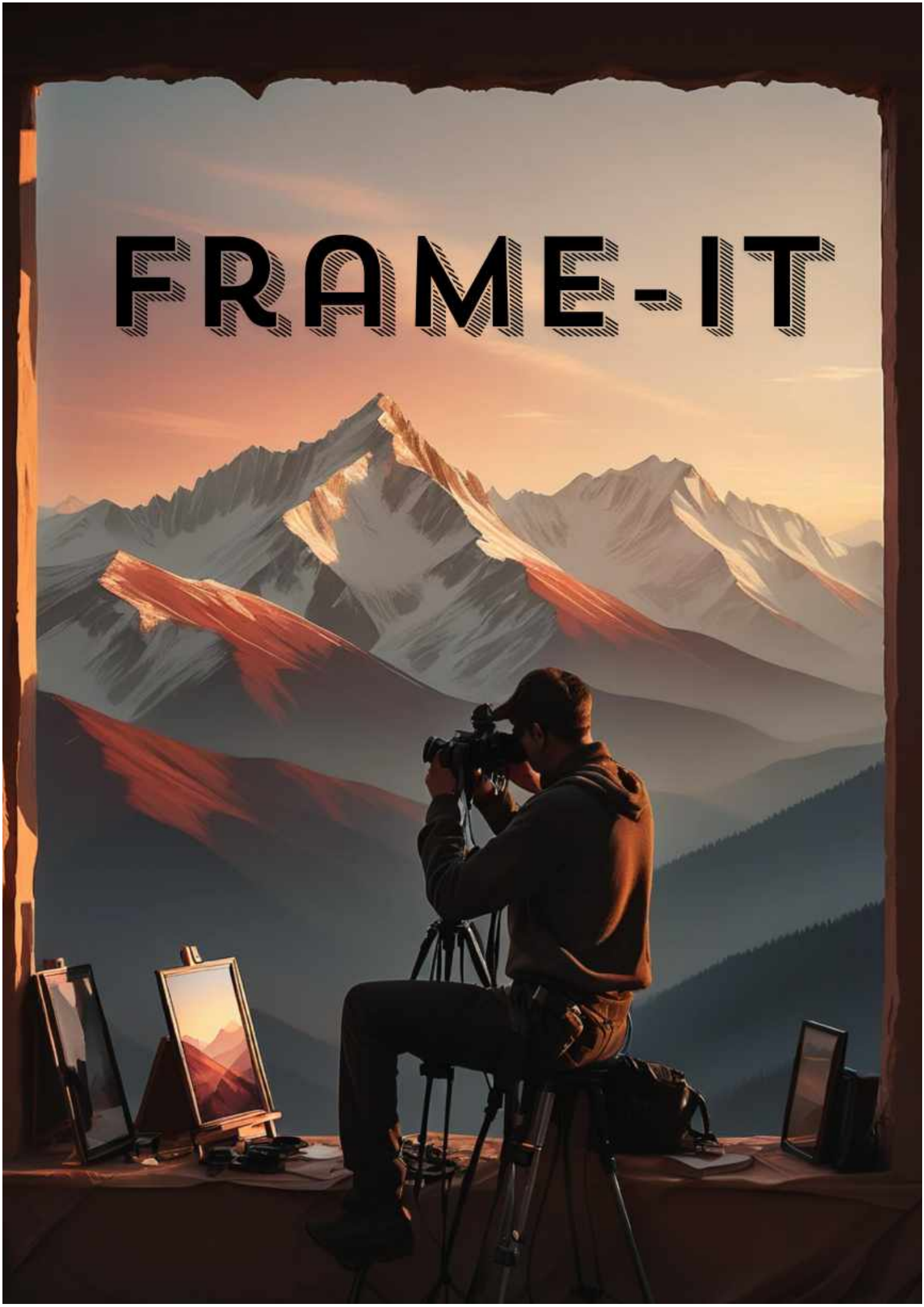
I visited Shantiniketan last month with my family from February 03 to February 05, 2024. We took the Shantiniketan Express from Howrah Station in the morning of February 03. It took not more than two hours to reach Bolpur (Shantiniketan) Station from Howrah. From Bolpur Station, we hired a toto and reached the 'Shantishudha' resort about four kilometers from Bolpur Station. The resort had a garden with flowers, herbs, shrubs, and trees with ripe fruits. There were two swings and a pond with fully bloomed lotus flowers on the campus. After having lunch, we went to the 'Sonajhuri hut'. There we joined hands with the tribal people in a tribal dance. We also bought some traditional dresses and ornaments.

The following day, we set out to explore Shantiniketan. First, we visited the Shantiniketan Museum. There we saw the replica of the Nobel Prize won by Rabindranath Tagore. We got to know many unknown facts about the Tagore family and the history of Shantiniketan. We saw many instruments used by Rabindranath Tagore and the costumes and ornaments worn by him. We saw the original writings of the poet and the paintings made by him and other artworks. After seeing the Museum, we saw the popular 'Vishwabharati' University along with the 'Kala' (art) Bhawan, the 'Patha' Bhawan, and the 'Sangeet' Bhawan. We saw the banyan tree in the shade of which Tagore wrote the poem 'Sahoj path' - "Kumor parar gorur gari". We saw the 'Amrokunjo' where Tagore taught the children in the shade of trees and the 'Chatimtala' where he meditated and wrote. We also saw the 'talgach' (brab tree) in the shade of which Tagore wrote his poem - "Talgach ek paye dariye sob gach Chariye".

After this, we visited the 'Srijani Shilpogram' (art village), the 'Rajbari' (house of zamindar), and the deer park. The same day in the evening, we visited the 'Kopai' river. We watched the 'Sandhya Arati' (evening prayers) which took place by the river. It refreshed our minds. The food items we had in the resort were very delicious and belonged to the typical Bengali Cuisine and included rice, potato fries, fish, mutton curry, the list is long.

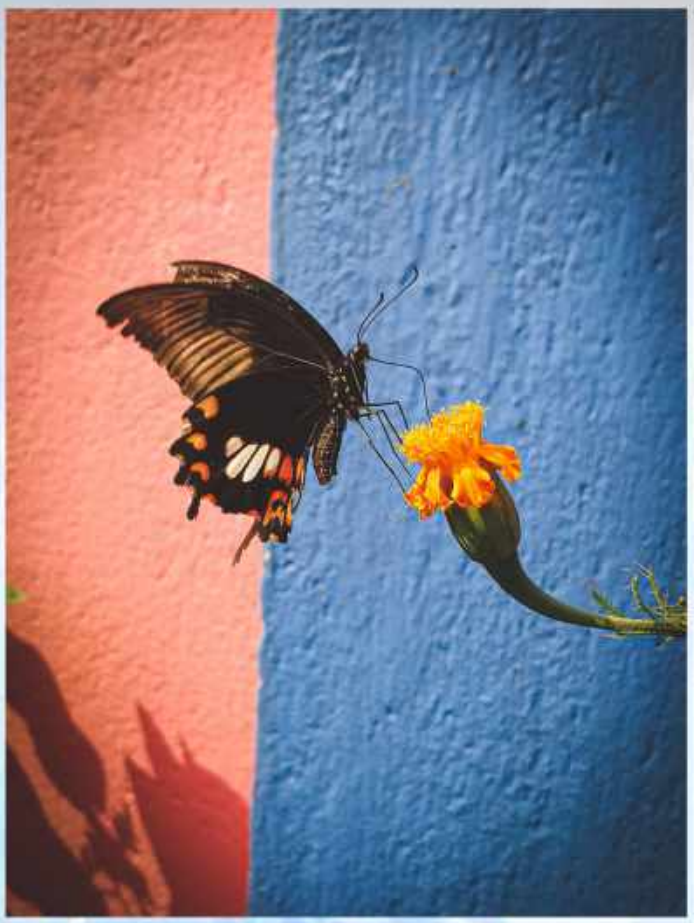
Our short trip to the place of silence and peace left a long-lasting impression on our minds. Our visit to Shantiniketan became memorable to us. We would like to visit there again and again.

-Debaditya Chakraborty
(ECE-A Ist)


FRAME-IT

SUBHAJIT PAUL-2ND

SUPARNA BANERJEE-1ST



SNEHA MUKHERJEE-2ND

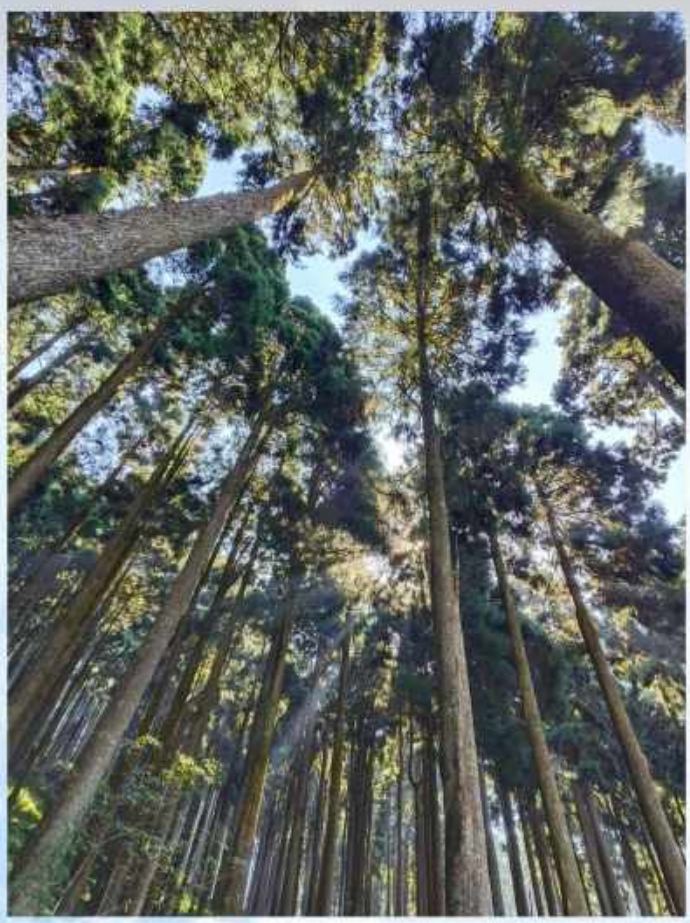
PUSHAN BASU-1ST

ABHINANDAN SINGH MAHRAUR-2ND

SAGNIK DUTTA-1ST

ABHINANDAN SINGH MAHRAUR-2ND

SOURAV MUKHERJEE-4TH

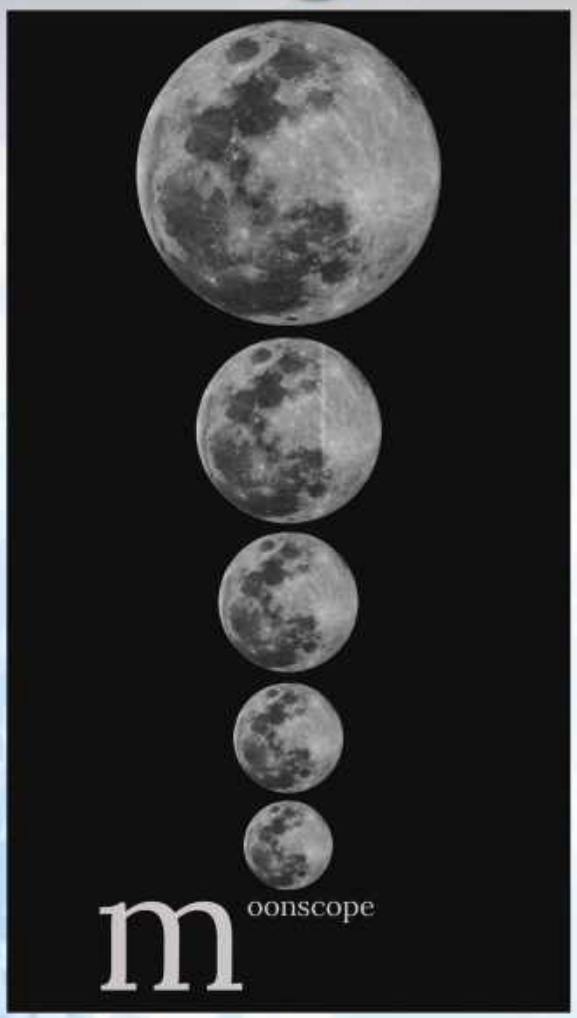


MEGHNA BOSE -3RD

ISANI PAUL-1ST

ARIJIT MUKHERJEE-2ND

SAYAN KARMAKAR-2ND



PURBITA MITRA-2ND

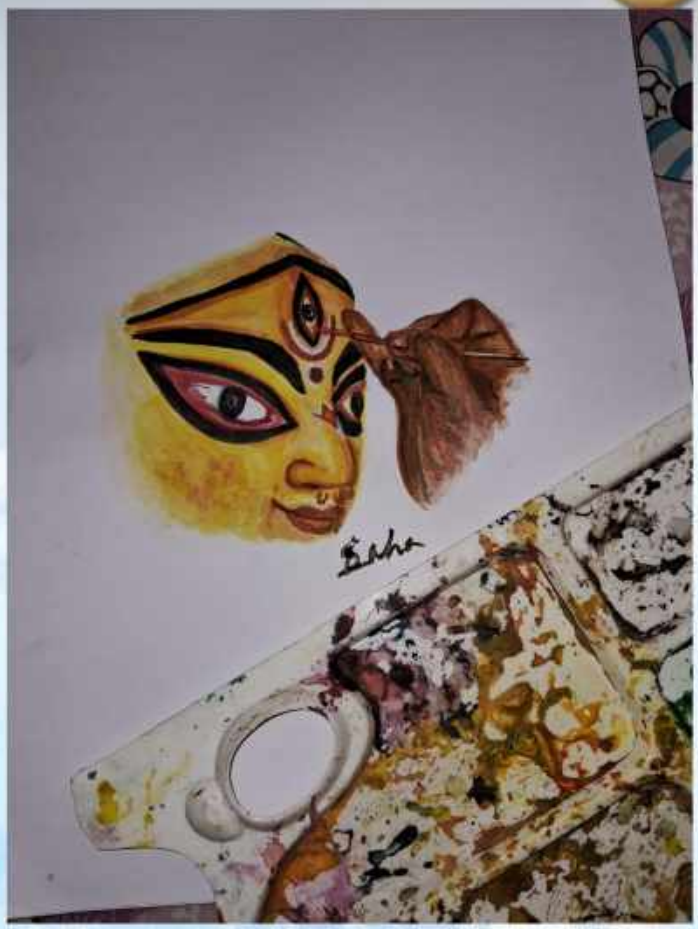
SWARNENDU SIL-3RD

AISHIK PAUL-2ND

VEDANT THAKUR -1ST

DIPANWITA BHANJA-4TH

ANUBHAB SHARMA-1ST



SUCHANA LAHA-1ST

SUBHRADEEP ROY-1ST

DIP RANJAN DUTTA-2ND

SUMANTRA DUTTA-2ND

RETTIKAA MANNA-2ND

BASUNDHARA HAZRA-2ND

PRATISHTA BASAK-1ST

SURUCHI KUMARI -2ND


THE
WORLD
TODAY

Union Cabinet Approve Spectrum - 5G

The Union Cabinet has given its approval to the 2024 spectrum auction, which is anticipated to bring in Rs 96,317 crore for the government coffers. Many spectrum bands, including 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, and 2300 MHz, which telecom operators can use to offer 2G, 3G, 4G, and 5G services, will be up for auction. This action is taken at a critical juncture as the telecom industry is rebounding
from recent setbacks and India is getting ready for the launch of 5G.

Why is spectrum important and what does it mean?

The radio frequencies allotted for use in airwave transmission are referred to as the spectrum. In wireless communication systems such as satellite communication, radio, television, cordless phones, and mobile networks, among others, it is a vital and limited resource. Since the introduction of cell phones and growing.

For Telecom Industry- Business Expansion

The upcoming auction coupled with reforms introduced in 2021-22 will infuse liquidity and stimulate investments in the debt-ridden industry. Telecom operators will be able to expand networks in semi urban and rural areas and support new technologies like Internet of Things (IoT), machine-to-machine communications.

Modern networks will prepare India to become a digitally empowered economy as envisioned under Digital India. Affordable spectrum prices can attract foreign operators too.

For Government – Revenue Generation

Experts predict the 700 MHz band to see maximum interest from operators due to its premium propagation and penetration characteristics. If sold completely, the auction can fetch around Rs 1.3 to 1.5 lakh crore for the government.

For The Telecom Sector: Business Growth

The impending auction and the changes implemented in 2021–2022 will provide liquidity and encourage investment in the heavily indebted sector.

In addition to supporting emerging technologies like machine-to-machine (M2M) communications and the Internet of Things (IoT), telecom operators will be able to extend their networks into semi-urban and rural areas.

As envisioned by Digital India, modern networks will equip India to become a digitally empowered economy. Low-cost spectrum might also draw in international operators.
Experts in government revenue generation forecast that operators will be most interested in the 700 MHz band because of its superior penetration and propagation qualities. The government might receive between Rs 1.3 and Rs 1.5 lakh crore from the auction if everything is sold.

-Sarojit Paul
ECE 2nd

RAM AYEE HAIN

One of the most remarkable things happens in 2024 is the inauguration of Ram Temple in Ayodhya, Uttar Pradesh. This Ram temple is the 3rd largest Hindu temple around the world. But the history behind it is not too much pleasing. The story had started at around 500 years ago; RAM JANMABHUMI is the site that, according to Hindu religion beliefs, is the birthplace of Ram. The seventh avatar of Bhagwan Vishnu, is on the banks of Sarayu River is a city called Ayodhya.

According to inscriptions on the site, the Babri Masjid was built by the 1st Mughal emperor Babur in the month of September ,1528, which destroyed Ram mandir.
Vishwa Hindu Parishad (VHP) constitutes a group to start the Ram Janmabhoomi movement. BJP leader LK Advani is made the leader of the campaign.

He led "Rath-Yatra" from Somnath to Ayodhya to gather support to build Ram temple at the site of the masjid. In 1985; the Rajiv Gandhi Government allowed Hindus to access the site for prayer. On 6th December 1992, Hindu nationalists demolished the masjid resulting in communal riots leading over 5000 deaths.

Archeological Survey of India (ASI) conducted a survey of the land in 1976-77, they found 12 pillars that remains of a Hindu temple. In 2019 Supreme court (November) granted 2.27 acres of land for construction of Ram Temple by handing over it to a trust.
The Shri Ram Janmabhoomi Teerth Kshetra trust began the first phase of construction of Ram mandir in March 2020.

The Architectural style of the temple is 'Nagara' style with sanctum sanctorum. Ram temple is among the most expensive religious project in India with an estimated cost of Rs. 1800 crore. The foundation features a 46 ft thick roller-compacted concrete layer resembling artificial rock, with a 21 ft granite plinth for moisture protection.

The Ram temple was designed by architect Chandrakant B Sompura. Very specially selected granite, sandstone and Makranga marbles are the only stones that have been used in the construction, which ensures a lifespan upto 1000 years and a earthquake of 6.5 would not effect it.

Ram Lala's Idol is carved by Arun Yogiraj and the Shaligram stone was used to make it. After long time 22th January,2024 honorable Prime Minister Narendra Modi inaugurated Ram mandir by 'pranpratishta' of Ram Lala. Prabhu Ram is the symbol of democracy, equality, culture, prosperity, heritage, peace, law, Nature, Success, Development.

-Debanjan Chakraborty
ECE 2nd

The World Today (Contemporary & Current Affairs)

The world today is a dynamic and complex landscape shaped by a myriad of political, social, economic, and environmental factors. From ongoing conflicts and humanitarian crises to technological advancements and global pandemics, there are numerous issues and events shaping our contemporary world. Let us into some of the key aspects of the world today.

Global pandemic and Public Health: The Covid-19 pandemic continues to have a profound impact on the world, affecting millions of lives and disrupting economics and societies globally. Vaccination efforts have been underway in many countries, but challenges such as vaccine distribution inequities and the emergence of new variants persist.

Climate change and Environmental concerns: climate change remains a pressing issue, with

with rising temperature extreme weather events, and environmental degradation threatening ecosystems and livelihoods worldwide.Efforts to climate change and transition to renewable energy sources have gained momentum, but urgent action is needed to prevent irreversible damage to the planet.

Technological Advancements and Digital Transformations: Rapid technological advancements, including artificial intelligence, automation, and blockchain are transforming industries and societies , offering opportunities for innovation and economic growth. However, these advancements also raise ethical and regulatory challenges, such as data privacy concerns and cybersecurity threats.

Economic Recovery and Resilience: The global economy faces challenges related to pandemic, including supply chain disruptions, inflationary pressures, and labor market uncertainties.Governments and international organizations are implementing measures to

support economic recovery and build resilience against future shocks, but disparities in access to resources and opportunities persist.

Healthcare and Access to Essential Services: Access to healthcare and essential services remains a critical issue, particularly in low-income countries and marginalized communities. Efforts to strengthen healthcare systems and expand access to essential services, including education and clean water, are essential for improving health outcomes and reducing inequalities.

Migration and Refugee Crises: Migration and refugee crises continue to pose challenges for countries and communities worldwide, driven by factors such as conflict, persecution, and environmental displacement. Addressing the root causes of migration, promoting inclusive policies, and enhancing international cooperation are crucial for managing migration flows and ensuring the protection of human rights.

In conclusion, the world today is characterized by a complex interplay of challenges and opportunities, from global pandemics and climate change to technological advancements and social justice movements. Addressing these issues requires collective action, collaboration, and commitment to building a more sustainable, equitable, and resilient world for future generations.

-Snehashis Kodali
ECE 2nd

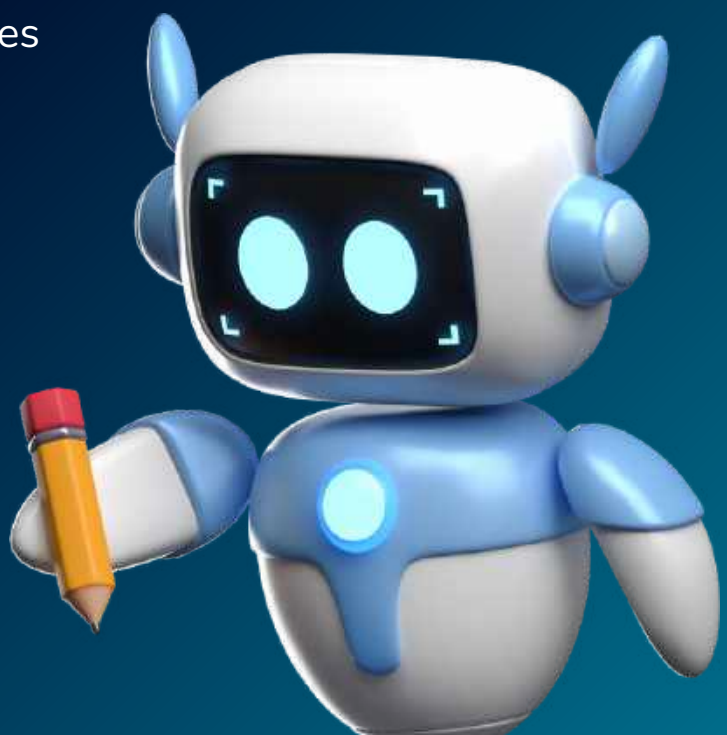
Technology and AI

In this era of rapid technological advancement, the world finds itself at a crossroads, grappling with the dual challenges of modernization and the emergence of artificial intelligence (AI) and machine learning. While many countries strive to keep pace with the relentless march of progress, others are seizing the opportunity to carve out their own niche in the ever-expanding realm of AI.

The pursuit of modernization has become synonymous with economic development and prosperity for nations around the globe. As societies evolve, there is an inherent pressure to embrace technological innovation and harness its potential to drive growth, improve living standards, and enhance competitiveness in the global marketplace. From infrastructure upgrades to digital transformation initiatives, countries are investing heavily in a wide range of sectors to propel themselves into the future.

However, amidst this pursuit of progress, the rise of AI and machine learning presents both opportunities and challenges for countries worldwide. On one hand, these technologies hold the promise of revolutionizing industries, transforming the way we work, live, and interact with the world around us. From automation and predictive analytics to personalized healthcare and autonomous vehicles, AI has the potential to unlock unprecedented levels of efficiency, productivity, and innovation across virtually every sector of the economy.

On the other hand, the widespread adoption of AI also raises complex ethical, social, and economic concerns that must be addressed. As automation replaces traditional jobs and reshapes the labor market, there is a growing urgency to ensure that the benefits of technological progress are shared equitably and that no one is left behind in the transition to a digital economy. Moreover, the proliferation of AI-powered surveillance systems and autonomous weapons poses significant risks to privacy, security, and human rights, highlighting the need for robust governance frameworks and international cooperation to mitigate potential harms.



Against this backdrop, countries find themselves confronted with a crucial decision: to embrace the transformative power of AI and machine learning or risk falling behind in the global innovation race. For some nations, the lure of technological supremacy has become a driving force behind their strategic objectives, leading to ambitious investments in research and development, talent acquisition, and infrastructure to bolster their capabilities in AI.

At the same time, there is a growing recognition that the benefits of AI should not be monopolized by a few countries or corporations, but rather shared for the collective good of humanity. International collaboration and knowledge sharing have thus become indispensable tools in the quest to harness the potential of AI for solving some of the world's most pressing challenges, from climate change and healthcare to poverty alleviation and education.

In conclusion, the world stands at a pivotal moment in history, where the choices we make today will shape the future of generations to come. By embracing the opportunities presented by AI and machine learning while also addressing the associated risks and challenges, countries can chart a course towards a more inclusive, sustainable, and prosperous future for all. The time for action is now, and the stakes could not be higher.

Anudipan Pal,
ECE-A, 2nd


EVENT
ECHOES

HACKHERITAGE 2023

HackHeritage 2023 was an exciting 24-hour event held at Heritage Institute of Technology on September 22nd, where more than 90 enthusiastic teams came together to celebrate creativity and technology. Each team had a mentor to help them out, creating a friendly atmosphere for new ideas. The best teams were supposed to represent Heritage Institute of Technology at the Smart India Hackathon.

HackHeritage 2023 wasn't just about winning; it was about working together and being passionate about making new things at Heritage Institute of Technology. This event also had active participation from students of Department of ECE, amongst which Team IceSpies comprising of Debanjan Sahana, Monojit Das, Sampriti Mitra, Soumyadeep Bose, Sourjya Mukherjee and Srijita Chatterjee from ECE 2nd Year got selected and represented HITK in the prestigious Smart India Hackathon 2023.

CHEMCON 2023

Heritage Institute of Technology hosted the Annual Session of Indian Institute of Chemical Engineers 2023 “CHEMCON 2023” from 27th December to 30th December. Around 1400 scientists, research scholars, corporate representatives, and faculty members/students from various engineering colleges across the country participated in this esteemed annual session. Over 900 research papers were also presented during these four days.

Simultaneously with the paper presentations, an exhibition was held which compromised of 26 stalls. Under “The Heritage” stall, two teams from the Department of Electronics and Communication Engineering: “Heat Stroke Detection System” and “Alzheimer's Aid” showcased their innovation models. “The Heritage” stall also featured other models from the ECE Department

HULT ONCAMPUS

2024

The Hult Prize '24, held at Heritage Institute of Technology on February 17, 2024, brought together 35 teams dedicated to address the global challenges with their innovative solutions, aligning with any or all of the 17 Sustainable Development Goals (SDGs).

The competition was conducted in two rounds, wherein eight teams advanced to the final round, showcasing exceptional talent and creativity in their ideas. One standout victory came from Monojit Das (ECE 2nd) and his team, who clinched the top prize, highlighting the department's excellence in innovation. There were also two other teams from ECE Department that featured in the finals.

Behind the scenes, the ECE department played a crucial role in the event's organization and success. Saumodip Das (ECE 3rd), as Deputy Campus Director, ensured smooth operations. Priyanshu Guha Thakurta (ECE 2nd) and Tanya Modi (ECE 2nd) expertly managed logistics, while, Arghyadeep Ghatak (ECE 3rd), Ankita Ghosh (ECE 2nd) and Shreya Sharma (ECE 2nd) effectively handled social media and outreach activities. Soham Dutta (ECE 2nd) contributed in the design team, while Sanyaee Das (ECE 3rd), Trisha Sengupta (ECE 2nd), and Ayusmita Saha (ECE 2nd) facilitated enriching workshops. Srinjan Kashyapi (ECE 2nd) and Aditya Kumar Shaw (ECE 2nd) provided invaluable tech support.

Their collective dedication, under Mousiki ma'am's mentorship, reflected the department's commitment to fostering change through innovation, making the Hult Prize '24 a resounding success.

ACHIEVEMENTS

TEAM ‘ICESPIES’

Represented HITK in the Grand Finale of Smart India Hackathon-2023

Selected & Participated in the Grand Finale of Smart India Hackathon-2023 with my team 'ICESPIES'. Members were - Soumyadeep Bose, Sampriti Mitra, Sourjya Mukherjee, Srijita Chatterjee, Debanjan Sahana and Monojit Das. We were the only team from our ECE department of HITK, selected & participated on that National Level Hackathon Finale (By Ministry of education) on 19-20 December 2023 at CHANDIGARH. Here we're dealing with a real-world problem statement which was given by Ministry of Defence. It was such an amazing experience and we got opportunity to work with DRDO scientists (36 Hours). We're still on the way for this year SIH...

~Debanjan Sahana

2nd Prize in Innovation, Design and Entrepreneurship Bootcamp Phase-II

Well, it was after our participation in Smart India Hackathon Final. Our team 'Icespies' participated in Innovation, Design and Entrepreneurship Bootcamp Phase-II, where we ranked second position. It was an event by Ministry of Education. The competition was on 29 January to 2 Feb 2024. Team members were - Soumyadeep Bose, Sampriti Mitra, Sourjya Mukherjee, Srijita Chatterjee, Debanjan Sahana and Monojit Das, all are from Ece department of HITK, 2nd Year, section B.

~Debanjan Sahana

TEAM ‘ALZHEIMER’S AID’

GRAND FINALE OF NATIONAL LEVEL STARTUP BIHAR INNOVATION CHALLENGE 2023

Team Alzheimer’s AID stood out among thousands, reaching the grand finale of Startup Bihar’s BIC’23 in Patna. After showcasing our model at the exhibition and advancing past the initial judging, we made it to the top 12. Although we didn’t secure a top 3 position, the event gave us great exposure and experience.

REPRESENTED HIT-K AND WON 1ST PRIZE IN POSTER MAKING COMPETITION IN INSTITUTION'S INNOVATION COUNCIL (IIC) REGIONAL MEET - EASTERN ZONE

IIC of HIT-K chose team Alzheimer’s AID to represent Heritage Institute of Technology in the poster competition IIC’s Regional Meet - Eastern Zone 2024. With the guidance of Professors Nandan Kumar Jana and Riddhi Goswami, we triumphed at the IIC’s Regional Meet - Eastern Zone 2024, earning the 1st prize in the poster competition

VLSID 2024

VLSID FELLOWS

Aratrika Bhattacharya
ECE 4th

Archisman Majumdar
ECE 4th

Ayush Kashyap
ECE 4th

Ritvik Bordoloi
ECE 4th

Rohan Ghosh
ECE 4th

Saumodip Das
ECE 3rd

Shriyans Roy
ECE 4th

SAUMODIP DAS, ECE 3RD presented a presentation on Smart Heat Stroke Detection System, developed by Saumodip Das, Sagnik Ray and Somsubhra Manna[ECE 3rd] at the Workshop on Intelligent Computing and Systems at the Edge (ICE) as part of VLSID 2024.

ICSTA 2023

SUMAN DEY, ECE 4TH
ISHA GHOSH , ECE 4TH

Presented my first-ever research paper at the prestigious International Conference on Systems & Technologies for Smart Agriculture - ICSTA 2023, hosted by AgriEnics - A National Program, CDACINDIA in collaboration with the Universityof Calcutta. 🎉 It's been an incredible experience collaborating with my fellow classmate ISHA GHOSH (4th Year, ECE, Roll No.: 2052202) and working on this research paper during my Summer Internship at CDACINDIA, Kolkata. The thrill of seeing our hard work pay off with an oral presentation in front of esteemed scientists and researchers is beyond words! Heartfelt gratitude to our mentor Sabyasachi Majumdar sir and Prof. (Dr.) Anindya Sen sir whose guidance and support made this opportunity possible.


CERTIFICATE
OF APPRECIATION
This is to certify that
Suman Dey
has presented the paper titled
AN EXPERIMENTAL STUDY ON LWT HASH ALGORITHMS TO SECURE IoT COMMUNICATIONS
in the International Conference on Systems and Technologies for Smart Agriculture (ICSTA 2023)
Organized by Centre for Development of Advanced Computing (C-DAC), Kolkata & University of Calcutta
at Kolkata, West Bengal, India, 19-20 December, 2023
PROF. ANJAN CHAKRABORTY
PROGRAM CHAIR
DR. ALOKESH GHOSH
PROGRAM CHAIR


CERTIFICATE
OF APPRECIATION
This is to certify that
Isha Ghosh
has presented the paper titled
AN EXPERIMENTAL STUDY ON LWT HASH ALGORITHMS TO SECURE IoT COMMUNICATIONS
in the International Conference on Systems and Technologies for Smart Agriculture (ICSTA 2023)
Organized by Centre for Development of Advanced Computing (C-DAC), Kolkata & University of Calcutta
at Kolkata, West Bengal, India, 19-20 December, 2023
PROF. ANJAN CHAKRABORTY
PROGRAM CHAIR
DR. ALOKESH GHOSH
PROGRAM CHAIR


CERTIFICATE
OF APPRECIATION
This is to certify that
Saumodip Das
has presented the paper titled
Design of Ternary Combinational Circuits
in the International Conference on Systems and Technologies for Smart Agriculture (ICSTA 2023)
Organized by Centre for Development of Advanced Computing (C-DAC), Kolkata & University of Calcutta
at Kolkata, West Bengal, India, 19-20 December, 2023
PROF. ANJAN CHAKRABORTY
PROGRAM CHAIR
DR. ALOKESH GHOSH
PROGRAM CHAIR

SAUMODIP DAS, ECE 3RD
SAYAN MUKHERJEE, ECE 3RD
SUTAPA TRIVEDY, ECE 3RD

Presented the paper titled Design of Ternary Combinational Circuits in the International Conference on Systems and Technologies for Smart Agriculture (ICSTA 2023) organized by C-DAC Kolkata and University of Calcutta.

ALL PARTICIPANTS IN ICSTA 2023 FROM HIT-K

COMPETITIONS AND HACKATHONS

ANEESH SAHA, ECE 1ST
1ST IN VALLE CONCURSO COMPETITION BY NRS MEDICAL COLLEGE AND HOSPITAL

NABENDU KUNDU, ECE 4TH

CODE IT OUT (ENVISION 2024), INTER COLLEGE CODING CONTEST CONDUCTED BY RAMAKRISHNA MISSION RESIDENTIAL COLLEGE, NARENDRAPUR

SANJANA GANGULY, ECE 1ST

1ST IN ALAP AT ADVAIT COMPETITION

AISHI MUKHOPADHYAY, ECE 1ST

TOP 40 IN SPACE HACKATHON 2023

Shortlisted as 40 top teams among 200 teams participating in the Space Hackathon 2023 organised by India International Science Festival 2024 at Faridabad, but unfortunately could not attend due to semester exam. Team Member: Akash Kundu CSE 2nd Year & Arnab Sengupta CSE(AI/ML) 1st Year

3RD IN MOCKUP 3.0, A DESIGNATHON ORGANISED BY IEEE-CS FROM MANIPAL UNIVERSITY JAIPUR

Mockup 3.0 , a Designathon organised by IEEE-CS from Manipal University Jaipur was an inter-college event where we stood 3rd overall and first from our problem statement. team member: Arnab Sengupta CSE (AI/ML) 1st Year

IMAN CHAKRABORTY , ECE 3RD

4TH POSITION AT OPTISIM IN TECHNO-OPTIMIZATION FEST OF IIT KGP

4th position at OptiSim Competition conducted in association with FlexSim during Optima 2023, the Techno- Optimization fest of IIT Kharagpur organised by the Department of Industrial and Systems Engineering.

SAYANDEEP BISWAS, ECE 2ND

RUNNER UP IN FOOTBALL IN MAGNUS 2K24 (JIMSH & BBIT)

PUBLICATIONS, PRESENTATIONS AND IEEE ACHIEVEMENTS

DIPANWITA BHANJA, ECE 4TH
SOURAV MUKHERJEE, ECE 4TH
SAPTARSHI CHAKRABORTTY, ECE 4TH
SOUNAK ROYCHOWDHURY, ECE 4TH

Publication of e-Journal in International Journal of Innovative Research Technology


Certificate of Publication
INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN TECHNOLOGY
DIPANWITA BHANJA
In recognition of the Publication of the paper entitled
ANALYSIS OF HIGH FREQUENCY UPLINK DOWNLINK CHANNEL PARAMETER WITH VARIOUS K FACTOR
Volume 10 Issue 9 February 2024
PAPER ID: 162332
EDITOR IN CHIEF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EDITOR IN CHIEF

AYUSH KASHYAP, ECE 4TH
SHRIYANS ROY, ECE 4TH
ROHAN GHOSH, ECE 4TH
FAISAL AHMED KHAN, ECE 4TH

Presentation of a Conference Paper titled 'Influence of Buffer Length and Mole Fraction on Analog Performances of a Symmetrical Underlapped DG Si/SiGe-based MOS-HEMT Device' at the 3rd International Conference on Control, Instrumentation, Energy & Communication (CIEC) 2024. Publication at IEEEXplore.


CIEC24
IEEE Joint CSS-IMS Kolkata Chapter
Certificate of Presentation
Certified that Sri/Smt. AYUSH KASHYAP of DEPARTMENT OF ECE, HERITAGE INSTITUTE OF TECHNOLOGY, KOLKATA has presented a research paper titled INFLUENCE OF BUFFER LENGTH AND MOLE FRACTION ON ANALOG PERFORMANCES OF A SYMMETRICAL UNDERLAPPED DG Si/SiGe-BASED MOS-HEMT DEVICE at the 3rd International Conference on Control, Instrumentation, Energy and Communication (CIEC), jointly organized by IEEE CSS-IMS Kolkata Chapter and Department of Applied Physics, University of Calcutta during January 25-27, 2024 held at Kolkata, India.
(Kaushik Das Sharma) General Chair
(Rajarshi Gupta) Technical Program Chair
Applied Physics

SWAPNENDU HAZRA, ECE 4TH
SUBHAJIT DAS, ECE 4TH
SOURAJIT MUKHERJEE, ECE 4TH
SWARNALI SAHA, ECE 4TH


8th International Conference on Computers and Devices for Communication
CODEC – 2023
December 14 – 16, 2023
Organized by
Institute of Radio Physics and Electronics, University of Calcutta

Certificate

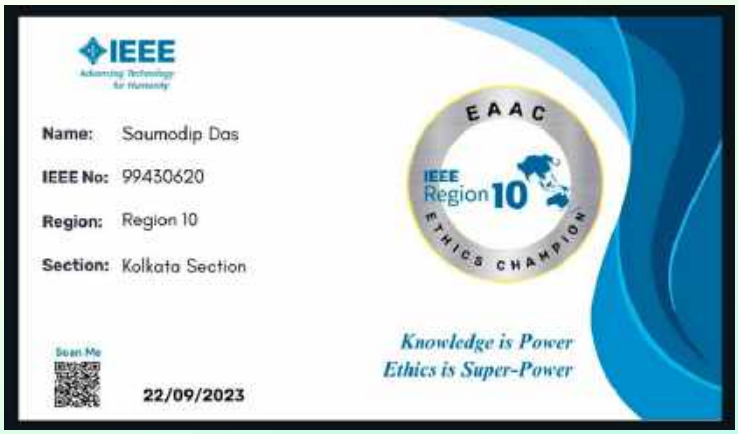
This is to certify that Swapnendu Hazra of Department of Electronics and Communication Engineering, Heritage Institute of Technology has presented the paper titled "OFDM On-Off Keying Index Modulation (OFDM-OOK-IM) with Enhanced Spatial Efficiency" at the 8th International Conference on Computers and Devices for Communication (CODEC - 2023) held on December 14-16, 2023 at the Ramakrishna Mission Institute of Culture, Kolkata, West Bengal, India.

Bratati Mukhopadhyay, Organising Chair, CODEC-2023
Ashik Paul, General Chair, CODEC-2023

Participated in the 8th International Conference on Computer and Devices for Communication, CODEC 2023 for poster presentation of "OFDM On-Off Keying Index Modulation (OFDM-OOK-IM) with Enhanced Spectral Efficiency" by Swapnendu Hazra (primary author and presenter), Subhajit Das, Sourajit Mukherjee, Swarnali Saha and Shounak Dasgputa (project supervisor and professor in Dept. of ECE, HITK) for publication in IEEE Xplore (in-press)

SAUMODIP DAS, ECE 3RD

Presented paper titled Recent Trends in Early Detection of Ocular Disorders using Image Processing, Signal Processing, Quantum Models and Related Approaches at the 7th International Conference on Electronics, Materials Engineering & Nanotechnology (IEMENTech) 2023.


IEEE
Name: Saumodip Das
IEEE No: 99430620
Region: Region 10
Section: Kolkata Section
EAAC
IEEE Region 10
ETHICS CHAMPION
Knowledge is Power
Ethics is Super-Power
Scan Me
22/09/2023

IEEE REGIONAL
ETHICS CHAMPION

AISHI MUKHOPADHYAY, ECE 1ST

Research Paper on "Firewall Log Anomaly Detection" Accepted at the IEEE 3rd INOCON 2024. Co-authored with Akash Kundu CSE 2nd year & Arnab Sengupta CSE(AI/ML) 1st year


SAI VIDYA INSTITUTE OF TECHNOLOGY
IEEE IEEE
3rd International Conference for
Innovation in Technology (INOCON 2024)

Certificate

This is to certify that Dr./Prof./Mr./Ms. Aishi Mukhopadhyay has presented paper entitled An Approach to Detect and Classify Potentially Suspicious Activity from Real-Time Log Data using Anomaly Detection Methods in 2024 3rd International Conference for Innovation in Technology (INOCON), jointly organised by Departments of CSE, ISE, ECE, CSE (AI & ML), CSE (DS) at Sai Vidya Institute of Technology, Bengaluru, India held during 4th – 6th March, 2024.

Dr. Shantikumar B Patil, Secretary and Outreach Chair
Dr. M S Ganesha Prasad, General Chair

OUR TEAM ADVISORS

AYAN BHATTACHARJEE
4TH YEAR

BISWAROOP JOARDAR
4TH YEAR

RAJAT JANA
4TH YEAR

RISHAV DAS
4TH YEAR

SK RUMMAN
4TH YEAR

OUR TEAM

SENIOR EDITORS

ANURAG DAS
3RD YEAR

PRITHVISHA GUPTA
3RD YEAR

ARGHYADEEP GHOSH
3RD YEAR

ESHIKA DAS
3RD YEAR

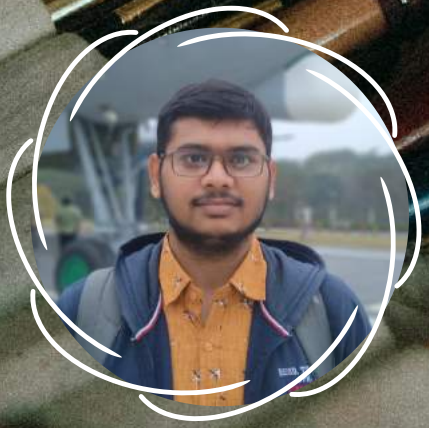
SHUBHA GHOSH
3RD YEAR

VIBEK ROY
3RD YEAR

OUR TEAM
JUNIOR EDITORS

ADITYA KUMAR SHAW
2ND YEAR

SHUVAM SAMANTA
2ND YEAR



ARIJIT MUKHERJEE
2ND YEAR

PRIYANSHU GUHA THAKURTA
2ND YEAR

AHONA DUTTA
2ND YEAR

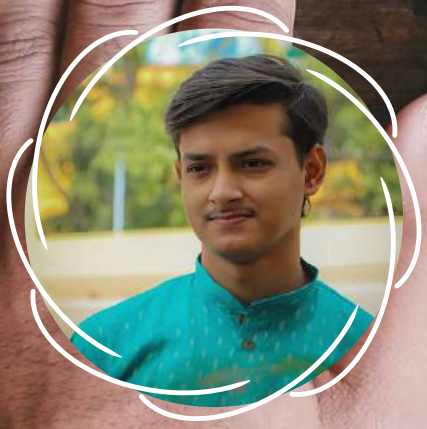
UPAMA ROY
2ND YEAR

OUR TEAM
SENIOR OUTREACH

SARGAM PAL
3RD YEAR

SAUMODIP DAS
3RD YEAR

SANYAEE DAS
3RD YEAR



KUSHAL NANDI
3RD YEAR

ARGHYADEEP GHATAK
3RD YEAR

OUR TEAM
JUNIOR OUTREACH

SHREYA SHARMA
2ND YEAR

SAYANDEEP BISWAS
2ND YEAR

SAYAN KARMAKAR
2ND YEAR

SAMPRITI MITRA
2ND YEAR

PRASHAREET CHOUDHURY
2ND YEAR

ANKITA GHOSH
2ND YEAR

AYUSH RAJ
2ND YEAR

AISHIK PAUL
2ND YEAR

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