MVP SAMAJ'S KBT COLLEGE OF ENGINEERING

Department of Information Technology

Presents

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Department of Information Technology

EDITORIAL BOARD

ABOUT THE DEPARTMENT

The Department of Information Technology is established in 2008-09. The Department has intake of 60 students. The Department of Information Technology was established with a vision to develop quality engineers to meet the current trends in the emerging world of IT. Department has well qualified faculty members to impart knowledge to the students about the latest technologies in IT field. Department has 9 laboratories which are well equipped with necessary software along with WI-FI connectivity. The Department is also intended to provide technical support for Website development of different educational Institutions under MVP Samaj. Different Student development centered programs are arranged in the Department.

DEPARTMENT VISION

To be the Centre for excellence in the development of IT solutions with specific approach of industry interface, blended learning and project-based learning leading to the development of globally competent graduates and life-long learners

DEPARTMENT MISSION

Committed to develop students as competent IT professionals for employment and self-employment by adapting to the innovative and interactive academic process to acquire domain specific technical knowledge, soft skills and social responsibilities

DEPARTMENT PROGRAM EDUCATIONAL OBJECTIVES

➢ Graduates will analyze, design and implement modern computing problems by applying their knowledge of mathematics, information technology, and emerging technologies.

➢ Graduates will possess an attitude and aptitude for research, entrepreneurship and higher studies in the field of Information Technology.

➢ Graduates will be aware of their professional, ethical, legal, and social responsibilities and contributions towards the betterment of society through active engagement with professional societies and other community activities.

CONTENTS

METAVERSE

DON'T JUST USE THE INTERNET BUT

EXPERIENCE THE INTERNET.

What is the Metaverse?

The metaverse is a vision of how the next generation of the internet will operate.

A metaverse will be an improved digital environment where it is possible to move seamlessly between work, play, shopping, socializing and creativity in one digital landscape.

What form that landscape will take is a subject of debate. Firms such as Meta (Facebook) are investing heavily in an immersive experience, where users with wearable hardware discard reality for a purely virtual world, interacting via avatars – the basis for the 'Oasis' depicted in Ernest Cline's novel, Ready Player One.

Others see the metaverse as more like an integration of the physical environment with the digital, where the real world is overlaid with digital surfaces and objects. This augmented reality approach builds on experiences like the highly successful Pokemon Go phone game, which allows players to seek and discover digital creatures in real world locations.

At the moment the metaverse is mainly a commercial enterprise. The building blocks are being rapidly developed by big corporates including gaming and technology companies. Firms like Facebook, Apple, Google and Microsoft are in direct competition, drawing on their enormous technological resources to design their own metaverse offerings.

The metaverse could fundamentally change not only how humans interact with technology but also how they interact with each other and the world around them.

This situation has serious implications for society. Just as the internet transformed the world in unexpected ways, the next iteration of our digital world will have an impact far beyond delivering more exciting entertainment and efficient commerce.

The metaverse could fundamentally change not only how humans interact with technology but also how they interact with each other and the world around them. It also raises questions about the effect on national and individual identities in a society where people spend increasing amounts of time in a parallel world.

How does metaverse work?

The way the metaverse will work is still being defined. But it will probably provide users with a single avatar or digital identity, which grants them access to an integrated digital ecosystem.

The ecosystem would potentially have its own currency, property and possessions. This could be a digitally altered form of reality, a virtual world built from scratch, or some combination of the two.

Within this metaverse, users may ultimately be able to perform all the online tasks that are currently spread across separate digital properties like websites and apps, ideally without the need for the many passwords and user accounts that characterize current digital experiences. Chinese apps (or 'super-apps') such as WeChat already have significant interoperability, integrating a discussion platform, payments and a social credit system.Meanwhile the gaming community may argue a game such as Fortnite qualifies as a kind of prototype metaverse. The game boasts 350 million registered users globally (a population equal to the US) and includes in-game currency that can be earned and traded.

While the building blocks exist, they are not yet connected into a true metaverse. Our assumptions are based on existing knowledge and behaviour. Many predictions may come true, but other possible paths will fail or simply not be taken up by developers and users as technology grows and people adapt to and help shape its possibilities.

What are the benefits of Metaverse??

The metaverse could bring new advances in all areas of society, beyond gaming to healthcare, education, commerce and creative industries.

For example, much like the internet, the metaverse offers the chance to facilitate the sharing of knowledge. Algorithms could be designed to learn from children's

behaviour, discovering how to create more effective learning spaces and teaching styles, both online and in reality. Children could also learn in a more interactive, less passive way.

The metaverse will also create exciting new possibilities for leisure and creative expression, allowing users to shape their own unique worlds, or to redesign the real one, decorating it with digital art and populating it with digital creatures.

How is Metaverse accessed ?
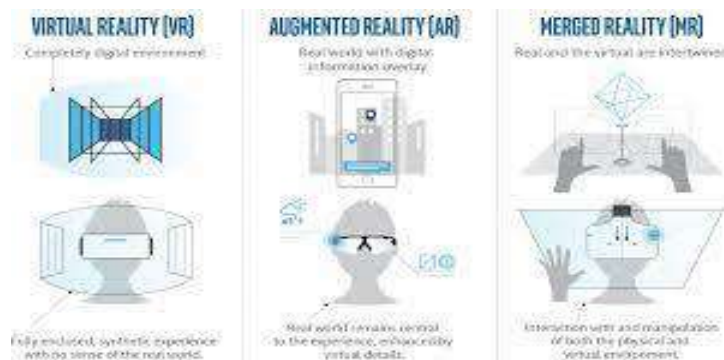
Two technologies considered important to the development and growth of the metaverse are virtual reality and augmented reality:

Virtual reality is a simulated 3D environment that enables users to interact with a virtual surrounding in a way that approximates reality as perceived through our senses. This approximation of reality is now typically accessed through a VR headset that takes over a user's field of vision. Haptics, including gloves, vests and even full-body tracking suits, enable more lifelike interaction with the virtual environment.

Augmented reality is less immersive than VR. It adds digital overlays on top of the real world via a lens of some type. Users can still interact with their real-world environment. The game Pokémon Go is an early example of AR. Google Glass and heads-up displays in car windshields are well-known consumer AR products.

Whether VR and AR experiences turn out to be the primary interfaces of the metaverse remains to be seen, Gartner senior principal analyst Tuong H. Nguyen told Lawton, adding that what we have now are precursors or pre-metaverse solutions.

At present, many of the metaverse-like experiences offered by gaming platforms such as Roblox, Decentraland and Minecraft can be accessed through browsers or mobile devices and a fast internet connection.

Metaverse pros and cons and challenges
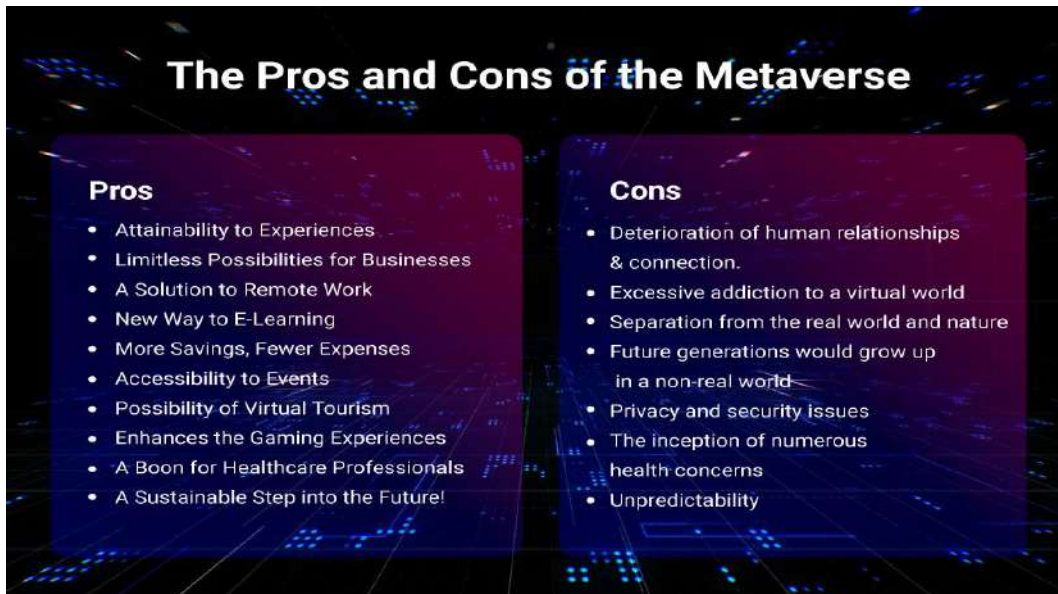
No matter what form the metaverse takes, cybersecurity and privacy standards loom as major challenges.

As security expert Ashwin Krishnan advised that businesses should be proactive in creating a viable data privacy policy tailored to their organizations and to work with the major metaverse platform owners and standards organizations to establish security and privacy safeguards. Consumers will need to make an effort to

understand the security and data privacy policies of both the businesses they frequent and the metaverse platforms on which those businesses reside.

What will the coming technology revolution mean for average user? For her article on metaverse pros and cons, technology journalist Mary K. Pratt interviewed analysts, consultants, business executives and researchers on the metaverse's potential benefits and drawbacks. On the positive side, an immersive metaverse enables humans to go where they were never able to go before, including outer space. Online social connections become much richer. Of course, the bad behavior witnessed on social platforms has the potential to be magnified in a virtual world. Findings are summed up in the chart below.

CHATGPT IS TIPPING POINT OF AI

ChatGPT, released by OpenAI, a powerful new chatbot that can communicate in plain English using an updated version of its AI system. While versions of GPT have been around for a while, this model has crossed a threshold: It's genuinely useful for a wide range of tasks, from creating software to generating business ideas to writing a wedding toast. While previous generations of the system could technically do these things, the quality of the outputs was much lower than that produced by an average human. The new model is much better, often startlingly so.

Put simply: This is a *very* big deal. The businesses that understand the significance of this change — and act on it first — will be at a considerable advantage. Especially as ChatGPT is just the first of many similar chatbots that will soon be available, and they are increasing in capacity exponentially every year.

At first glance, ChatGPT might seem like a clever toy. On a technical level, it doesn't work differently than previous AI systems, it's just better at what it does. Since its release, Twitter has been flooded with examples of people using it to strange and absurd ends: <u>writing weight-loss plans</u> and <u>children's books,</u> and offering advice on how to <u>remove a peanut butter sandwich from a VCR in the style of the King James Bible</u>.

There are other reasons to be skeptical besides the unusual use cases. Most pointedly, despite years of hype, AI notoriously only sort of works in most applications outside of data analysis. It's pretty good at steering cars, but sometimes it rams into another vehicle. Mostly, it provides good answers to queries, but sometimes it seems to make up the results entirely.

But a deeper exploration reveals much more potential. And the more you look, the more you see what has changed with this model — and why it seems like a tipping point.

ChatGPT, now open to everyone, has made an important transition. Until now, AI has primarily been aimed at problems where failure is expensive, not at tasks where occasional failure is cheap and acceptable — or even ones in which experts can easily separate failed cases from successful ones. A car that occasionally gets into accidents is intolerable. But an AI artist that draws some great pictures, but also some bad ones, is perfectly acceptable. Applying AI to the creative and expressive tasks (writing marketing copy) rather than dangerous and repetitive ones (driving a forklift) opens a new world of applications.

What are those applications, and why do they matter so much?

First, not only can this AI produce paragraphs of solidly written English (or French, or Mandarin, or whatever language you choose) with a high degree of sophistication, it can also create blocks of computer code on command.

This is a major change. Massive increases in speed have been seen in <u>a randomized trial of AI code tools</u>. One good programmer can now legitimately do what not so long ago was the work of many, and people who have never programmed will soon be able to create workable code as well.

Second, it has an incredible capacity to perform different kinds of writing with more significant implications than might be initially apparent. The use of AI in writing can greatly increase the productivity of businesses in a variety of industries. By utilizing AI's ability to quickly and accurately generate written content, businesses can save time and resources, allowing them to focus on other important tasks. This

is particularly beneficial for industries such as marketing and advertising, consulting, and finance, where high-quality written materials are essential for communicating with clients and stakeholders.

Additionally, AI can also be useful for industries such as journalism and publishing, where it can help generate articles and other written content with speed and accuracy. Overall, the use of AI in writing will greatly benefit businesses by allowing them to produce more written materials in less time.

the third major change that happened with this release: the possibility of human-machine hybrid work. Instead of prompting an AI and hoping for a good result, humans can now guide AIs and correct mistakes. (Despite what my AI writing partner claims above, it's not *always* accurate.) This means experts will be able to fill in the gaps of the AI's capability, even as the AI becomes more helpful to the expert. This sort of interaction has led to increases in performance of players of Go, one of the world's oldest and most complex games, who have learned from the AIs that mastered the sport, and become unprecedentedly better players themselves.

A final reason why this will be transformative: The limits of the current language model are completely unknown. Using the public mode, people have used ChatGPT to do basic consulting reports, write lectures, produce code that generates novel art, generate ideas, and much more. Using specialized data, it's possible to build each customer their own customized AI that predicts what they need, responds to them personally, and remembers all their interactions. This isn't science fiction. It is entirely doable with the technology just released.

The problems of AI remain very real, however. For one, it is a consummate bullshitter, and I mean that in a technical sense. Bullshit is convincing-sounding

nonsense, devoid of truth, and AI is very good at creating it. You can ask it to describe how we know dinosaurs had a civilization, <u>and it will happily make up a whole set of facts explaining, quite convincingly</u>, exactly that. It is no replacement for Google. It literally does not know what it doesn't know, because it is, in fact, not an entity at all, but rather a complex algorithm generating meaningful sentences.

But these disadvantages are much more prevalent outside of the creative, analytical, and writing-based work that AI is now capable of. A writer can easily edit badly written sentences that may appear in AI articles, a human programmer can spot errors in AI code, and an analyst can check the results of AI conclusions. This leads us, ultimately, to why this is so disruptive. The writer no longer needs to write the articles alone, the programmer to code on their own, or the analyst to approach the data themselves. The work is a new kind of collaboration that did not exist last month. One person can do the work of many, and that is even without the additional capabilities that AI provides.

This is why the world has suddenly changed. The traditional boundaries of jobs have suddenly shifted. Machines can now do tasks that could only be done by highly trained humans. Some valuable skills are no longer useful, and new skills will take their place. And no one really knows what any of this means yet. And keep in mind: This is just one of *many* models like this that are in the works, from both companies you know, like Google, and others you may not.

IMMERSIVE CX

The latest research by Zendesk signals a dramatic shift in expectations, with 71% of business leaders globally rethinking the entire customer experience

Immersive experiences are fast becoming a key differentiator for brands to stay competitive and help ensure customers remain loyal, according to Zendesk, Inc's latest global C*ustomer Experience (CX) Trends Report*.

The report, which consists of data from nearly 3,700 customers and over 4,700 customer service and experience leaders, agents, and technology buyers from 20 countries, as well as Zendesk Benchmark product usage data from nearly 100,000 Zendesk customers worldwide, found that 71% of customers surveyed globally are excited about experiences that are natural, convenient and fluid.

Immersive CX is evolving into the new standard, redefining how companies engage with their customers. This change stems from what people are increasingly demanding of brands today: that they meet them where they are, under their terms, through seamless and engaging interactions. Over the last several years, leaders have recognised how this transformation has required an expanded role of CX, prompting them to make major investments to remain competitive and meet elevated customer expectations.

"In the past two years we have seen customer expectations rising like never before and businesses having to up their CX game at an unprecedented speed, all in the midst of major macro trends shaping the global economy", said Matthias Goehler, Chief Technology Officer EMEA at Zendesk. "Insights from this year's CX Trends Report show the importance of strategically investing in CX, particularly during times of uncertainty. In EMEA, we have seen that almost the totality of respondents

(70%) stated that building business resilience through customer services becomes a top priority during an economic downturn".

1. **<u>Customers want (and expect) AI to evolve:</u>** Increased investment in AI has not gone unnoticed, and customers are becoming more comfortable with its presence, the study finds. Of those who interact with customer service bots on a regular basis, 72% of customers surveyed globally have experienced quality improvements and say bots perform well when answering simple inquiries, respond faster than human agents, and are reliable to surface accurate, helpful information.

2. **<u>As customers enjoy richer experiences with bots, their expectations have also risen :</u>** 75% of customers surveyed globally expect AI interactions will become more natural and human-like over time, and the ideal evolution of AI will enable customers to ask increasingly complex questions. On the other hand, companies are more and more committed to investing in AI-driven solutions, with 65% of EMEA leaders believing AI will drive large business benefits over the next few years. With customers' expectations towards AI increasing fast, the time to invest in this technology is now or risk losing customers to the competition."

3. **<u>Conversational experiences empower customers:</u>** Customers are driving the rise of conversational experiences. They want fluid, friendly and natural interactions that put them in control and do not interrupt current tasks. For example, if a customer stops an interaction, they expect a new support representative to be able to easily pick up where the conversation last ended. In fact, around 70% of customers surveyed globally spend more with brands that provide a seamless experience between all points of contact. Similarly, 64%

of customers said they will spend more if their issues are resolved where they are.

4. **<u>Customers are eager for deeper personalisation:</u>** According to the trends, 59% of global customers surveyed want companies to use the large amount of data they have to provide truly personalised experiences that transcend typical marketing efforts, whether it is online or in-store, compared to 48% in EMEA.

5. **<u>Customer well-being and sentiment are reshaping CX :</u>** Businesses are un-prepared when it comes to understanding customer emotions. Organisations have made efforts to improve customer well-being, but 63% of business leaders surveyed globally admit those efforts have been unfocused and reactive. Companies have not made strides in tracking emotional data in a more formal way. Only 22% of leaders and managers surveyed globally say that customer sentiment is used to personalise the experience a customer receives.

6. **<u>The road ahead for CX :</u>** CX leaders have become increasingly aware of the benefits of creating immersive experiences, and recognise that support functions are capable of driving revenue. In fact, 72% of business leaders surveyed globally believe merging teams and responsibilities around CX will increase operational efficiencies, and 64% globally already have plans in place to do so.

In 2023 and beyond, harnessing the power of exceptional customer experiences will be a key for business resilience and growth, especially as we navigate through uncertainty," said Goehler. "Companies that understand the value of investing in technology to provide what their customers want -a seamless, immersive CX-, will be those gaining more customers, building on loyalty, and becoming profitable in the long run."

DEVSECOPS

As almost half of security leaders report that they have a backlog of vulnerable applications, utilising automation as part of DevSecOps is key

Since its creation over a decade ago, DevOps has become a vital component of how companies operate. Building upon the foundations of the agile movement, DevOps leverages automation for quality and security testing, as well as for formerly manual deployment and operations activities, in a bid to introduce software into production at speed.
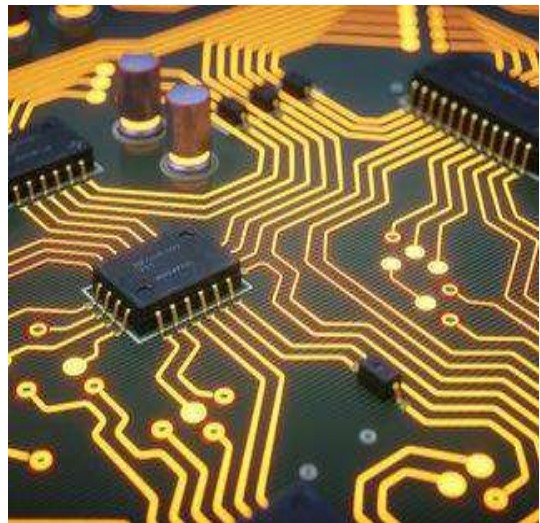
As Peter Chestna, North American CISO at Checkmarx, explains, DevOps in general is about flow, fast feedback loops, and experimentation and learning: known as 'the three ways' of DevOps.

"The 'Sec' in DevSecOps calls attention to security as an important part in both the culture and process," Chestna says. "The main advantage of DevSecOps is that it enables the quick release of secure software to customers. When done properly, experimentation and learning alongside fast feedback enables continuous improvement, which nets faster releases as well as higher quality and security over time."

Automation is the key to the kingdom

Automation is at the heart of DevSecOps, with the security tools' continuous monitoring and testing allowing DevOps teams and security experts to focus on activities that enhance business sense.

DevSecOps removes the overhead of remembering to run security tools and processes. Organisations can set up automatic tests and scans to run at check-ins or other key points during deployment, eliminating the risk of skipping a step. GitLab's [2022 DevSecOps Survey](#) found that a majority of DevOps teams are running static application security testing (SAST), dynamic application security testing (DAST), or other security scans regularly, but fewer than a third of developers actually get those results in their workflow. A majority of security pros say their DevOps teams are shifting left, and 47% of teams report full test automation.

"Automation is the key to the kingdom of DevSecOps," comments Stephen Gates, Security Evangelist at Checkmarx. "However, integration comes first. Once integrated into the development pipeline, security scans can become so automated that they become second nature, and full developer adoption of security scans processed in DevSecOps initiatives will be the outcome."

Generally, flow is accomplished by releasing small increments quickly, Chestna explains. "This is enabled by automation to make testing-and-release highly repeatable," he adds. "This is typically referred to as Continuous Integration (testing each change) and Continuous Delivery (releasing each change) and abbreviated as CI/CD or CI/CD pipeline.

"CI automation codifies the controls, policies, and standards for the company into tests that can be run efficiently against any change to ensure that it is acceptable to

release; CD automation ensures that the software can be released on demand without user intervention or the risk of human error."

Clearing vulnerability backlogs : A report by [Rezilion](#) – an automated vulnerability management platform accelerating software security – in conjunction with the Ponemon Institute revealed that organisations are losing thousands of hours in time and productivity dealing with a massive backlog of vulnerabilities that they have neither the time nor resources to tackle effectively.

The *State of Vulnerability Management in DevSecOps* report highlighted that 47% of security leaders have a backlog of applications that have been identified as vulnerable. Two-thirds of respondents said their backlog consists of more than 100,000 vulnerabilities, while the average number of vulnerabilities in backlogs overall is a mind-boggling 1.1 million, according to the data.

"This is a significant loss of time and dollars spent just trying to get through the massive vulnerability backlogs that organisations possess," said Liran Tancman, CEO of Rezilion. "If you have more than 100,000 vulnerabilities in a backlog and consider the number of minutes that are spent manually detecting, prioritising, and remediating these vulnerabilities, that represents thousands of hours spent on vulnerability backlog management each year. These numbers make it clear that it is impossible to effectively manage a backlog without the proper tools to automate detection, prioritisation, and remediation."

Expensive hours are lost trying to wrangle massive backlogs on both the production and development side of software applications. The survey found that 77% of respondents said it takes longer than 21 minutes to detect, prioritise, and remediate just one vulnerability in production.

"The key to clearing vulnerability backlogs is to have a true correlation of alerts coming from all of the various scans performed," comments Gates. "Everyone knows security tests return lots of results, but without correlation, developers end up solving issues that aren't critical, while potentially overlooking ones that are. Correlation of scan results is imperative and, by the way, aggregation is not correlation."

The battle to stay ahead of security threats

According to Carlos Morales, Senior Vice President of Solutions at Neustar Security Services, DevSecOps has become a high priority for organisations as they look to better establish security as a central tenet through every phase of the software development lifecycle.

"By making security a shared responsibility across development, operations and security teams, DevSecOps should help better position organisations to identify potential vulnerabilities early in the process – ideally before being put into production – and save them from much bigger headaches down the line," he said.

And while organisations may be unable to stay ahead of security threats, utilising DevSecOps teams can help them react quickly to attacks.

"We'll never be able to stay ahead of security threats," adds Chestna. "The best we can do is maintain high standards to keep the code base as clean as possible and build the right muscles to allow us to react quickly to emerging threats. The faster and more repeatable the process to release software, the more we can trust it for quick updates during a crisis or incident."

"Threats are the attackers, and they will never go away," concludes Gates. "Neither will their attacks. To stay ahead of threat actors and their attacks, though, one must understand risk. DevSecOps teams must fully understand and accept the risks they are willing to live with and resolve the risks they are not. Once they fully understand and document their intolerable risks, they can manage them more effectively."

COGNIGY: DEVELOPING INNOVATIVE

CONVERSATIONAL AI SOLUTIONS

Powering up contact centres with its Conversational AI capabilities, Cognigy is working with UiPath to develop innovative solutions for transforming CX

As an UiPath advanced technology partner, Cognigy benefits from a native integration between the two platforms, as Heltewig explains. "These bots also need to be able to interact with backend systems, and that's where something like UiPath can be tremendously helpful.

"To use the airline example, if you give your booking number and date of birth, for example, we query a backend system that has information about your flight, and this backend system essentially answers instantly.

"Today UiPath processes can be long-running, it can take anywhere between two seconds or 20 minutes, depending on how much load there is on the system," says Heltewig.

"We've built functionality in Cognigy natively built in for UiPath where UiPath can call back after 15 minutes. And then we can get back to the customer. As a result, we've built use cases with UiPath as a global innovation team around HR management, claims processing and many other use cases in the insurance and other sectors."

It is an exciting time to be partnering with UiPath: a business which went all the way from start-up to global leader in record time.

"At Cognigy we're hyper-focused on powering up contact centres with our Conversational AI capabilities," states Heltewig. "We are currently developing a joint offering in the form of a robotic call centre automation that we will take to market together. It will be a fully automated robotic call centre service solution that seamlessly integrates Cognigy with the UiPath enterprise automation platform.

"And one person we're working with is Boris Krumrey, UiPath's Global VP of Automation Innovations," he concludes. "He's a great champion for Cognigy, and we are very glad to be working with him and the team to continue developing innovative solutions for transforming customer and employee experiences together." A global leader in enterprise Conversational AI, Cognigy is hyper-focused on powering up the contact centre to exceed customer expectations, improve agent satisfaction and respond to market changes.

And through a collaboration with UiPath, organisations will soon be able to benefit from the seamless integration between Cognigy and UiPath, says Philipp Heltewig, Cognigy's CEO and Co-founder.

Through solutions including Cognigy's Conversational IVR and Agent + Assist, Cognigy supports human agents in handling customer inquiries by monitoring the conversation and providing AI-powered help to the agent in real time.

Among Cognigy's success stories is the powering of all of Lufthansa Group's chat-based self-service options, allowing customers to chat with virtual agents that employ the power of AI and machine learning.

"These solutions, of course, scale in real-time to meet demand," says Heltewig. "Contact centres simply can't go from 1,000 agents to 10,000 agents within five

minutes. However, with our virtual agents, the enterprise has infinite capacity to scale to help customers, without the wait times usually associated with contact centres."

BUDGET ROBOTS INSPIRED BY ANIMALS, A STEP FORWARD FOR HUMANS

Researchers in the United States have developed a cut-price robot that could soon be helping humans in the home and responding to emergencies in the field
Researchers at Carnegie Mellon University's School of Computer Science and the University of California have designed a system that enables a small, low-cost robot to climb and descend stairs, traverse uneven and varied terrain, walk across gaps, and even operate in the dark.

The research could be a step toward solving existing challenges facing legged robots and bringing them into people's homes, say researchers. A paper supporting the research - Legged Locomotion in Challenging Terrains Using Egocentric Vision - will be presented at the upcoming Conference on Robot Learning in Auckland, New Zealand.

"Empowering small robots to climb stairs and handle a variety of environments is crucial to developing robots that will be useful in people's homes as well as search-and-rescue operations," says Deepak Pathak, an Assistant Professor at Carnegie Mellon's Robotics Institute. "This system creates a robust and adaptable robot that could perform many everyday tasks."

The team tested the new robot on uneven stairs and hillsides at public parks, challenging it to walk across stepping stones and slippery surfaces and climb stairs that would be similar to a human leaping over a hurdle. The robot adapts quickly and masters challenging terrain by relying on its vision and a small onboard computer, say researchers.

Six years of traning into one day

A simulator was also used to train the robot with 4,000 clones, where they also practised walking and climbing on challenging terrain. The simulator's speed allowed the robot to gain six years of experience in a single day. The simulator also stored the motor skills it learned during training in a neural network that the researchers copied to the real robot.

The robot's new system bypasses the mapping and planning phases used in previous approaches and directly routes the vision inputs to the control of the robot. What the robot sees determines how it moves, say researchers. The robot can be produced more cheaply because there is no mapping or planning involved and movements are trained using machine learning.

"This system uses vision and feedback from the body directly as input to output commands to the robot's motors," says Ananye Agarwal, an SCS PhD student in machine learning. "This technique allows the system to be very robust in the real world. If it slips on stairs, it can recover. It can go into unknown environments and adapt."

The team looked to nature for elements of the system, with inspiration coming to them in the way a human has to lift its leg up high to scale a ledge or hurdle and from the movement of hind legs by four-legged animals. "Four-legged animals have a memory that enables their hind legs to track the front legs. Our system works in a similar fashion," says Pathak.

MICROSOFT BEGINS TO ROLL OUT AI-POWERED CREATOR TOOL

"Dog astronaut launching into space, digital art," powered by Image Creator

The new Image Creator tool, powered by Open AI's DALL·E 2, allows users in select markets to create AI-generated images from Microsoft's Bing search engine

Microsoft has announced it is released its AI-powered Image Creator tool, which is powered by DALL·E 2 by OpenAI, in what it describes as a limited preview in select markets.

According to a blog on Microsoft's website, Image Creator allows users to create an image that doesn't exist, limited "only by their imagination".

"Simply type in a description of something, any additional context like location or activity, and an art style, and Image Creator will make it for you," the blog reads.

"Users have always been able to search Bing Images for an image that exists on the web, but with Image Creator, they're now able to create the images they want to see.

Within Edge, users can use Image Creator in their sidebar. They're able to create an image to share a life update with their friends online and drag and drop it within their main working page, all without losing focus on their workflow.

More than two million images created a day

Last month OpenAI announced that it removed the waitlist for its DALL-E AI image generator service, meaning anyone can sign up and use it.

According to the company, more than 1.5 million users worldwide are now using DALL-E to create more than 2 million images a day.

The tool is rolling out to Bing in selected markets, with integration with Microsoft Edge to come later this month. Microsoft says it will be free to use, but has outlined a content policy to prevent misuse.

"It's important with early technologies like Image Creator – which is powered by AI technology DALL·E 2 by OpenAI – to acknowledge that this is new and that we expect it to continue to evolve and improve," the blog adds. "We take our commitment to responsible AI seriously. To help prevent the delivery of inappropriate results across the Designer app and Image Creator, we are working together with our partner OpenAI, who developed DALL·E 2, to take the necessary steps and will continue to evolve our approach. We will regularly take the feedback we have and share that with OpenAI to improve the model as well as applying to our own mitigations work."

Microsoft last week revealed Microsoft Designer, which uses AI technology, including DALL·E 2, meaning users are able to instantly generate a variety of designs with minimal effort.

According to [Liat Ben-Zur](#), Corporate Vice President, Modern Life, Search and Device, the new tools will help users ignite their imaginations and express themselves.

"With Designer, there's no need to spend time building cards or social media posts from scratch," he said. "And you no longer need to search through thousands of pre-made templates.

"Designer invites you to start with an idea and let the AI do the heavy lifting. For example, with 'start from scratch' within Designer, you can simply describe an image you want to see, and the app does the work for you to create something totally unique. As you work in Designer, every surface of the app is powered by AI to help ensure consistent, aligned, properly scaled, and beautiful designs, even with or without any inherent design ability."

SIMULATION

Simulation What Does it Mean?

A simulation is a model that mimics the operation of an existing or proposed system, providing evidence for decision-making by being able to test different scenarios or process changes. This can be coupled with virtual reality technologies for a more immersive experience.

Simulations can be used to tune up performance, optimise a process, improve safety, testing theories, training staff and even for entertainment in video games! Scientifically modelling systems allows a user to gain an insight into the effects of different conditions and courses of action.

Simulation can also be used when the real system is inaccessible or too dangerous to assess or when a system is still in the design or theory stages.

Key to any simulation is the information that is used to build the simulation model and protocols for the verification and validation of models are still being researched and refined, particularly with regard to computer simulation.

How Simulation Works :

Simulation works through the use of intuitive simulation software to create a visual mock-up of a process. This visual simulation should include details of timings, rules, resources and constraints, to accurately reflect the real-world process.

This can be applied to a range of scenarios, for example, you can model a supermarket and the likely behaviours of customers as they move around the shop as it becomes busier. This can inform decisions including staffing requirements, shop floor layout, and supply chain needs.

Another example would be a manufacturing environment where different parts of the line can be simulated to assess how their processes interact with those of others. This can provide an overview of how the entire system will perform in order to devise innovative methods to improve performance.
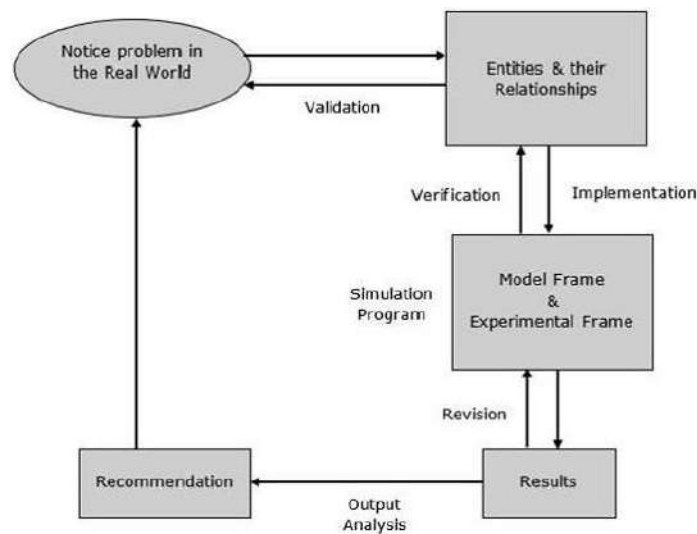
Advantages:

1. Less Financial Risk :

Simulation is less expensive than real life experimentation. The potential costs of testing theories of real world systems can include those associated with changing to an untested process, hiring staff or even buying new equipment. Simulation allows you to test theories and avoid costly mistakes in real life.

2. Exact Repeated Testing:

A simulation allows you to test different theories and innovations time after time against the exact same circumstances. This means you can thoroughly test and compare different ideas without deviation.

3. Examine Long-Term Impacts:

A simulation can be created to let you see into the future by accurately modelling the impact of years of use in just a few seconds. This lets you see both short and long-term impacts so you can confidently make informed investment decisions now that can provide benefits years into the future.

4. Gain Insights for Process Improvement

The benefits of simulation are not only realised at the end of a project. Improvements can be integrated throughout an entire process by testing different theories.

Limitations :

While there are a great many advantages to using simulation, there are still some limitations when compared to other similar techniques and technologies, such as digital twin.

A digital twin expands on simulation to incorporate real time feedback and a flow of information between the virtual simulation and a real life asset or assets. The difference being that while a simulation is theoretical, a digital twin is actual.

Due to this, simulations have limitations when it comes to assessing actual real-world situations as they occur.

Why is Simulation Used?

Simulation is used to evaluate the effect of process changes, new procedures and capital investment in equipment. Engineers can use simulation to assess the performance of an existing system or predict the performance of a planned system, comparing alternative solutions and designs.

Simulation is used as an alternative to testing theories and changes in the real world, which can be costly. Simulation can measure factors including system cycle times, throughput under different loads, resource utilisation, bottlenecks and choke points, storage needs, staffing requirements, effectiveness of scheduling and control systems.

While simulation can be used to manage processes, procedures and assets, Swedish philosopher Nick Bostrom took the notion of simulation further in his 2003 paper, 'Are You Living in a Computer Simulation?' He argues that by adding artificial consciousness to simulations, you can blur the lines between reality and simulation, making it difficult to tell if you are living in reality or if you are living in a simulation. This simulation hypothesis argues that, should you become aware that your 'reality' was not actually 'real,' your memories could be edited by the simulation to once again make you blissfully unaware that you are not actually a real person in the real world!
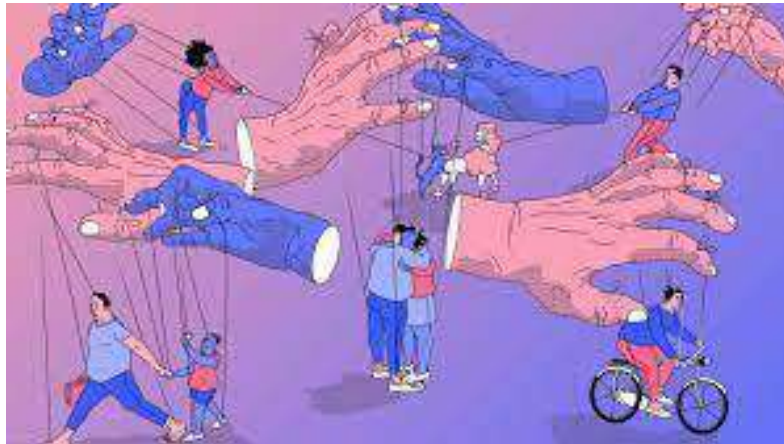
Conclusion:

Simulations are used for a range of applications across industry, saving time and expense while being able to test theories and ideas before implementing them in the real world. Although related techniques such as digital twin may provide added benefits due to the two-way flow of information this allows, simulations still have a great many uses.

Whether testing theories, assessing procedural performance or determining the lifecycle of an asset simulation is a useful tool for many businesses and organisations.

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BLOCKCHAIN AND CRYPTO MINING
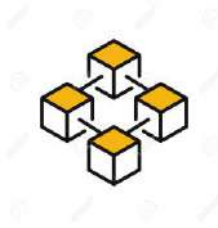
Blockchain:

Blockchain is a decentralized digital ledger that records transactions across a network of computers. It is used to create and manage digital assets, such as cryptocurrencies.

Blockchain technology can be used for a wide range of applications, including:

- Digital currencies: The most well-known application of blockchain technology is the creation of digital currencies, such as Bitcoin.

- Smart contracts: Blockchain technology can be used to create "smart" contracts, which are self-executing contracts with the terms of the agreement between buyer and seller being directly written into lines of code.

- Supply chain management: Blockchain technology can be used to track goods as they move through the supply chain, from manufacturer to end consumer. This allows for increased transparency and efficiency in the tracking of goods

- Digital identity: Blockchain technology can be used to create digital identities for individuals, which can be used for things like voting or accessing government services.

- Medical records: Blockchain technology can be used to create secure and decentralized medical records, which can be accessed by authorized parties.

Despite its potential benefits, there are also challenges and limitations to the adoption and implementation of blockchain technology. These include scalability issues, regulatory challenges, and a lack of understanding about the technology among the general public.

Crypto Mining:

Crypto mining is the process of using specialized hardware and software to solve complex mathematical problems in order to validate transactions on a blockchain network. When a miner successfully validates a block of transactions, they are rewarded with a certain number of cryptocurrency coins as a reward. This process is called "mining" because it is similar to the process of extracting valuable resources from the earth.This process is also known as "proof of work" and is used by several different types of cryptocurrencies, including Bitcoin, Ethereum, and Litecoin.

Miners use specialized hardware, such as graphics processing units (GPUs) or application-specific integrated circuits (ASICs), to solve complex mathematical problems in order to validate transactions. These problems are designed to be

difficult to solve, but easy to verify, which helps to ensure the integrity of the network.

The process of Mining can be quite competitive, as miners compete to be the first to validate a block of transactions and receive the mining reward. As the value of a given cryptocurrency increases, more miners will enter the market, which can lead to an increase in the difficulty of mining. This can make it more challenging for individuals to profit from mining and can lead to the centralization of mining power among larger mining pools or companies. Miners are incentivized to participate in the network by receiving newly minted coins as a reward for their contributions to the network.

As the popularity of cryptocurrencies has grown, so has the demand for mining. This has led to an increase in the amount of electricity required to power the mining hardware, which has raised concerns about the environmental impact of cryptocurrency mining.Another concern with cryptocurrency mining is the centralization of mining power. As the difficulty of mining increases, the cost of mining equipment and electricity also increases, making it difficult for individual miners to compete with large mining pools that can afford to invest in more powerful hardware.

Overall, cryptocurrency mining is an important process that helps to secure and validate transactions on a blockchain network. However, it is important to consider the environmental and decentralization implications of the process.

Ethereum:

Ethereum is a decentralized, open-source blockchain platform that enables the creation of smart contracts and decentralized applications

(dApps). It was created in 2015 by Vitalik Buterin and has since grown to become the second-largest cryptocurrency by market capitalization.Ethereum uses its own native cryptocurrency, Ether (ETH), to fuel its network. Ether is used to pay for transactions and computational services on the network, and can also be traded on cryptocurrency exchanges.

One of the main differences between Ethereum and Bitcoin is that Ethereum is a programmable blockchain, allowing developers to build and deploy their own decentralized applications (dApps) on the network. These dApps can be used for a wide range of purposes, such as creating decentralized exchanges, prediction markets, and non-fungible tokens (NFTs).Another key feature of Ethereum is its smart contract functionality. Smart contracts are self-executing contracts with the terms of the agreement written directly into the code. They allow for the automation of complex financial transactions and can be used to create decentralized autonomous organizations (DAOs).

Ethereum is also planning to move from its current consensus mechanism, known as Proof of Work (PoW) to Proof of Stake (PoS) in the upcoming Ethereum 2.0 upgrade. PoS is a more energy-efficient consensus mechanism, where instead of miners solving complex mathematical equations, validators are selected based on the amount of cryptocurrency they are willing to "stake" or lock up.Overall, Ethereum provides a robust and flexible platform for decentralized application development and smart contract functionality. Its upcoming upgrade to Ethereum 2.0 is expected to improve scalability, security and energy-efficiency.

As of 2023, Ethereum is considered as one of the most promising blockchain platforms for decentralized finance (DeFi) and non-fungible tokens (NFTs) with huge potential for real-world applications in various industries.
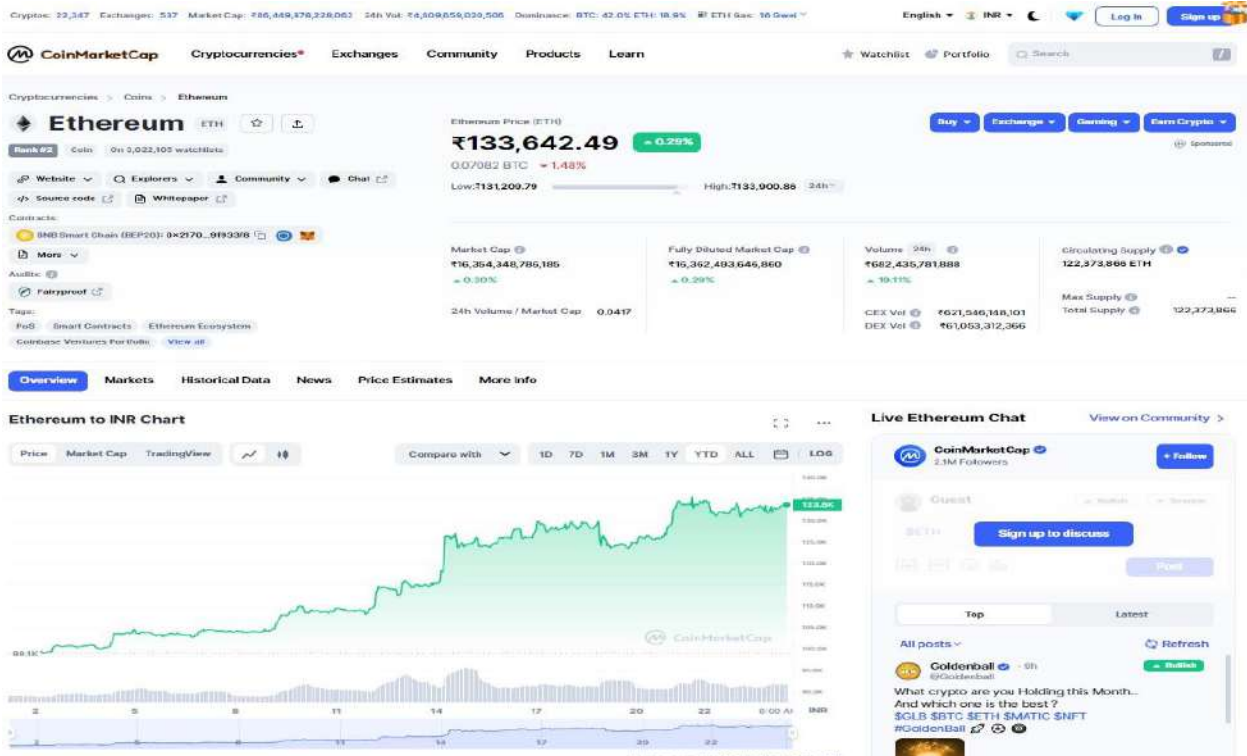
Price of Ethereum – 24 Jan 2023

Conclusion:

In conclusion, Blockchain is a decentralized digital ledger that records transactions across a network of computers. Crypto mining is the process of using specialized hardware and software to validate transactions on a blockchain network and get rewarded with cryptocurrency coins. It is a key aspect of many blockchain networks, but it can be quite competitive, which can lead to the centralization of mining power among larger mining pools or companies.

CRYPTO = MONEY

Article By-Omkar Savant

SE-IT