HITech

Technical magazine of CSE Department, Heritage Institute of Technology

In This Issue:

Foreword

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It is our great privilege, being in the Editorial Board on behalf of students and teachers, to announce the publication of the HITech April 2022 issue. HITech is the Technical Magazine of the Department of Computer Science and Engineering, Heritage Institute of Technology, Kolkata.

We aim to encourage students of the CSE Dept to contribute articles on Technological Development and innovations in the field of computer science and allied disciplines like AIML and Data Science.

The present issue has been specially focused on the advancements of artificial intelligence. It delves into a lot of details regarding AI powered automation and modernization. It has been shown how a large number of sensors can be used for the collection of data through different means. According to various market studies, data analytics field plays a vital role in the manufacturing of items and supplying processed goods according to societal needs. If the Industry leaders of our country emphasize the production of these products having high market value and high demands, we would consider that as a success in such publication efforts.

Sustainable AI

By Riya Singh, 2nd Year, CSE

While there is a growing effort towards AI for sustainability it is time to move beyond that and address the sustainability of developing and using AI systems. Sustainable AI is a movement to foster change in the entire lifecycle of AI products towards greater ecological integrity and social justice. It is focused on more than AI applications; rather, it addresses the whole socio-technical system of AI. Sustainable AI takes sustainable development at the core of its definition with three accompanying tensions between AI innovation and equitable resource distribution; inter and intergenerational justice and between environment, society and economy.

The power for positive change that AI, brings holds the possibility for negative impacts on society. The recent explosion of AI, made possible by ever-rising amounts of data and computing power, has given rise to the field of AI ethics. The first and second waves of AI focused on what AI might do and the practical concerns of machine learning respectively. It is time to usher in the third wave of AI ethics, one that confronts the environmental disaster, that must place sustainable development at its core.

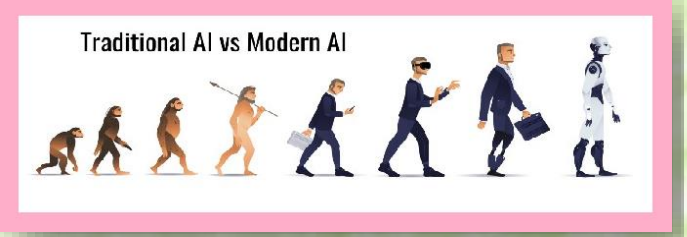
It is estimated that the process of training a single NLP model can lead to approx. 600,000 lb of CO2 emissions. Also, other studies have shown that 'google's AlphaGo Zero' generated 96 tonnes of co2 over 40 days of research training. In a time when the world must commit itself to reduce carbon emissions, one has to ask if the emissions from algorithms that can play games are worth the cost. AI is a technology for which we cannot afford to ignore environmental issues. It's therefore time when we must turn our attention to sustainable AI.

While the use of AI for achieving sustainability is to be applauded there are many reasons why the environmental costs of AI, and sustainability of AI, need to be studied and made transparent to the AI community, consumers, and policymakers. They should connect with the environment to remember that there are environmental costs to AI.

Some Interesting facts about Traditional vs Modern AI with instances

By Aryan Dutta, 2nd Year, CSE

Traditional AI (1950–2008): The term "Artificial Intelligence" was coined in 1956 at Dartmouth. Notable AI approaches back then were Fuzzy Logic (FL) and Expert Systems with programming languages like Prolog and Lisp being the favored choice. Later there were breakthroughs like for example Garry Kasparov being defeated by IBM's Deep Blue.



Modern AI (2008 onwards) The term "Data science" was coined in early 2008 which subsequently introduced advanced analytics leveraging Statistics, Probability, Linear Algebra, etc.

The advent of modern AI happened in 2012 when GPU was utilized for the training of neural network architecture.

If you are asked, "Why did all the breakthroughs happen in the last 8–10 years when AI has been around for more than 70 years? ". The Answer to it is: There is a Cambrian Explosion of Data, which has faster & cheaper processing using 'GPU,' and Today there is fast-paced AI research going around everywhere.

The current effect of AI on Normal Life

By Sayan Sinha, 3rd Year, CSE

Being able to trust life without computers is almost impossible. We want computers everywhere we use things in daily life. Therefore, it is essential to develop intelligent computers to make our life simpler. The study of computers that mimic human intelligence and senses, such as perception, speech recognition, decision-making, and language translation, is known as computer science. Technology may undergo a revolution thanks to computer science.AI can be classified as Type I and Type II.

Under Type 1 comes Slender AI also known as Weak AI. This can be designed to perform a selected task with intelligence. It is referred to as weak AI because it is unable to operate outside of its boundaries. It has been trained to try a specific task. Face recognition (Siri on Apple phones), speech recognition, and image recognition are a few examples of Slender AI. IBM's Watson mainframe computer, self-driving cars, taking part in chess, and resolution equations also are some samples of weak AI.

Another category is General AI also known as AGI / Sturdy AI. This approach will work as effectively as humans at practically every activity involving psychological features. The ability to build a system that may potentially function like a person on its own is what defines general AI the most. Many researchers may have this as a long-term objective to create such machines.

The third category is Super AI. Super AI is a type of artificial intelligence in which machines are more intelligent than people and are capable of handling any task requiring psychological complexity better than people. The ability to reason, solve puzzles, form judgments, plan and communicate independently are among the most options of a sturdy AI. The creation of sturdy AI may be the largest revolution in human history.

Yes! AI has many branches of Study, One of which is Data Engineering, next Robotics, Machine learning, and Natural Language processing. Google's Alpha Go and IBM's Deep Blue system comes under Reactive machines. Self-awareness comes under Type II AI, where consciousness is the future of computer science. These machines will outsmart people. If these machines square measure fictional then they will bring a revolution in human society.

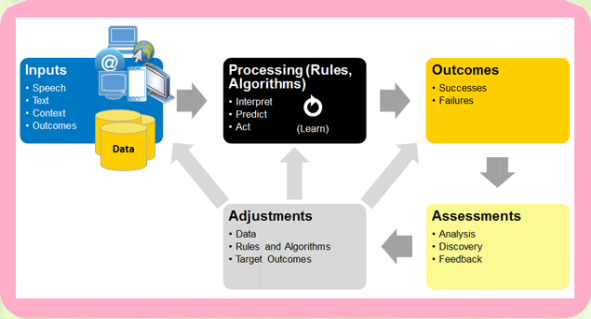
The Future of Learning: How Modern AI and Deep Learning Will Change the Way We Teach and Learn.

By Arya Das, 2nd Year, CSE

The world has changed dramatically over the past few decades, and in just the past few years, this change has been very rapid and noticeable. Technological advancements are now possible at an alarming rate, thanks to two popular new fields of study known as artificial intelligence (AI) and deep learning. AI research can be traced back to the 1950s, but recently it's become an especially hot area of interest due to breakthroughs in deep learning technology, which is a subset of AI concerned with making machines capable of processing information on their own rather than through direct programming. Artificial intelligence is a computer system that can do tasks that normally require human intelligence. For example, an artificial intelligence system may be able to read medical records and diagnose a disease as well as a doctor.

How Does AI Work? AI is everywhere, so it's not surprising that there are many misconceptions about what it is. There are a lot of articles out there that introduce AI as a machine that can think like a human. This is a myth. The machine can do many things just like humans, but cannot think like one. It tries to process the facts based on rules of prediction to interpret a new fact out of a set of given facts. The inputs may be processed signals, handwritten texts, or spoken instructions. The Rules and the facts - data should lead to a targeted outcome.

Ways Traditional AI Has Improved Our Lives Artificial Intelligence (AI) has been around since the beginning of the computer age and there are many ways it has improved our lives, from healthcare to retail to home automation to transportation. Here are 5 ways you might not have thought about. It's time to start thinking about AI in a new way... maybe even an artificial way! How are robots



helping us at home? Robots are designed to perform simple, repetitive tasks that can be done without human supervision. This frees up humans to focus on more important tasks. If you're a working parent who's constantly worried about your kids getting into mischief, a robot may be able to help them with homework or keep them company until you get home from work.

For elderly adults and people with disabilities, the assistance of robots can make their lives easier. How did voice assistants help us with our daily tasks? Voice assistants are a perfect example of how traditional AI is changing our lives. They allow us to organize our schedules, send messages, and play music without having to touch a screen. This kind of convenience is invaluable for those who find it difficult or impossible to use their hands and fingers.

How do self-driving cars change mobility?

Self-driving cars will change the way we move around in the future. With self-driving cars, people with disabilities will be able to go anywhere they want to go. It will be a safer option as well; human error is responsible for 94% of crashes.

As we are moving into the future, it is inevitable that education will change. With advancements in technology and tools such as artificial intelligence, the way we learn could be very different from how it is now. AI is making waves in many industries, but one area in that we are seeing a lot of success is education. When combined with other technologies such as virtual reality (VR) or augmented reality (AR), modern AI can help us rethink how we teach and learn.

One of the most interesting possibilities is the use of virtual teachers to teach students about world affairs and other subjects. This tool would allow students to explore new topics without having to travel or ask a teacher for more information. It also takes some pressure off of teachers because they can work with more students at once. Thanks to these new digital tools, even students who live in remote areas without access to traditional classrooms can gain access to quality education.

AI for the Future

By Jibitesh Chakraborty, 2nd Year, CSE

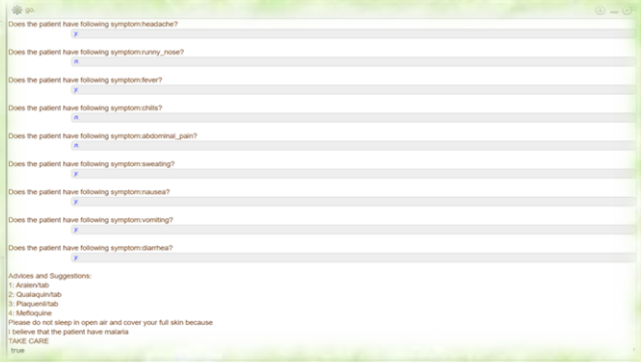
Embedding Artificial Intelligence (AI) in integrated circuits is one of the technological pillars of the so-called digital transformation. Embedded artificial intelligence (AI) is the application of machine and deep learning in software at the device level. The software can be programmed to provide both predictive and reactive intelligence, based on the data that is collected and analyzed. With embedded AI, devices can run AI models at the device level and then directly use the results to perform an appropriate task or action. In this entire process, the cloud plays no vital action as all programming occurs at the very core level of the system, in an embedded chip. The cloud is still helpful from a data storage perspective, as data can be stored temporarily at the device level and eventually sent to a cloud server for safekeeping.

Though the application and usage of embedded AI are pretty vast, in the present scenario it is widely seen in these industries:-

Agriculture, Aviation, Field Service Management, Finance, Healthcare, Manufacturing, Retail

Shipping, Supply chain. When your Dr. is an Expert system, why worry about it?

Being Computer engineers we can engineer our Diagnostive System and then refer it to a doctor.



Not only the above-stated areas, but AI is also very relevant in VLSI engineering. AI needs to go and will go hand in hand for a greater brighter future.

AI innovations that have rocked the world

By Sarah Moid, 2nd Year, CSE

When it comes to Artificial Intelligence, there is no shortage of inventions. These technological innovations are making the world demonstrated by machines, as opposed to the natural intelligence exhibited by humans.

Artificial intelligence research has been defined as the field of study of intelligent agents, which refers to any system that perceives its environment and takes actions that maximize its chance of achieving its goals.

The term "artificial intelligence" was previously used to describe machines that imitate and display "human" cognitive skills that are associated with the human mind, such as "learning" and "problem-solving".

Many AI innovations have rocked the World:

Speech recognition and virtual assistants-Natural language processing (NLP) is an integral part of artificial intelligence. NLP is a subset of AI that can understand the human voice. Virtual assistants use NLP to transcribe speech-to-text with great accuracy.

Virtual or digital assistants have been on the market for quite some time. However, the intelligent assistant of the iPhone, Siri, got into the news. Advances in this field have changed the way we interact with these devices today.

In the last few years, the number of voice digital assistants has grown to more than 1 million. There are plenty of options these days, with some big names like Google Assistant for Android, Amazon Alexa, and Microsoft Cortana.

Biometrics (Our Day to day record keeping System -Institutes/Universities/Hospitals)

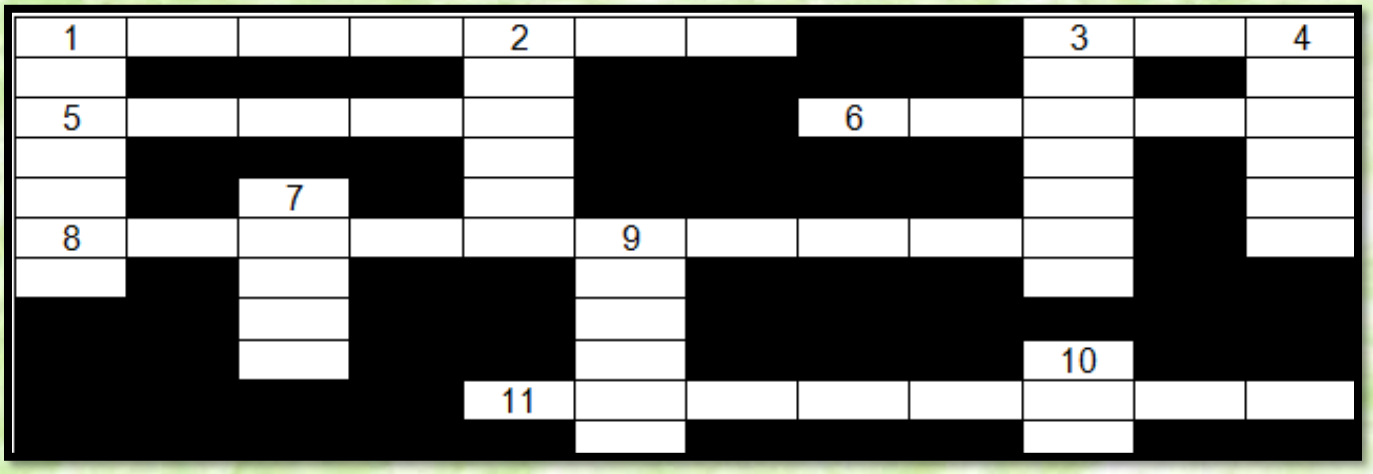
AI in biometrics has the ability to identify measure and analyze the biological characteristics of people. In recent years, it has played a key role in the organization's security. Authentication using biometric analysis of human behavior and physical characteristics of the human body.

Biometric authentication takes a similar approach to classic methods but has certain advantages. Classic methods depend on something you know, such as a password or PIN, while in the case of biometrics you don't need to remember anything, as it relates to the physical aspects of the structure and form of the human body.

There is no shortage of inventions when it comes to artificial intelligence. Thanks to these technological innovations for which the world is safer and smarter. Life has been made more convenient for us.

Crossword

Collected by, Prof. Somenath Sengupta,
Assistant Professor, CSE

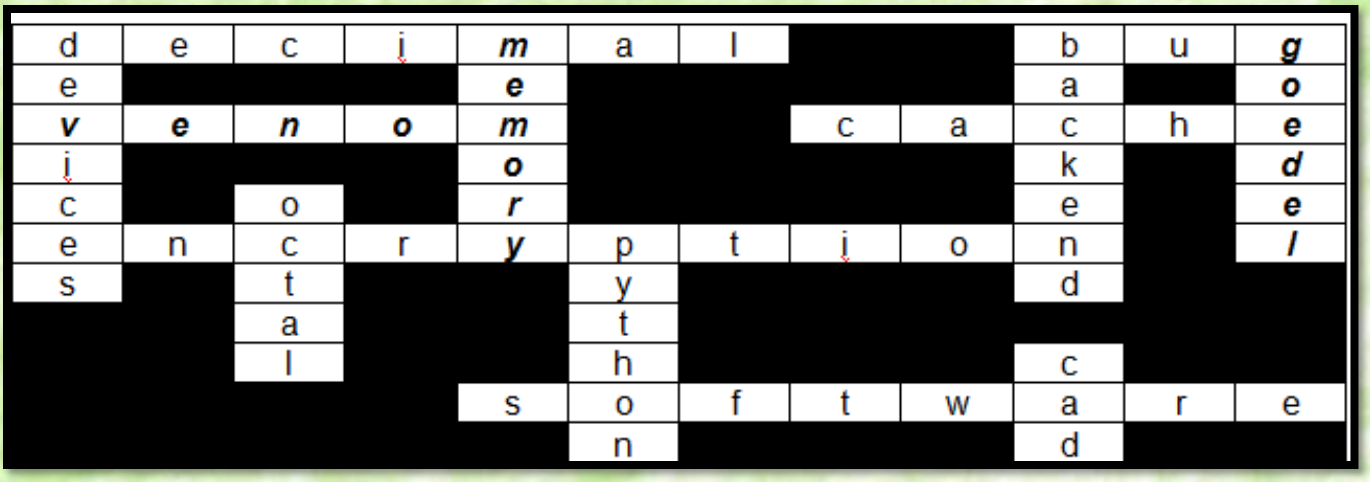


Hints:

ACROSS:
1. The number system consists of at most 10 digits.
3. Comes free with software.
5. A computer security flaw (acronym)
6. The fastest system memory.
8. For safety, we do this during data transfer.
11. A very large collection of computer instructions

DOWN:
1. Pieces of physical hardware.
2. Computer data storage
3. Location of RDBMS
4. Name of a declarative, general-purpose language for artificial intelligence based on logic programming
7. The number system consists of at most 8 digits.
9. A programming language created by Guido van Rossum and first released in 1991
11. A type of software that allows users to create 2D and 3D design and modeling

Solution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