DIGITAL OUTLET

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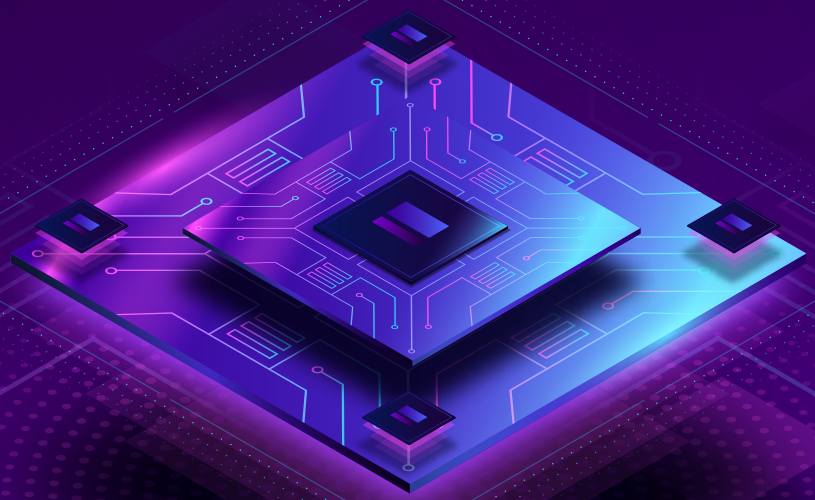

ACM CCET STUDENT CHAPTER
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Chandigarh College of Engg. & Tech.
CCET

VISION

Chandigarh College of Engineering and Technology aims to be a center of excellence for imparting technical education and serving the society with self-motivated and highly competent technocrats.

MISSION

1. To provide high quality and value based technical education.
2. To establish a center of excellence in emerging and cutting edge technologies by encouraging research and consultancy in collaboration with industry and organizations of repute.
3. To foster a transformative learning environment for technocrats focused on inter-disciplinary knowledge; problem-solving; leadership, communication, and interpersonal skills.
4. To imbibe spirit of entrepreneurship and innovation for development of enterprising leaders for contributing to Nation progress and Humanity.

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Advancing Computing as a Science & Profession

LOOK WHAT OUR MENTORS HAVE TO SAY

Our mission at ACM CCET is not only to produce engineering graduates but to produce engineering minds.

- Dr. Manpreet Singh

Principal CCET (Degree Wing) | Source of Inspiration

ACM CCET provides student a great opportunity to learn scientific and practical approach of computer science.

- Dr. Sunil K. Singh

Professor and HOD, CSE | Faculty Mentor

Every person should be provided with an opportunity to learn and explore the field of computer science.

- Sudhakar Kumar

Assistant Professor, CSE | Faculty Sponsor

CCET ACM Student Chapter focuses not only on the growth and development of technical skills but also on an individual as a whole.

- Anshul Gupta

UG Scholar, 6th Semester, CSE | Chairperson

CCET ACM STUDENT CHAPTER

Our Chapter was established on September 18, 2015, and it will be completing its 6 years in the upcoming September. From this year CCET ACM Student Chapter has decided to work on the following initiatives and the team is already working towards it.

Research and Development

Competitive Coding

Designing & Digital Art

Web Development

ABOUT CASC

ACM boosts up the potential and talent, supporting the overall development needs of the students to facilitate a structured path from education to employment.

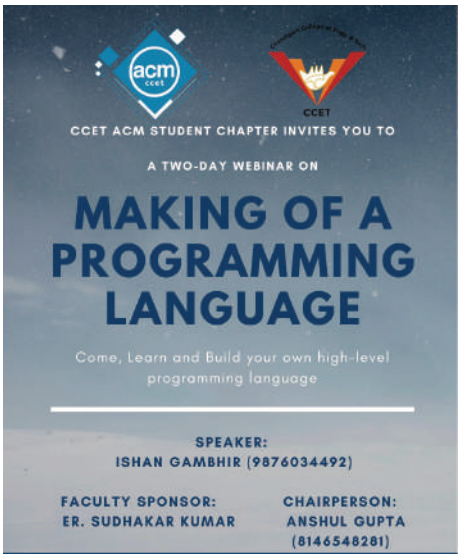
Our Chapter was established on September 18, 2015, and it will be completing its 6 years in the upcoming September. The total number of members presently stands close to 152. Over the years, CASC has been growing and involving more tech enthusiasts who share their experience and knowledge of their domain with other budding technocrats.

Overall, we at CCET ACM Student Chapter, through collaboration and engagement in a plethora of technical activities and projects, envision building a community of like-minded people who love to code, share their views, technical experiences, and have fun.

BENEFITS

- A vast network of nearly 100,000 highly dedicated student and professional peers.
- Become a member of computing community through one of hundreds of Professional and Student Chapters worldwide
- A full year subscription to ACM magazines and news letters.(Communications of the ACM, XRDS: Crossroads, MemberNet etc.)
- Participation in ACM Distinguished Speakers Program (DSP).Renowned International Thought Leaders Speaking on the Most Important Topics in Computing Today
- The option to subscribe to the full ACM Digital Library, which includes over 2 million pages of text.
- Unique volunteering opportunities to gain hands-on experience and knowledge of the marketplace

TWO DAY WEBINAR ON 'MAKING OF A PROGRAMMING LANGUAGE'



MAKING OF A PROGRAMMING LANGUAGE

May 15-16, 2021

YOUTUBE STREAM LINK

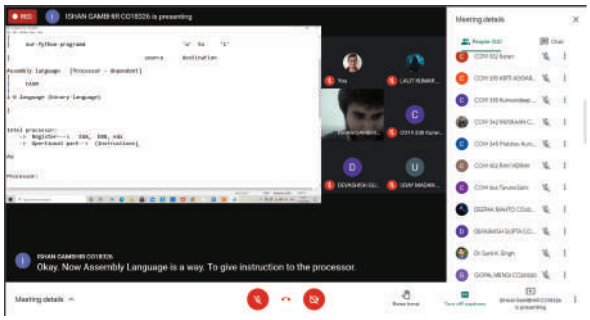
TOPICS COVERED

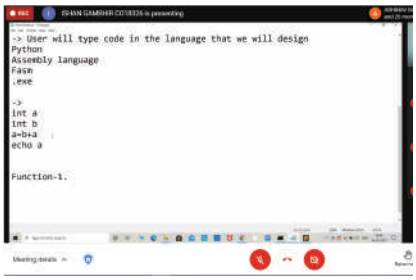
1) Introduction to FASM (Flat Assembler.
2) Difference Between 32bit and 64bit CPU.
3) Introduction to 32bit registers.
4) Syntax of FASM and discussion on implementation of a basic Compiler.
5) Deciding syntax, and operators for new high level language.
6) Phase by Phase implementation of Compiler and study of the same to build your new language.
7) Writing and running your first sample programme in new designed language.

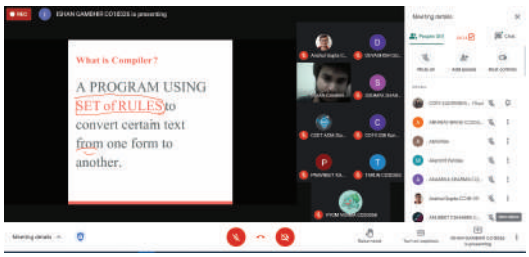
May 15-16, 2021

In this two-day session, the audience was guided about how a new high-level programming language is designed, and how a compiler translates that code to an assembly language, and then how an assembler translates it to executable machine code. After the event, the audience can code their own compilers, and hence at the end, each one has their own high-level programming language.

EVENT GALLERY







SPEAKER

ISHAN GAMBHIR

Researcher and Expert in Computer Science fundamentals; Associated with Chegg India as a Computer Science Expert; Currently working on compilation using dynamic programming.

THE WORLD OF AI

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KEYWORDS

Artificial Intelligence | Machine Learning

JOHN MCCARTHY in 1956 make up the term "ARTIFICIAL INTELLIGENCE". Research on AI has now been premeditated for a lengthy period, but it is still considered to be one of the intangible subjects in Computer Science. Artificial Intelligence is considered to range from apparatuses that are efficient of THINKING to quest for algorithms which can be implied for the board games. With numerous tactics, AI is considered to be an interdisciplinary science. But now a major paradigm alteration is happening in effectively all technology related sectors with the intensification and advancement in ML and DL AI is applicable in every field of work in this society.

Over the past 70 years the success received in making search algorithms, statistical analysis, machine learning algorithms to be more related to the real life is considered to be the major achievement of AI. However, most of these advancements are not noticed by the people at large. "TRUE AI" as interpreted by people has not progressed much. This is because True AI is considered something way more fictional like the sci-fi movies. Although in future these things might be achievable but for now AI is still at the infant stage only. One more reason is after a problem which is considered to be AI is solved, than it is just completely removed from the domain of AI, and it usually comes under the normal computation criteria.

The current technological infrastructure reality is always outpaced by expectations in the domain of AI. The Turing Test (INTELLIGENCE MEASURING ARCHETYPAL) is one such a test that no computer has ever come close to passing, even after the ever-going research in this domain. Applications like Expert Systems have shown potential but have not become as natural as human experts. The Turing Test was proposed in 1950 by mathematician and computing pioneer Alan Turing in his paper entitled "Computing Machinery and Intelligence". The paper itself commenced by posturing the unpretentious question: "CAN MACHINES THINK?" It is an unrepresentatively laid-back scheme of determining whether a mechanism or an application can establish some sort of humanoid intelligence. This test has always been the center of research for AI researchers. A large section AI researchers society also supposes that Turing Test would never be passed. This test is represented a powerful vision to AI which is quite proven by the fact that it is still very much in the larger picture of the AI world.

VOL. 01 ISSUE 02 ARTICLE 01

THE V'S OF BIG DATA

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DATA | Internet | Artificial Intelligence

What is Big Data?

There is an exponential increase in the availability of data in the world. Collecting huge volumes of data from traditional and digital sources that can be compiled, stored, organized, and analyzed to reveal patterns, trends, and opportunities is referred to as Big Data. It is collected from equipment and IoT devices such as smartphones, sensors, wearable devices such as fit bands for monitoring health, etc., and is a very valuable source of information. Analytics powered by artificial intelligence (AI) and machine learning are applied to data in real-time to improve decision-making and automation and to draw conclusions aimed at increasing efficiency or opening new business lines.

Big Data is one of the technologies that make IoT possible. Sensors are embedded in IoT devices. These devices make decisions on their own without any involvement of humans. Data sensed by the sensors is integrated to perform further analytics on the collected data for better decision-making and improved efficiencies.

Also, social media is one of the biggest online platforms in the present world. It helps the companies to understand the demands and interests of the audience to increase efficiency for better user comfort. Big data frameworks like Hadoop can be used to mine the sentiment data from Facebook, Twitter, or other social media platforms to understand the customer feelings and attitudes about the product and make real-time decisions to improve the quality of the product and make customers happy. It is also used in processing the data which saves a lot of time as compared to the traditional way.

Three V's of big data are -

Volume - Large amounts of data are collected from a variety of sources such as smartphones, sensors embedded in IoT devices, social media, and more. It is stored on platforms to identify relevant data and make good use of it.

Velocity - Data from IoT devices is generated at an ever-accelerated speed. It must be collected, processed, and handled in a timely manner.

Variety - There is a variety of data that includes all types of formats such as structured and unstructured data. Structured data is easy to sort and extract value from. It can be easily stored, analyzed, and organized within columns of the database. Unstructured data such as emails, videos, documents, web pages, and audio is difficult to sort and extract from.

Recently, additional V's are proposed by big data practitioners -

Veracity - It refers to the quality of data collected from the devices. Data coming from different sources should be correct and valuable so that organizations must be able to trust the quality of data.

Variability – The flow of data is unpredictable as data is changing often and varying. Sophisticated programs must be created to understand the context and meaning of data.

Visualization - Data must be visualized in graphs to tell its meaning to both technical and non-technical decision-makers. The information available from data will help in better decision-making.

VOL. 01 ISSUE 02 ARTICLE 02

FASHION FORECASTING USING DATA ANALYTICS

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KEYWORDS

Data | Internet | Artificial Intelligence | Forecasting | Data Mining

Fashion Forecasting -

Marketing segmentation and targeting strategies are quickly evolving to adapt with the ever-changing environment, moving away from obsolete, static, demographic-based criteria and toward dynamic, mood, lifestyle, and psychographic impacts. Fashion forecasting in its generic form is a global career that focuses on upcoming trends with design features and supply a consumer-driven fashion design application in digital dynamics, by using text mining and semantic network analysis. The goal of this analysis is to review blog articles about fashion collections.

Analysis of Data after Mining -

Recently, the fashion industry has used online data to identify upcoming fashion trends. On an enormous scale, the Google Fashion Trend Report in the US compiled data on over six billion searches. The fashion-related searches were compared by applying time-series clustering to categorize trends into six clusters of "sustained growth," "seasonal growth," "rising stars," "sustained decline," seasonal decline," and "falling stars." However, as confirmed by the Google report, it's difficult to distinguish whether a searcher intended to purchase the product or whether there were some other miscellaneous reasons for the search.

AI trendspotters -

IBM's Watson AI can sift through several thousands of photos from fashion shows to govern which colours and patterns should shops carry so as to be equipped for the upcoming season. Irrelevant variables like backdrop kinds and model skin tones, are ignored by the algorithm. Then it detects and records the most prominent colours in each image, eventually delivering statistics on how often each colour appears.

The power of AI in trend forecasting doesn't stop there. The trends you'll notice at prominent retail stores this year have been in the works for a while. According to Fashion Snoops, blue surpassed pink as the most popular colour on the runways for spring and summer 2021, so anticipate more periwinkle colours next season.

Semantic network analysis -

By expressing semantic links between words in a network in a graph with labelled nodes and edges, semantic network analysis generates information about them. Any words that may be linked to other words are referred to as nodes. Designers, brands, design characteristics, sentiment words, and evaluation words are frequent nodes in the fashion world. A matrix comprising rows and columns of entities is used in semantic network analysis. If the rows and columns of a matrix relate to the same set of things, it is called 1-mode. A matrix can be 2-mode, on the other hand, if the rows and columns index separate groups of things.

VOL. 01 ISSUE 02 ARTICLE 03

CLEAN MOBILITY

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KEYWORDS

Electric Vehicles

With rise in pollution due to fuel combustion, world is forced to search for alternatives to drive the society by transforming it from fuel combustion vehicles to electric powered vehicles.

An Electric Vehicle (EV) runs on Battery packs which is fed to the Inverter converting DC to AC which in turn drives the Induction Motor resultantly driving the vehicle. The EVs have few advantages over the traditional vehicles, apart from being a cleaner and greener source of energy. EVs are also Safer, Noiseless, high performance oriented, highly responsive due to efficient software and can handle high Torque and Power. Moreover, there's plenty of ways to Recharge the Batteries from Solar options to the inbuilt Regenerative Braking System which converts the motion of moving wheel into electricity by making the Inverter work as the Generator when Accelerator Paddle is released i.e., converting the Kinetic Energy of the moving vehicle into electricity instead of wasting it in heat.

The EVs seems to be the only way to keep our mobility and our planet.

The benefits of electric cars have brushed off on many leading countries with many making goals to switch completely to the EVs. With more than a dozen countries, mostly in Europe, ready to phase out sale of fossil fuel vehicles by 2050. Norway aims to achieve 100% EV share of new passenger vehicle sales by 2025.

Comparatively, major markets in Asia seems less ambitious as they lack official long-term statements about full electrification. With 2050 being the target year for most countries to achieve 100% switch and 2030 for achieving 20-30% switch.

With these high goals industry giants like Tesla and others must come to play as their role is a major one. Although each country is pushing its own research into this field, a few have been able to achieve a significant market share. Moving forward, efficient technology sharing, and effective costing will be a big step towards the cleaner mobility goal.

India is not far behind in making major changes to align with global EV goals. India switching towards the EVs will be a major step not only locally but also globally to help meet these goals. India has always been a front runner in innovation and technology and India's engineering prowess has always been proven in testing times. Leading Indian Motor Vehicle companies like TATA Motors, Hero, Mahindra etc. are now exploring new innovations in EVs, suitable for Indian market.

To further push the clean mobility goal many state governments have announced their goals, with Delhi's being most comprehensive in the country with its Switch Delhi campaign. The Capital aims for 25% of all its vehicles being switched by 2024 and all government department cars by the end of 2021. The Central Government is aiming 70% of all commercial cars, 30% of private cars, 40% of buses, and 80% of two-wheelers and three

wheelers sold in India by 2030 be electric. India preparing to providing Stable and abundant charging stations, subsidies, and incentives have already put its front foot into the global EV goals.

Now, as we all understand the need for the EVs, the other half of the responsibility lies on our shoulders, the consumer. With making smart choices and choosing what best for our future we should all be aware and well educated about the benefits as well as disadvantages of opting or not opting EVs respectively.

With the trust we put in ourselves and the people surrounding us, we can all look collectively at cleaner and greener future for us and the generations to come.

ANGULAR OR REACT?

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KEYWORDS

Frameworks| JavaScript
Angular | React

The choice for a front-end library or framework is not a walk in the park. Angular and React have proven to be two of the most popular JavaScript front-end frameworks and libraries. So, naturally, the selection among them is extremely debatable. Therefore, it is necessary to focus on some comprehensive differences between Angular and React, helping you choose the best fit for your next or existing project

What is Angular JS?

Angular JS is a JavaScript-based front-end framework. Released in 2010, by Google, Angular is used to build Single Page Applications (SPAs). It serves as the frontend part of the MEAN stack as an open-source web application framework. The latest version of Angular is 1.2.21.

What is React JS?

React JS is a free and open-source JavaScript library that was released in 2013 by Facebook. It is a part of the MERN stack and is additionally accustomed to building Single Page Applications. The most recent version of React is 17.0.2

Popularity

According to Stack Overflow, Angular was popular until 2016 but since 2018, React has become more popular, ranking first over Angular. The reports in Google Trends showcase React as the most talked about. React leads in NPM downloads too.

Maturity of Frameworks

Both React and Angular are quite mature with an oversized community. The maturity among them can be com pared using GitHub's community response within which Angular has 59k stars while React has 146k stars.

Learning Curve

Learning Angular might be a touch difficult as compared to React. It requires you to learn modules, directives, services, templates, etc. as basics and advanced concepts such as AoT compilation. On the other hand, you have to get hands-on with JSX, props, configuration, and routing libraries to get React expertise.

Performance

We measure the performance using the Document Object Model (DOM). Angular makes use of a Real DOM which is perfect for single pages which require fewer updates. The library size is huge which makes the apps slower. React uses a virtual DOM which is apt for pages requiring regular updates. The size of the library is small which make the pages more dynamic

Tools

Angular provides various built-in libraries which come in handy when building complex applications whereas React requires the implementation of additional libraries. As a consequence, the React developers have more freedom to have their code organized as per their wishes

Angular vs React for mobile

Both Angular and React offer cross-platform mobile application frameworks or libraries. Ionic and NativeScript are the most widely used platforms to build mobile applications in Angular, which has no official support for mobile app development. Here, React Native takes the spotlight as it is widely used for mobile applications.

When to Choose What?

To build a large scale application that is loaded with a spread of features, one must opt for Angular. It not only provides us with a reliable framework but also makes the development of real-time message apps easy. Programmers who have an upper hand at the OOP languages such as Java, C or C++ might be at ease working with Angular because Angular uses TypeScript which has a similar syntax with these languages. It is for this reason, they can enjoy the feature of getting their errors detected in the compile-time. Angular offers clean code development and a material design-like interface.

On the other hand, developers mostly prefer using React JS because it provides a better user experience and faster performance. Considering the simplicity and the syntax of JSX (which is used in React), building applications using React is a simpler path. The learning of React is much easier and React offers a better mobile cross-platform network. Once you combine React with ES6, it's perfect for managing heavy loads with relative ease.

Conclusion

Choosing a framework or a library depends completely on your project level, goals and requirements. If you are a beginner and have less coding practice then you can go with React because its learning curve is faster and it's easier to get a job with React as compared to Angular. If you want a full-blown framework to build a large scale project and love the oop concepts then go with Angular.

VOL. 01 ISSUE 02 ARTICLE 05

MLOPS

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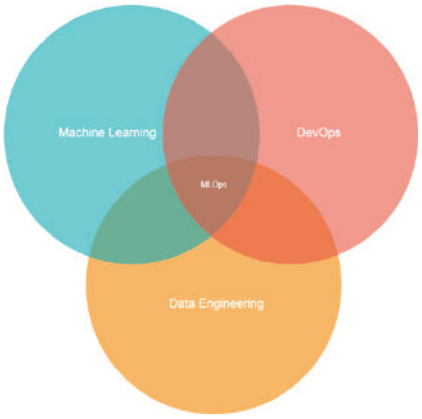
KEYWORDS

Machine Learning |
DevOps |

MLOps- A new era of DevOps, Powered by Machine Learning.

While discussing AI, we typically examine data pre-preprocessing, perceptions, and model structure however altogether less routinely, the innovation is referenced as far as execution and arrangement!



With the interesting mix of terms "AI-ML" and "Development Operations," MLOps is an assortment of methods, that is utilized for AI and its life cycle computerization and its calculations in execution for enormous scope. It clears a smooth way for a coordinated effort between an information researcher and IT proficient, and consequently goes about as a scaffold between the abilities, methods, and apparatuses utilized in information designing, AI, and DevOps. There are various benefits of MLOps which incorporate

Extended time for growing new models: Using MLOps, Developer activity experts are answerable for the creation climate, while, meanwhile, Data Scientists can zero in on the primary information and data tasks;

Fast promoting of ML Models: MLOps additionally works with model learning by giving computerization and holding. It builds CI/CD for carrying out, sending, and refreshing AI pipelines.

More precise gauges and forecasts: MLOps thinks about information and model approval, assessment measurements underway, and preparing the model again against new and new datasets. This load of result in the decrease in dangers of incredible experiences and guarantee that you can believe results delivered by your calculation when settling on significant choices.

MLOps is considered as DevOps often. MLOps obtains a ton of provisions from DevOps, however here are a few contrasts between the two-Besides code forming, you need a spot to save information and model forms: a ton of testing is engaged with ML and AI, which makes information researchers train models on different informational indexes and get various yields. Thus, notwithstanding code adaptation control utilized in DevOps, MLOps needs a bunch of explicit instruments for saving information and reuse of model variants; Monitoring models after some time for corruption: "Everyday routine changes thus encounters information our model takes in"- and it brings about model debasement by diminishing the exactness of the model. Endless preparing: Once the debasement is seen in a model, it must be retrained by utilizing new and late information. The constant preparing and in MLOps replaces the testing acted in DevOps.

VOL. 01 ISSUE 02 ARTICLE 06

MEMRISTOR

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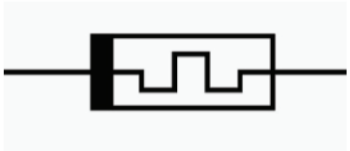
KEYWORDS

Memory



(Symbol of Memristor)

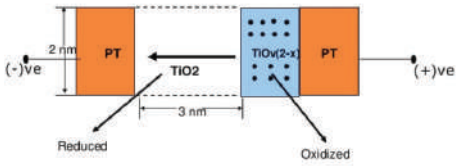
Brief History

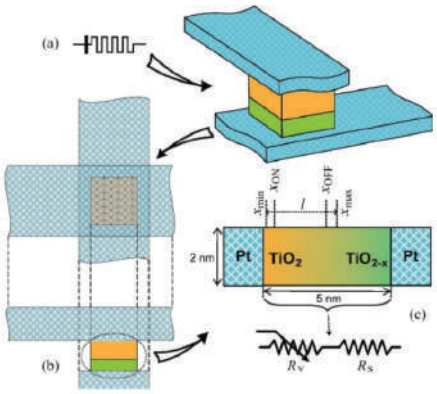
Until 1971 everyone heard and studied some of the very famous circuit elements like resistor, capacitor and inductor but in 1971 a scientist name Leon Ong Chua theorised the new type of circuit element named "Memristor" which is a non-volatile electronic memory that means memristor can retain stored information even after power is removed just like a ROM. But until 2008 (40 years after the theory) the first practical device was fabricated by group led by Stanley Williams at HP Research Labs. Since then, the field has rapidly grown and there has been a huge amount of work and research to be done on these next generation memory storing devices.

Capabilities

The memristors has definitely the potential to transform the semiconductor industry enabling smaller, faster, cheaper chips and computers they can contain huge amount of data with very faster read and write speed plus the are non-volatile electronic memory as the cherry on top of the cake they are very much capable to replace ssd even they require less energy to operate and are faster than present solid-state storage technologies and they can store at least twice as much data in the same area.Also memristors are predicted to enable computers that turn on and off like a light switch.

Principal and Working





Memristor basically controls the flow of electrical current (just like variable resistor i.e. rheostat) but memristor also remember the amount of charge previously flowed through or current it even without power.

As you can see in the diagram the devices mainly comprises of almost half titanium dioxide which is oxygen deficient so that behave like very good conductor (comparable to some good conducting metals)and simple titanium dioxide so the transition in memristor is just like metalinsulator transition. Since the vacancy in titanium dioxide is positively charged the main idea is that a positive voltage pushes the vacancy down into simple titanium dioxide and hence the thickness is decreasing and transition is shifting down. When we remove current that thickness remain the same. The. Amazing part is just begun yet if instead of positive voltage we applied negative voltage the thickness will started to decrease that is the transition is shifting up hence the resistance of memristor is always controlled by how much simple titanium dioxide is left.

VOL. 01 ISSUE 02 ARTICLE 07

CLOUD COMPUTING

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KEYWORDS

Cloud Service | Service Models

Cloud computing is basically defined as the groups of networks that are responsible for providing the user with the basic computing services. The basic services we obtain in the cloud are Servers, Storage, Database, Networking, Software, Analytics and Intelligence. All these things are done over the internet services ("the cloud"). The large cloud services have the services distributed over multiple locations but being centered and controlled at one single place. This makes it easier for the user to avail all kinds of work, functions and services at one place.

In the past few years the continuously increasing technology has led to the advancement in cloud computing. According to the survey of 2017 about 90% of industries are using cloud computing in their day to day work. It is so because cloud computing allows users to get their work easily done, with improved manageability and less maintenance, and it enables IT teams to more rapidly adjust resources and to meet fluctuating as well as unpredictable demand providing hike in the business.

It is the on-demand availability of computer system resources, without direct active management by the user. In simple terms it means storing, managing and accessing the data and programs on the remote server that are hosted on the internet instead of the computer's hard drive.The utilization of all the resources is tracked for each application. It provides both the user and the resource provider for the account of what has been used, it is used for effective use of resources and to monitor bills.

Benefits of cloud computing are low cost, used on Global Scale, have good performance, good security services, high speed as well productivity, and are reliable to be used. All these things help a particular company to earn more and provide a better quality service to the clients. This also offers several benefits over a single corporate data center, including reduced network latency on a greater economies of scale.

There are three types of cloud computing which are : Public, Private and Hybrid.

Public clouds are owned and operated by third-party cloud service providers, which deliver their computing resources like servers and storage over the Internet. Microsoft Azure is an example of a public cloud.

A private cloud refers to cloud computing resources exclusively used by a single business or an organisation. A private cloud can be physically located on the site of a particular company.

Hybrid clouds are a combination of both public as well as private clouds, bound together by technology that allows data and applications to be shared between them. By allowing data and applications to move between private and public clouds, a hybrid cloud gives your business greater flexibility in comparison to the others.

Other than this there are also four types of service models which are IaaS, PaaS, FaaS and SaaS.

IaasS(Infrastructure as a service) - It is a service where infrastructure is provided as an outsource to companies such as networking equipment, devices and web-servers. It is also known as Hardware as a service (HaaS). It provides various operating systems like security and servers for developing applications, servers, etc.

PaaS(Platform as a service) - It is a cloud computing service that supplies an on-demand platform for developing, testing, delivering and managing software applications. It is designed to make it easier for developers to quickly create web or mobile apps.

FaaS(Function as a service) - It is a cloud computing code execution model in which the cloud provider fully manages all the virtual machines which are necessary to serve requests, and requests are billed by an abstract measure of the resources required to satisfy the request, rather than per virtual machine, per hour.

SaaS(Software as a service) - It is a method for delivering software applications over the Internet, on demand and typically on a subscription basis. This form of cloud provider hosts and manages the software application and handles all forms of maintenance, like software upgrades and security patching

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APPLICATION PROGRAMMING INTERFACE

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When you make an online payment, have you ever wondered how that transaction is completed? How are your credentials verified? Does the third party application have access to all your credentials to verify the transaction?

The answer to that is APIs or Application Programming Interface.It allows websites to access data and interact with external software components, operating systems,-servers.

APIs act as an executive layer when accessing data. API gateway is responsible for executing a request on behalf of the client to the database. APIs retrieve requested data from the database and send it back to the client. Due to the way it functions it acts as a security layer as the client and the database can not directly exchange data.

APIs allow secure distribution of copyrighted data or the data which the system grants limited access to by the use of API keys. API key is a unique identifier which authorizes the user when an API request is made to prevent any unauthorized access.

APIs also act as a layer of abstraction, the user does not have to worry about the complex mechanism being followed to complete a specific task which provides an easy to use interface.

TYPES OF APIs

Public APIs - Public APIs are freely available for anyone to use. Businesses often prefer public APIs as they allow them to easily implement new ideas and features. For example, Google Maps APIs

Partner APIs - The access of these APIs are restricted and can only be used by authorized licenced owners. They are used in Subscription based services.

Private APIs- These APIs are made only to be used by employees of a specific company. They are often used by companies to integrate various services.

Composite APIs - These APIs are designed to combine multiple endpoints into one call. For example, when adding a product in a cart multiple API calls have to be made including for user information, cart status, etc. hence,These are more efficient for the client.

REST APIs-

REST stands for Representational State Transfer. It is an architectural style where HTTP requests are sent to perform create, read, update and delete (CRUD) operations.

The methods used are GET and POST methods. Get method is used to request data from a resource by using URLs. POST method is used for creating or updating data to the server.

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COWIN BECOMES CATALYST IN COVID CURATION

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CoWin as the name suggests an initiative for the victory of the vaccine over Corona Virus is becoming the new trendsetter of the tech-based healthcare system. In a country like ours, with an increasing population, it becomes extremely important to introduce the concept of herd immunity thereby preventing the masses to be affected in an adverse way. Scientists, researchers, doctors, and front-line workers have worked day and night to first, bring out the vaccine and then the vaccination process in general. But to eliminate this gap of vaccines and their reach to the general public, apps like Arogya Setu, CoWin, COVA App, and others have acted as a bridge to curate every possible individual. This is the reason I personally refer CoWin as the Collaborative Win of India against Corona Virus because it is due to such apps, India, even being diverse in every 200km, stands as one.

There is no one denying the fact that there were certain concerns when initially the real-time app was launched. But that again is countered by the fact that if previously the number of users were thousand or in lakhs and if on a certain day the user count crosses the ten million mark, the app is more likely to crash or not respond unless it is scalable to that level. This can be a possible reason when the vaccine registrations for 18-45 were live, the app did not respond well in terms of response time for a few days. Indeed, even as metropolitan, taught individuals face difficulty with the Cowin Application, many anticipate that the situation should extend the nation's gap on digital advancement, making the quick procurement to an antibody significantly more hard for the huge number of India's country poor. On the contrary CoWin, alone, has seen as many as forty-eight crore registrations as per the available data at dashboard.cowin.gov.in of the total fifty-two crore vaccine doses administered until today. These many registrations in such a short span ensure that the dream of Digital India that every one of us sees is not so far from being accomplished.

Overall, this COVID-19 pandemic has disrupted the ongoing practices in the offline mode long before. But as a Computer Science (CS) Undergraduate, I think it opened various opportunities as well for computer enthusiasts. Computer Science has acted as a backbone of various industries in these tough times. May it be the platforms like Google Meet, Zoom, Teams for online meetings and conferences, Coursera, edX, Udemy for education, or Twitter, Instagram for social media, every such platform has got a boost of which the stats say the same. Also, when it comes to the vaccination, it can be registered online, administered easily, through our 'technical backbone', CoWin. This is the reason why the CoWin has acted as a curator not only for the vaccinators but also for CS professionals. With the technology expansion in India and more than 30 countries expressing their interest in the CoWin, India is nothing short of making itself 'Aatma-Nirbhar'!!

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BRAIN WAVES

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Can you login to a computer without coming into physical contact with it, i.e., with your mind? With this process, a new biometric feature can be developed for authenticating a computer user in real-time, which involves brain waves. Or, can you control the security of a computer by changing the password with your thoughts? Sounds impossible, isn't it? But it is actually possible through Brain Computer Interface, or BCI in short. So, what is BCI? A Brain–computer interface (BCI) is a system that measures the activity of the central nervous system (CNS) and converts it into artificial output that replaces, restores, enhances, supplements, or improves natural CNS output, and thereby changes the ongoing interactions between the CNS and its external or internal environment (Source: Reference Module in Biomedical Sciences, 2016). With the help of BCI technology, researchers have been able to control drones in the sky, improving the quality of life of older adults and elderly patients, and even entering very complex commands as an input. But is it different from human computer interaction? How does it work? To understand this concept, we need to understand brain waves and how we can calibrate them.

Ever thought, what are these thoughts?

The human brain contains hundreds of billion nerve cells called neurons, which are connected by synapses, trillions of connections. On an average, each connection transmits about one signal per second. Thoughts can be considered as electric impulses generated by neurons. These neurons release special chemicals known as neurotransmitters, which generate these electrical signals in neighboring neurons (Source: "Somehow... that's producing thought," says Charles Jennings, Director of Neurotechnology at the MIT McGovern Institute for Brain Research).

Neuronal Firing

To understand neuronal firing, we need to understand three parts of a neuron, which are the soma, dendrites, and axons.

- Soma: It is the "brain" of the brain cell which processes information and determines its importance for transfer to other cells.
- Dendrites: They are tree-like structures capable of receiving and gathering information from other neurons for delivery to the soma.
- Axon: Important information is passed from neurons to neurons through axons (act as wires). The axon is insulated with a fatty substance called myelin, to keep electrical current strong and flowing directionally.

The process of normal neuronal firing takes place as a communication between neurons through electrical impulses and neurotransmitters. If enough neurotransmitters are released, neuron firing is repeated in the next neurons. The propagation of thoughts depends on two things-how many neurons are firing and how often.

How Brain Computer Interface works?

The Brain computer interface works on the concept of these neurons firing by measuring the number of neurons firing event per second, i.e., the frequency of brain waves, and measuring the number of neurons involved, i.e., the amplitude of the brain waves. These changes in voltage are measured using electrodes attached to the top of your head or hooked up directly to neurons by drilling through the skull. Also, these waves are categorized into 4 types, namely alpha, beta, theta, and delta waves, which signifies different mental status according to frequency ranges and other features. With the help of these different categories of brain waves, BCI can measure human emotions like alertness, attention, focus and stress.

Types of BCI:

Brain computer interfaces can be classified into three main groups: invasive, semi-invasive and non-invasive. Not to mention, these types have their own rewards and drawbacks. In invasive techniques, with the help of medical surgery, a special device is directly inserted into the human brain to capture brain waves. In semi-invasive, the special device is attached to the skull. In contrast to these two techniques, non-invasive means no device is attached to the human brain and is hence considered the safest way. However, these devices can only capture "weaker" human brain signals due to the obstruction of the skull. The detection of brain signals is achieved through electrodes placed on the scalp.

In non-invasive BCI, there are numerous advances taking place. For instance, EEG (electroencephalography), MEG (magnetoencephalography), or MRT (magnetic reso-

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BRAIN WAVES

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nance tomography). Electroencephalography (EEG): It is a physiological method of choice to record the electrical activity generated by the brain via electrodes placed on the scalp surface. Non-invasive EEG (electroencephalogram)-based BCIs are the most widely researched approach

Application:

Most BCIs were initially developed for medical applications. There are many instances in healthcare which take advantage of brain signals in all associated phases, including prevention, detection, diagnosis, rehabilitation, and restoration. Smart homes, offices, and traffic can exploit this BCI, which will offer more luxury, physiological control, and, most importantly, safety. In entertainment, a video game called Brain-Arena where the players can join a collaborative or competitive football game by means of two BCIs. They can score goals by imagining left or right-hand movements.

Potential of BCI in the Future:

You can measure its potential by the fact that recently, 'Elon Musk' announced a $27 million investment in Neuralink at its start, a venture to develop a BCI which can improve human communication with the help of AI. Neuralink has received over $151 million in funding since its founding in 2016. The Nearables company invented the "world's first brain-controlled virtual reality (VR) game". This BCI company recently raised $10 million to move beyond game making and to develop some next-generation real-world applications. And so on.

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ZERO TRUST SECURITY MODELS VS TRADITIONAL PASSWORDS

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Cyber Security has always been one of the major concerns in computer science and IT. Earlier it was much easier for the companies to implement a security perimeter in order to prevent cyber threats. Once a user, application or device was inside, it could be trusted. Hence, ever since the early 1990s, companies have been building their network architecture using endpoint-based controls. Various companies have been relying on approved ports, IP addresses and protocols to validate data as well as users across the internet. The validated users are then trusted to communicate safely inside the company perimeter.

However, today, the onset of work from home culture and rapid use of bring your own device (BYOD) schemes, cloud services and Internet of Things (IoT) in the workplace has led to expansion of business perimeter. With the increase in cyber-crimes, especially identity thefts, traditional password protection methods are simply not enough to safeguard the data. This has created a need for new security paradigm that which does now allow hackers to take advantage of you trust.

Zero trust is a new security paradigm that follows the motto,

"Never trust, always verify".

The term "Zero trust" was coined by John Kindervag, vice president and principal analyst for Forrester Research who recognized trust as the primary reason for vulnerability. He emphasized the fact that traditional security models, which believe everything inside an organization's network should be trusted, are outdated. Once on the trust is broken and the users, threat actors and malicious insiders get access to the network, they are free to move laterally and exfiltrate data.

The core concept of zero trust network architecture (ZT or ZTNA) is simple. It assumes everything to be hostile. In contrast to traditional password systems, Zero Trust leverages Micro segmentation at application level and prevents lateral movement by providing Layer 7 threat prevention. It also simplifies granular user-access control. It treats all network traffic hostile and blocks the workloads from communicating until they are identified by a set of attributes. These attributes can be workload fingerprint or identity. The use of identity-based policies result in stronger security that travels along with the workload wherever it communicate whether in a public cloud, a container , a hybrid environment or an on-premises network architecture. Hence, internet becomes a new transport network via encrypted micro tunnels. Due to ZTNA's environment-agnostic protection, applications and services are secured even across network environments without any change in company architecture or any policy updates.

However, the presence of legacy systems and use of Peer-to-Peer Technologies are few important factors that present challenges for ZTA success.

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