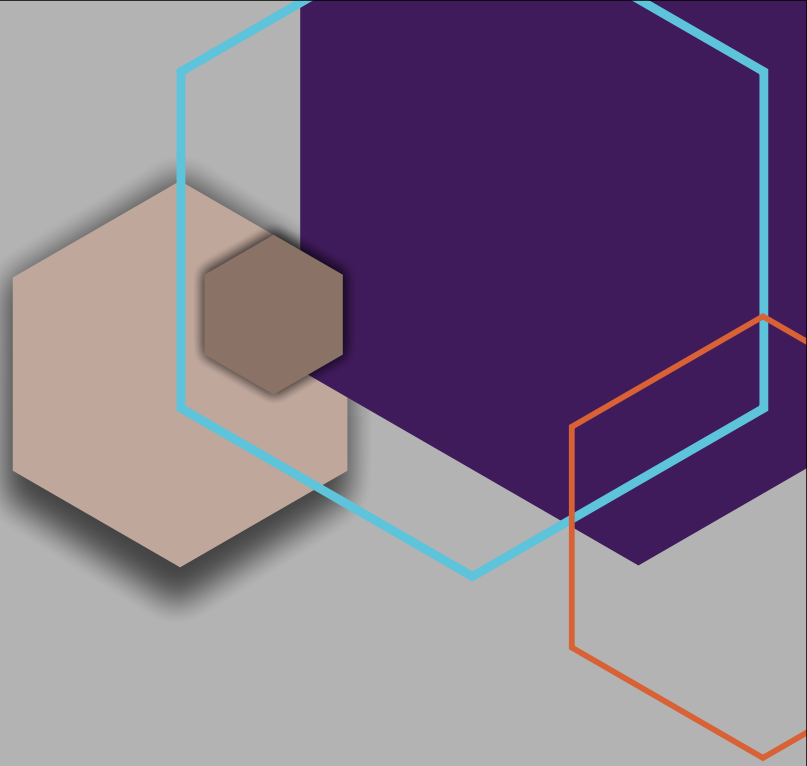




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Being front-end Developer

A front-end web developer is probably what most people think of as a “web developer”. A front-end web developer is responsible for implementing visual elements that users see and interact with in a web application. They are usually supported by back-end web developers, who are responsible for server-side application logic and integration of the work front-end developers do.

Front end developers code website using a variety of skills such as HTML, JavaScript, and CSS etc. A front end developer uses designs and makes them live and working website. Here we are discussing skill sets required for being a front-end developer.

· HTML (Hyper Text Markup Language): For creating Web pages, describes the structure of a Web page. HTML elements tell the browser how to display the content.

· CSS (Cascading Style Sheets): It is used for styling purpose. CSS describes how HTML elements are to be displayed on screen, paper, or in other media. CSS saves a lot of work. It can control the layout of multiple web pages all at once. The most popular front end framework is Bootstrap. Knowledge of Bootstrap makes your css task much easier and saves lots of time.

· Responsive design: Responsive Web design is the approach that suggests that design and development should respond to the user's behavior and environment based on screen size, platform and orientation. There are various devices with different screen sizes and resolutions ranging from mobile phones, tablets, medium size screens to large size screens. A group of people prefer mobile phones over web while some other like web. To hold on all types of customer and for providing them good user experience you should have knowledge of responsive design.

· Experience with CSS Preprocessor: Preprocessor are another element that a front end developer can use to speed up CSS coding. A CSS preprocessor adds extra functionality to CSS to keep our CSS scalable and easier to work with. It processes your code before you publish it to your website, and turns it into well-formatted and cross-browser friendly CSS. SASS and LESS are the two most in-demand preprocessor, according to real job listings.

· JavaScript/JQuery: JavaScript is a text-based programming language used both on the client-side and server-side that allows you to make web pages interactive. Incorporating JavaScript improves the user experience of the web page by converting it from a static page into an interactive one. JQuery is a JavaScript library: a collection of plugins and extensions that makes developing with JavaScript faster and easier.

· Typescript: Typescript is a front-end language that fixes many of limitations of JavaScript framework while keeping all the benefits. Typescript is an Object oriented programming language. It has static typing and it uses types and interfaces to describe how data is being used. Typescript catches mistakes in your JavaScript code earlier on. It has the ability to catch bugs and errors before runtime, so you'll write reliable code and mitigates the pitfalls of JavaScript that are only found at runtime.

·Experience with RESTful Services: Rest stands for “Representational State Transfer”. Restful service is a lightweight architecture that simplifies network communication on the web. Being a frontend developer you will be needed to consume REST APIs into your web application to get or post data. So you should have knowledge of HTTP request like: GET, PUT, POST etc. They also make a web service perform better, scale better, work more reliably, and be easier to modify or move.

·JSON (JavaScript Object Notation): JSON is a lightweight format for storing and transporting data. JSON is often used when data is sent from a server to a web page. It is supported by all programming languages. A common use of JSON is to read data from a web server, and display the data in a web page.

·Cross-Browser Development: Modern browsers are getting pretty good at displaying websites consistently, but there are still differences in how they interpret code behind the scenes. Until all modern browsers work perfectly with web standards, knowing how to make each of them work the way you want them to is an important skill. That's what cross-browser development is all about.

·Web Performance: Web performance refers to the speed in which web pages are downloaded and displayed on the user's browser. It is very necessary for good user experience. JavaScript frameworks play a major role in it. Good JavaScript practices, media optimization, minimizing the number of DOM nodes, making sure the best order and attributes are used for including contents such as styles, scripts, media and third party scripts can drastically improve the user experience.

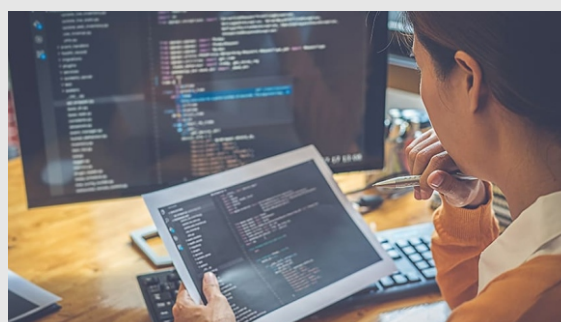
·Testing and Debugging: Bugs happen and for being a good debugging and testing processes is vital. You can set debugger in browser, in your code or you can log your data in console to get current state of data and check how exactly data flow is working in your application. So you can easily catch if there is some error or bug and fix it.

·Git and Version Control Systems: Version control systems let you keep track of changes that have been made to code over time. It makes code maintenance and merging very easy when multiple developers are working on same project. You can commit your stable code and also revert back to an earlier version if you screw something up.

The challenge associated with front end development is that the tools and techniques used to create the front end of a website change constantly and so the developer needs to constantly be aware of how the field is developing.

A report by HackerRank, meanwhile, found that the global demand for JavaScript outweighs the expertise available on the market. According to the report, 48% of employers worldwide say they need JavaScript skills, yet only 42% of student developers say they are proficient in the language.

So, if you plan on becoming a JavaScript expert, you can expect to be highly employable. Great salaries, huge demand and job security are just some of the perks that come with a career in web development.



Hyundai's AI-based humanoid robot is ideal for showroom services amid Covid-19

Hyundai Motor Group has introduced a highly advanced humanoid robot that can provide customers service across its showrooms. Called 'DAL-e', the robot is capable of independently communicating with people using precise recognition capabilities and mobility functions. DAL-e stands for 'Drive you, Assist you, Link with you-experience'.

The robot is equipped with state-of-the-art artificial intelligence technology for facial recognition as well as an automatic communication system based on a language-comprehension platform. Currently, the robot has been deployed at the Hyundai Motor showroom in Seoul on a pilot run, with an aim to further optimize and improve it before adopting it in diverse operating environments.

Following the pilot operation, it is expected to be used in various fields that require everyday interactions with customers. "(The robot) is expected to become a messenger capable of delivering consistent messages to customers in a more intimate and personal way than conventional robots," said Dong Jin Hyun, Vice President and Head of the Robotics Lab at Hyundai Motor Group.

Measuring 1,160 X 600 X 600 mm and weighing 80kg, Hyundai says that the human-like machine is significantly lighter and more compact compared to other customer service and guide robots in the market.

The robot has a friendly attitude and emotive physical features. At a time when coronavirus pandemic has reduced footfall in auto showrooms, this robot will provide a contact-free environment. It will also recognize customers not wearing a mask and advise them to wear one.

The robot's advanced communication capability helps it engage in an automated and smooth dialogue with customers by providing them useful information on products and services. It can respond to verbal as well as screen touch commands. It can also escort customers to designated spots using its omnidirectional four wheels.

The robot isn't just a piece of information providing machine but also an entertaining element for the showrooms. It can explain technologies and vehicle features by connecting wirelessly to a large display screen at the venue, beckon visitors to take photos with it and also provide gestured feedbacks using its movable arms. The robot is an ideal solution to handle customers who do not prefer being assisted by human staff amid Covid-19 circumstances.



Looking for new solutions: pairing traditional gadgets with new algorithms

Although gadgets were driving technology adoption even before the lockdown, smart technologies have been brought into focus by the pandemic. More companies rely on artificial intelligence and machine learning algorithms to improve efficiency and keep workspaces functional. Increasingly traditional gadgets are being paired with new algorithms to find workable solutions.

Warehouses run by Amazon started using smart technologies to alert authorities whenever people breach the 6 feet distance to maintain social distancing guidelines. For this, Amazon uses artificial intelligence to create a 6 feet radius around every employee. Once an employee breaches that parameter, it alerts them about social distancing. Other companies are using tags to create six feet boundaries to decrease the chance of catching the infection.

When we think about such innovations, usually what comes to mind are the western countries, but India has had a spate of meaningful innovations over the last few years. Start-ups like Niramai and Staqu have worked on developing temperature screening devices. Some are even installed at airports so that authorities can monitor swathes of people to detect potential Covid-19 cases.

However, such screening also raises concerns about privacy. How far can technologies be allowed to go to permeate our lives? Is it ethical for employers to track every movement of their employee? In some cases, technology has proven to be a boon to maintain health, security and safety standards. But given all this is too new, its larger implications are yet to be determined.

In the US, technology companies are wary of partnering with police officials. They have found that there is an inherent bias in how technology is being used. Algorithms, in some cases, are more likely to detect African-Americans as perpetrators than Caucasians. Companies, like IBM, have stopped their facial recognition programmes for government purposes.

India has also been in the midst of such controversy. Last year, the Union home minister in the Parliament remarked that the government was using government IDs, like driving licence, voter ID card, passport, etc, to identify perpetrators in the Delhi riots. Given the scale of destruction, some might say it was warranted, but what if the government starts using such means to quell even peaceful protests.

However, that is just one end of the spectrum. On the other end are companies like Staqu, which have been aiding police to solve crimes using its famous AI Jarvis. Atul Rai, CEO and co-founder, explains that the company started its operation in nine districts and has since expanded.



How an ML model to predict psychosis is changing mental health landscape

Recently, a team of European scientists, led by researchers at the Max Planck University, has developed a machine-learning model to predict psychosis in patients in clinically high-risk states. The study found that psychosis transitions could be predicted in a broader risk spectrum by sequentially integrating machine learning models and psychiatric assessments of clinical and biological data. The algorithm helps in targeted and timely intervention detecting the possibility of psychosis, in clinical high-risk (CHR) patients or patients at risk of depression (ROD).

Here, we try to understand how the scientists developed the machine learning model to diagnose psychosis and look at the benefits of using such models.

The Process

A multi-modal machine learning integrates different modes or domains of information like linguistic, acoustic, and visual data. The study integrated clinical and neurocognitive data, structural magnetic resonance imaging (sMRI), and polygenic risk scores (PRS) for schizophrenia — same sources of data a physician would use to diagnose psychosis.

Data for 334 patients in CHR states or ROD was collected to analyse the risk of psychosis transition, which was defined as patients showing at least one of the five positive symptoms that reached psychotic intensity daily for seven days.

The study analysed the data using a machine learning software called NeuroMiner, developed to test unimodal, multi-modal, and clinically scalable sequential risk calculators for transition predictions in prognostic tools.

First, unimodal risk calculators were trained across three different domains. The clinical-neurocognitive domain included data of prodromal symptoms, childhood adversity, functioning, and neurocognitive measures. The genetic domain included polygenic risk scores for schizophrenia, and sMRI domain included the grey matter volume maps.

Unimodal algorithms were then combined to see if they improve the prognostic accuracy using stacked generalisations. Later, it was combined with clinical rater's predictions of whether the person will transition to psychosis.

Also, the differences between the prognostic assignment groups and a group of 334 healthy patients were checked to determine whether the predictive patterns of the models deviated from normality. It also ensured that the results were not affected by the prognostic generalising effect using patients' longitudinal data and other unsupervised machine learning methods.

The researchers have developed a 'sequential prediction method' that optimises the ordering, number of data modalities, and the prognostic uncertainty thresholds to decide whether a patient needs further testing. Identifying the optimal prognostic workflow, the scientists tested whether it achieved similar performance as the fully stacked models.

Using AI Tools for Diagnosis

The study found that combining a doctor's prognosis with algorithmic pattern recognition improved the prediction to a margin that justifies the clinical implementation of predictive machine learning tools.

Predicting psychosis and other complex mental health issues is a difficult task. The process is laborious and unaffordable to many vulnerable populations. Deployed at scale, tools like these can bring down the diagnostic cost and facilitate differentials.

AI provides multiple ways to diagnose a person's mental health conditions. One does not always need to be in a specialised medical facility, which is usually an essential requirement for diagnosing complex mental health issues. Apart from analysing a person's biological parameters, methods like text analysis of a person's social media or monitoring behavioural patterns through smart devices can help in mental health prognosis.

Hence, AI tools can improve prognostic accuracy and clinical scalability in terms of availability and affordability.

The team of researchers discovered a way to convert CO₂ into jet fuel

A new breakthrough could help reduce the carbon footprint of air travel, with the aim to bring emissions by jets to net zero. A team of researchers from Oxford University has successfully managed to turn carbon dioxide (CO₂) into jet fuel, though as of now the experiment was performed at a very small scale. As concerns about climate change keep mounting by the day, scientists have been looking into converting CO₂ into sustainable, synthetic hydrocarbons fuels for transportation purposes for a few years now. As of now, this reverse engineering has only been experimented in the lab but could be a game-changer when introduced on a larger scale - making air travel carbon neutral.

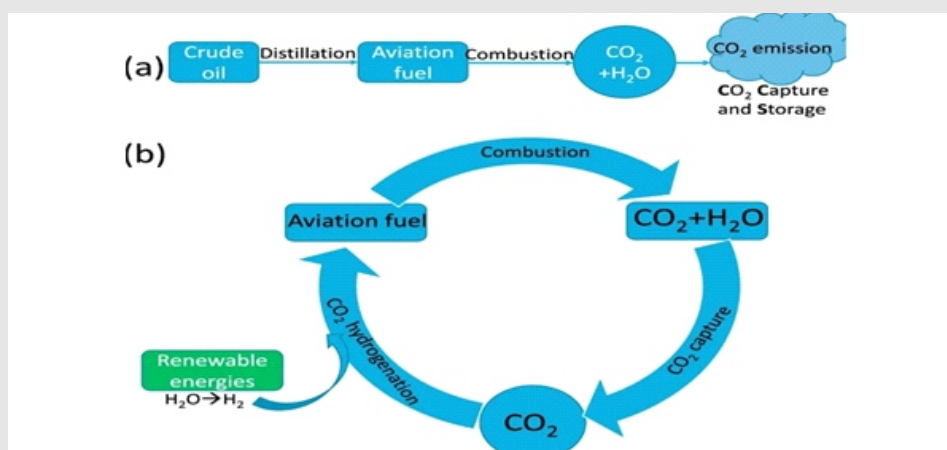
The team of researchers have discovered a way to use low-cost iron catalysts to convert CO₂ in the atmosphere (or directly from emissions of factories) into synthetic jet fuel. The scientists first prepare the Fe-Mn-K (iron-manganese-potassium) catalyst by the organic combustion method (OCM). This catalyst then exhibits a CO₂ conversion through hydrogenation to hydrocarbons in the aviation jet fuel range of 38.2 percent and a low carbon monoxide output of 5.6 percent. The conversion reaction also produces other by-products which are important raw materials for the petrochemical industry and are presently also only obtained from fossil crude oil.

In this method, the carbon dioxide extracted from air is employed for conversion and later re-emitted from jet fuels when combusted in flight. Resultantly, the overall effect of this process is a carbon-neutral fuel.

As of now, this process remains inside the walls of the lab. There are challenges that need to be overcome before this could be made a practically viable method of aviation fuel production. One of the hurdles involve carbon capturing – the process of capturing carbon from the atmosphere. The activation of CO₂ is also a challenge. Another complication is that hydrocarbon synthesis via the hydrogenation of CO₂ usually favours the formation of short-chain, rather than the desirable long-chain that is required for the synthesis of aviation fuel.

This new process represents a significant social advance that highlights CO₂ recycling and resource conservation as an important, pivotal aspect of greenhouse gas management and sustainable development. This catalytic process is expected to be the route to achieving net-zero carbon emissions from the aviation industry in the near future – that is until we as a society are fully equipped to run on eco-friendly electric airplanes.

Speaking to Wired, one of the paper's authors, Tiancun Xiao from Oxford's Department of Chemistry, said, “Climate change is accelerating, and we have huge carbon dioxide emissions. The infrastructure of hydrocarbon fuels is already there. This process could help relieve climate change and use the current carbon infrastructure for sustainable development.”



Quantam computing with AI is driving the impossible to possible

Merging quantum computing with artificial intelligence (AI) has been on the priority list for researchers and scientists. Even though quantum computing is still in the early phases of development, there have been many innovations and breakthrough. However, it is still unclear on whether the world will change for good or bad when AI is totally influenced by quantum computing.

Quantum computing is similar to traditional computing. It relies on bits, which are 0's and 1's to encode information. The data keeps growing despite limiting it. Moore's law has observed that the number of transistors on integrated circuits will double every two years, making way for tech giants to run the race of making the smallest chips. This has also induced tech companies to compete for the first launch of a viable quantum computer that would be exponentially more powerful than today's computers. The futuristic computer will process all the data we generate and solve increasingly complex problems.

Remarkably, the use of quantum algorithms in artificial intelligence techniques will boost machines' learning abilities. This will lead to improvements in an unprecedented way. The main goal of the merger is to achieve a so-called quantum advantage, where complex algorithms can be calculated significantly faster than with the best classical computer. The expected change will be a breakthrough in AI. Experts and business leaders predict that quantum computing's processing power could begin to improve AI systems within about five years. However, combining AI and quantum is considered scary from an angle. The late researcher and scientist Stephen Hawking has said that the development of full AI could spell the end of the human race. Once humans develop AI, it will take off on its own and redesign itself at an ever-increasing rate. Humans, who are limited by slow biological evolution couldn't compete and would supersede.

Quantum computing influences artificial intelligence

Can solve complex problems quickly

One of the major expectations that people have from quantum computing is to have increased computational skill. It is predicted that quantum computers will be able to complete calculations within seconds that would take thousands of years to calculate. Google claims that the company has a quantum computer that is 100 million times faster than any existing computer. This futuristic and quick way of calculating will solve all the data problems in minutes if not seconds. The key to availing the transition is by converting all the existing data into quantum language.

Enhance warfighter capabilities

Even though the improvement of quantum computing is in the initial stage, it is expected to enhance warfighter capabilities significantly in the future. It is predicted that quantum computing is likely to impact ISR (intelligence, surveillance and reconnaissance), solving logistic problems more quickly. While we know the types of problems and general application space, optimisation problems will be some of the first where we will see advantages.

Applications in the banking sector

Malpractice and constant forgeries are common in the banking and financial sector. Fortunately, the combination of AI with quantum computing might help improve and combat fraud detection. Models trained using a quantum computer will be capable of detecting patterns that are hard to spot using conventional equipment. Meanwhile, the acceleration of algorithms will yield great advantages in terms of the volume of information that the machines handle for this purpose.

Help integrate data from different datasets

Quantum computers are anticipated to be experts in merging different datasets. Although this seems quite impossible without human intervention in the initial phase, computers will eventually learn to integrate data in the future. Henceforth, if there are different raw data sources with unique schema attached to them and a research team wants to compare them, a computer would have to understand the relationship between the schemas before the data could be compared.

Microsoft azure cloud computing grows 50 percent, Xbox sales sees boost during pandemic

Microsoft on Tuesday (26-12-21) reported its Azure cloud computing services grew 50 percent, the second quarter of acceleration in a business that had begun to slow as the global pandemic benefited the software maker's investment on working and learning from home.

The company's shares rose 5 percent in extended trading after gaining about 41 percent in 2020 as covid-19 shifted computing to areas where the software maker has bet big. It also saw a surprise recovery in sales on the LinkedIn professional social network and navigated a chip shortage that had threaten to hold back its Xbox business.

The shift to work from home due to the COVID-19 pandemic has accelerated enterprises' switch to cloud-based computing, benefiting Microsoft and rivals such as Amazon's cloud unit and Alphabet's Google Cloud

On a conference call with investors, Microsoft executives said they expect a midpoint of \$14.83 billion (roughly Rs. 1,08,150 crores) in revenue from the company's "Intelligent Cloud" segment for the fiscal third quarter, compared with Wall Street expectations of \$14.12 billion (roughly Rs. 1,02,960 crores), according to Refinitiv data. For the company's productivity segment and its personal computing segment, sales are expected to have a respective midpoint of \$13.48 billion (roughly Rs. 98,300 crores) and \$12.50 billion (roughly Rs. 91,150 crores), compared with estimates of \$12.90 billion (roughly Rs. 94,060 crores) and \$11.60 billion (roughly Rs. 84,570 crores), according to Refinitiv data.

Microsoft said GamePass, the company's \$10 (roughly Rs. 730) monthly gaming subscription, has 18 million users, up from 15 million disclosed in September. The Xbox Live online gaming service has more than 100 million monthly active users. Microsoft did not give an update on the 115 million Teams daily users it disclosed in October but did say that the mobile version is used by 60 million daily users.

Microsoft said revenue in its "Intelligent Cloud" segment rose 23 percent to \$14.6 billion (roughly Rs. 1,06,400 crores), with 50 percent growth in Azure. Analysts had expected a 41.4 percent growth in Azure, according to consensus data from Visible Alpha. The previous quarter Azure grew 48 percent.

"This was really driven by continued customer demand, with stronger-than-expected consumption as customers have increased their focus on digital transformation," Microsoft Chief Financial Officer Amy Hood told Reuters in an interview. Atlantic Equities analyst James Cordwell said that last year, "economic weakness and delays in implementation had masked the extent to which Azure was benefiting from the accelerated shift to the cloud caused by the pandemic. But with these results that benefit is now plain to see."

LinkedIn revenue growth, which dipped as the pandemic shut down businesses, reached 23 percent, near its pre-pandemic rate of 24 percent a year earlier. Hood said advertisements on LinkedIn drove the increase.

"We continue to see advertising market recovery," she said.

Microsoft bundles several sets of software and services such as office and Azure into a "commercial cloud" metric that investors watch closely to gauge the company's progress in selling to large businesses.

Commercial cloud gross margins - a measure of the profitability of its sales to large businesses - were 71 percent in the quarter, compared with 67 percent a year earlier. Revenue from its personal computing division, which includes Windows software and Xbox gaming consoles, rose 14 percent to \$15.1 billion (roughly Rs. 1,10,030 crores), driven by strong Xbox content and services growth, beating analysts' estimates of \$13.5 billion (roughly Rs. 98,400 crores), according to IBES data from Refinitiv.

Microsoft in November released two new Xbox consoles, its most visible non-work and non-school brand, but the hardware proved difficult to find as a global semiconductor shortage contributed to tight stocks as many retailers. Xbox hardware sales were up 86 percent despite the shortages, and Hood said growth is likely to continue, with older models also contributing to sales.

"Demand still outpaces supply, and we do expect that to continue," Hood said. "The team did a nice job of getting consoles, both of this newest generation as well as continuing to sell the older generation, which provides a great value for gamers."

Most IoT companies are adapting to edge computing as a base

A recent research by Intel on self driving cars or autonomous vehicles has highlighted that a car would be generating around 1GB of data every second and would also be requiring computing of this data within few seconds. However, cloud network solutions are quite fast enough to receive 1GB of data within a second, by computing possibilities, and also relaying it back.

If not this then, the time taken to ask for a car to switch on the light, and the time it hits a tree, would leave very little time. Undoubtedly, systems are getting much faster, amid the coming of a new technology that's becoming all pervasive. To second that, Edge Computing is becoming a fast base for almost all IoT devices. This allows users to send in more data to the cloud, and several firms are also trying to put more power in computing devices.

Also, Artificial Intelligence is fast gaining momentum on Edge. It's noted that the concept is not new, given the focus on security and privacy, this becomes especially important as privacy scandals get uncovered. Edge can be calculated on the mobile phone too. Every phone has certain computing capacity and it stores specific data that it doesn't even share with the central server – like fingerprints or face scanning.

Previously, there was a fear among people that manufacturing companies would be getting a hold of personal data, and can build further elaborate profiles. Now, the manufacturing companies gave consumers some assurances that the data would always be staying on the phone and would never be making it to Apple's or Samsung's database. The decision would be left on the phone as to whether it would decide on encoding and decoding a fingerprint.

Siri and Google are cloud dependent, where any query by the user is being sent to the cloud, where AI determines the question and sends the answer back, which is being relayed to the user.

Amazon had announced a few years ago that it would be creating a custom chip for Echo, as the cloud is not overburdened with every piece of information, but it's calculated and determined within the device.

All of this might seem to be complicated, yet there are companies that are going through an elaborate exercise of understanding that not everything can be transferred to the cloud. In this regard, Edge paves out as the only solution. Here, an autonomous car doesn't need everything to be sent on the cloud. The information of what to hold and what not to can be taken by the computer onboard. For instance, a security cam can decide which information to hold, and what not to.

The held information can be transferred to the cloud. This facilitates the fact that computing on Edge can take various forms, but it doesn't talk about having control over data. Also, going forward, computer might give an illusion of choice of downloading updates, whereas Edge Computing doesn't. However, Edge would be needing more solutions, probably a Blockchain.

