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Computer Department

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To be the center for excellence for training the world-class engineers to work with multi-disciplinary domain based on the state-of-the-art of technology enabled academic system blended with industrial and business practices.

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To educate and train undergraduate students in Computer Engineering by instilling excellence to fulfill professional and social requirements in business and industry on the platform of scientifically designed academic processes.

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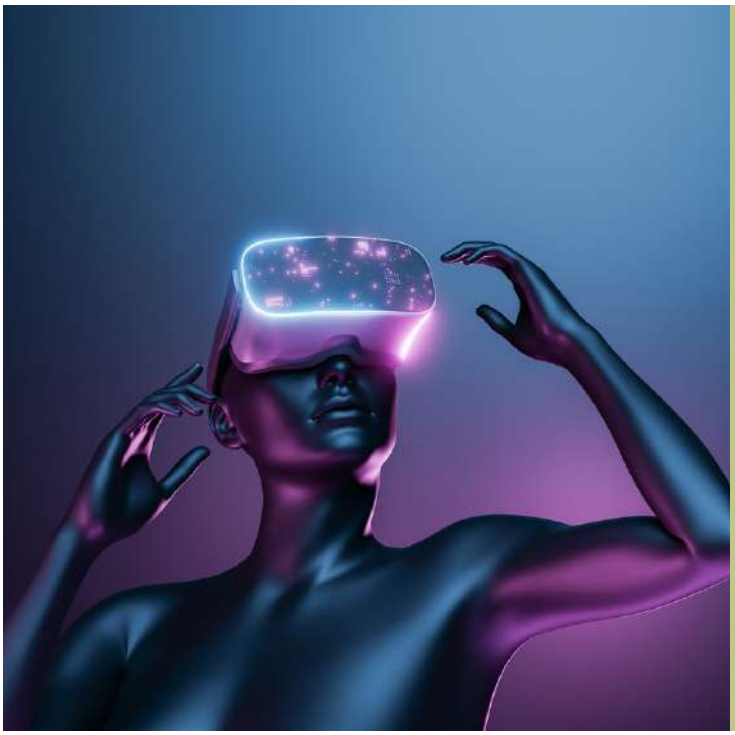
01.

Metaverse: An Alternate Reality



“In simplest terms, the metaverse is the internet, but in 3D.”

If you’re a regular user of social media and online services, you’ve probably seen the term “metaverse” at least once in the past few months. It’s a term associated with a new vision of the internet that was brought further into the limelight when Facebook CEO Mark Zuckerberg recently announced that Facebook will now be known as Meta.

“Meta” means “beyond” in Greek, but the word was also chosen to reflect the company’s commitment to being a metaverse company. Zuckerberg’s vision of the metaverse is an online virtual world that we can access and have experiences in using virtual and augmented reality headsets.

That said, the metaverse isn’t Facebook’s idea, and it isn’t even a new one. In the simplest terms, the metaverse refers to a persistent and immersive 3D environment that makes extensive use of new and emerging technologies like virtual and augmented reality. It aims to take people beyond the screen and into virtual worlds.

The History of The Metaverse:

The term “metaverse” was coined by author Neal Stephenson in his 1992 novel Snow Crash. The book is set in a dystopian future where people spend much of their time in a virtual world called the metaverse. The idea of the metaverse is also present in many other science fiction novels; Ernest Cline’s Ready Player One is a prime example.

Science fiction aside, other tech companies have released products that mirror the concept of a metaverse. In the field of video game development, for instance, companies like Epic Games and Roblox have already gone as far as hosting concerts via online games. Other examples of metaverse-like video games include titles such as The Sims by Electronic Arts and Second Life by Linden Lab.

Though none of these examples are close to the scope of what the metaverse could actually entail, they embody one of its core ideas: a shared virtual environment that people can interact with, and where they can interact with each other and participate in events together using customized digital avatars. And as virtual reality becomes more mainstream, it is relatively certain that in the near future we’ll see games like Fortnite hosting concerts you can attend using VR headsets. The metaverse idea has already seeped into the corporate world. Microsoft has announced the rollout of Mesh for Microsoft Teams in 2022. Mesh is an online platform that uses holograms and mixed reality to create virtual spaces. Its addition to Teams is to help build remote work environments that foster deeper connectedness among team members. However, the appearance of the metaverse in its ideal form is still up for discussion.

How Does the Metaverse Work?

The metaverse can take various forms. Older platforms like Second Life take place entirely on the screen and have no virtual reality component. Second Life has itself been used for virtual business meetings, with some major brands even buying virtual real estate on the platform. Current concepts like Meta, which is currently under heavy development, make use of virtual, augmented, and physical reality to create a far more immersive experience. This begins with creating an avatar, which is a person's representation in the virtual environment, whereupon they will be able to participate.

When Will The Metaverse Get Here?

There are different opinions. When Zuckerberg shared his vision of the metaverse, he gave a timeline of five to 10 years for the technologies he introduced to become mainstream.

Venture capitalist Matthew Ball has a much longer time frame in mind. To paraphrase what he wrote in his 2020 essay The Metaverse: What It Is, Where to Find it, and Who Will Build It, he believes that the internet wasn't designed for the metaverse experience. He argues that while a lot of modern-day technologies contain attributes that can be found in a metaverse, none of them can operate at the levels a metaverse requires to function. He thinks it will take decades to build the metaverse.

That said, when it's created, we probably will not see a smooth transition from the internet as we know it to the metaverse, and the major players won't be the only ones. Smaller companies focusing on the many different aspects of the metaverse will likely play a part. But what does all this mean for people and brands?

How Will The Metaverse Change Our Lives?

The most directly observable phenomenon will probably be the increase in metaverse experiences. The actual metaverse may be decades away, but there will likely be an increase in the availability of AR and VR media formats and the introduction of more immersive technologies.

Working from home could evolve to re-creating your office virtually in your home or even creating a digital space where your office could be permanently located. Online shopping could take on a whole new meaning as well. Even today, clothing brands like Balenciaga and Gucci have partnered with Fortnite and Roblox, respectively, to launch clothing collections for in-game avatars. We could see new forms of fashion come to life.

Beyond these examples, however, most people see the metaverse as a digital world where anything, including work and play, can happen. The ideal metaverse will include as many environments as user and producer imaginations allow.

What Will The Metaverse Mean For Brands?

The metaverse will allow brands to tell their stories in ways never possible before. It will allow them to connect with consumers in new ways. It likely won't have any geographical limitations, and it probably won't need expensive marketing campaigns or reports that take weeks to put together. It'll be about just the brand story that consumers want.

One way brands can prepare themselves for the metaverse is to get involved in social VR early. This will let you take full advantage of the metaverse's capabilities. Social interaction online has changed a lot since the early days of chat rooms and forums, and it continues to evolve as platforms like Instagram and Snapchat continue to gain traction among consumers. VR is the next step in the evolution of social networks, and it opens up new possibilities that haven't yet been explored. For example, in VR anyone can be an influencer – and brands will need to adapt if they want to stay relevant among the next generation of consumers. A celebrity endorsement means nothing when you can hang out with your idol or play games with them in a VR space.

The possibilities of the metaverse are immense. But we must also consider the possible side effects. Issues plaguing the online world today, such as privacy leaks, the commercialization of online spaces and the centralization of technological power, will probably rear their heads in the metaverse if not addressed.

Other side effects, of course, are as yet unknown and will only be made apparent as the creation of the metaverse progresses. In any case, the metaverse is coming, so brands should start thinking now about how to get ready.

Examples of the Metaverse

There are numerous use cases of the metaverse that go far beyond gaming. For example, a participant might use it to spend time with friends remotely, visit virtual retail stores or attend virtual events. For corporate events and meetings, the metaverse promises to help bridge the gap between the physical and the virtual world. This will bring a whole new level of consistency and immersion for today's increasingly popular hybrid events format.

Another increasingly popular implementation of the metaverse is Decentraland, which allows businesses and individuals to trade in virtual real estate for cryptocurrency. The growing popularity of such platforms has encouraged many forward-thinking brands to invest in digital properties to increase their reach and even create virtual office environments. This has major implications for business meetings and other events – especially in today's distributed work environments.

How will the Metaverse Impact Meetings and Events?

Perhaps the most important implication of the metaverse for the events sector is that it offers unlimited space for ideas. By contrast, an office or meeting room can only hold a finite number of monitors, and monitors can only display a limited number of simultaneous video feeds. With the metaverse, there is no hard limit on the number of people who can get involved.

hosting events of practically any size, including major trade fairs and the like. For example, a business could participate in a major virtual event by setting up a virtual booth that attendees can walk up to in the virtual world in much the same way as they would with a physical event.

For smaller-scale events, such as business meetings and conferences, the metaverse helps remove the remoteness from remote work. This can help increase engagement and company culture alike, in a way that meetings over platforms like Zoom or Microsoft Teams never could.

The engagement aspect should also not be underestimated. The metaverse greatly expands on the concept of gamification, which has now been widely adopted as a way to engage both customers and employees and, in the case of events, attendees. This results in more dynamic and connected workplaces, along with an increased ability for self-expression and creativity. After all, the metaverse offers practically unlimited ways for participants to create their virtual identities by way of customizable avatars. For the metaverse and marketing, it also presents a fun and creative way to connect with customers. In the end, the metaverse is a major step up from the virtual and hybrid events that we've all become accustomed to over the pandemic.

The impact on hybrid events is particularly important since the metaverse helps break down the divide between those attending in person and those attending virtually. In either case, attendees can enjoy a similarly engaging and high-quality experience.

What About the Drawbacks of the Metaverse?

The metaverse, at least in the form envisaged by Meta's Mark Zuckerberg, is still in its infancy. It also faces significant concerns around privacy and various other factors. Moreover, we must also consider the fact that a lot of communication is shared through body language, either subconsciously or consciously. This inevitably gets lost in a virtual environment, at least for the time being.

Despite both the demonstrable and potential drawbacks of the metaverse, there is no denying its potential to greatly disrupt the events sector. However, rather than viewing it as a way to completely change and redefine the event landscape as it exists today, a more constructive approach would be to recognize how it can augment current hybrid event formats. The main thing to remember is that face-to-face interactions are key to building trust, and while physical interaction will remain irreplaceable, it is not always an option. In these cases, the metaverse might just turn out to be the next best thing.

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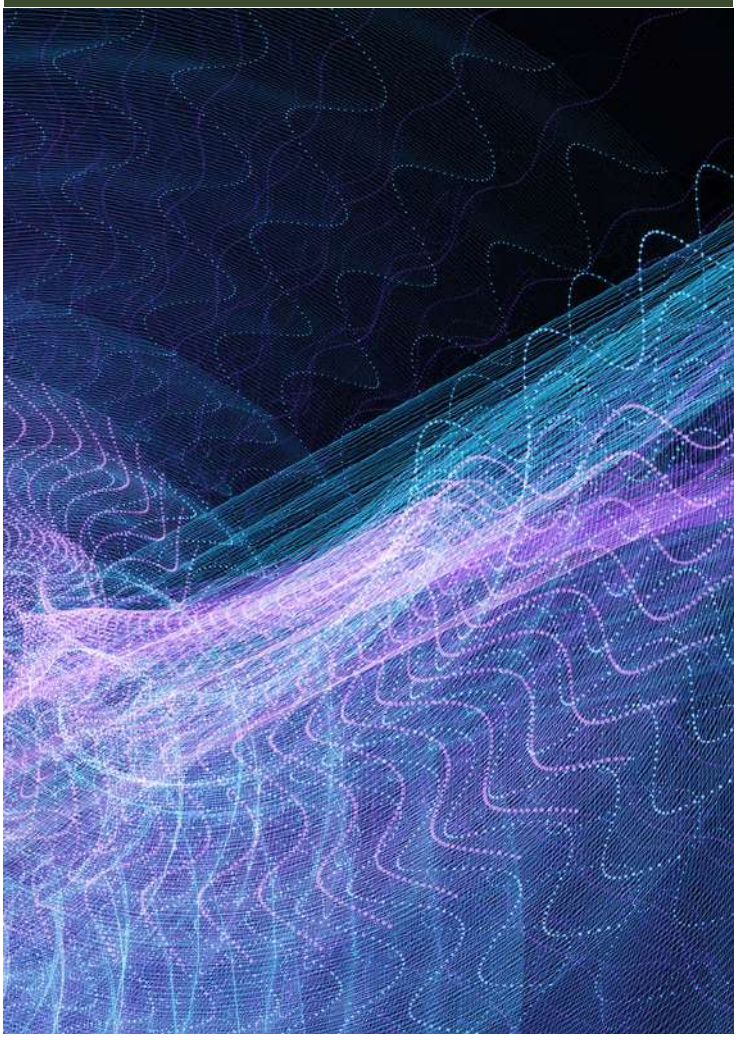
02.

Multi-scale attention network for image inpainting

-Sathe Prathamesh (BE)



Introduction

Image inpainting is the task to fill the missing pixels in a corrupted image, which can be used in numerous applications, such as image editing object removal noise removal and the restoration of old photos. As an ill-posed inverse problem researchers focus on predicting the missing areas realistically and accurately by analysing the known parts of the corrupted image.On the other hand, exemplar based inpainting methods try to fill the missing regions by exploiting image statistical and self-similarity priors.

However, these methods are effective only when the priors and the missing parts have the similar textures. To address these problems, we propose a multi-scale attention network (MSA-Net) for image inpainting, in which a multi-scale attention group (MSAG) is presented to improve the performance of inpainting network. Here, several multi-scale attention units (MSAUs) are included in MSAG to catch the deep context from low-level details to high level semantics gradually. In each MSAU, an attention based spatial pyramid structure is presented to analyse the image context from different receptive fields. In the structure, the obtained multi-scale features are strengthened by the attention mechanisms. Here, a fusing spatial attention is designed to combine average information, high activation and deep context of local neurons, which can distinguish the important spatial components from the feature in a scale. Furthermore, an augmented channel attention is presented to describe the semantics of features in all scales, which can emphasis informative maps and suppress useless deep context. Finally, in order to generate the missing parts from the border regions to the inside, a max pooling-based mask update method is explored to define the location of the missing region for each down sampling layer of MSA-Net.

Previous work:

Previous image inpainting researches generally fill the missing regions by the diffusion-based inpainting (Shen and Chan, 2002; Chan and Shen, 2001; Mainberger et al., 2011; Boscain et al., 2018; Zhang et al., 2014; Amrani et al., 2017) and exemplar-based inpainting (Criminisi et al., 2003; Efros and Leung, 1999; Jin and Bai, 2019; Kumar et al., 2016; Ružić and Pižurica, 2015). Here, Shen and Chan (2002) propose a total variation (TV) based general mathematical model for local non-texture inpainting. Chan and Shen (2001) propose a new inpainting model based on curvature-driven diffusions (CDD) to improve TV inpainting by realizing the connectivity principle. Though the above diffusion-based inpainting methods can ensure local intensity smoothness, they are not suitable to fill large missing regions for producing blurring artefacts. For better details of textures, the exemplar-based algorithms try to synthesize textures by directly copying similar patches from the input images (Akl et al., 2018). Efros and Leung (1999) propose a non-parametric method for texture synthesis, which can preserve local structure and produce good results for a wide variety of synthetic and real-world textures. Criminisi et al. (2003) propose an algorithm for removing large objects, in which the confidence in the synthesized pixel values is propagated in a manner similar to the propagation of information in inpainting. Since the exemplar-based algorithms fill the holes with suitable image patches, they are effective only when the priors and the missing parts have the similar textures.

In recent years, many deep learning methods have made dramatic achievements in image inpainting (Pathak et al., 2016; Yeh et al., 2017; Yu et al., 2018; Liu et al., 2018; Nazeri et al., 2019; Wang et al., 2018; Zheng et al., 2019; Guo et al., 2019; Hong et al., 2019). Yang et al. (2017) proposes a multi-scale neural patch synthesis approach, inspired by a neuroscience model of the primate visual cortex, Christian et al. (2015) propose a deep convolutional neural network codenamed Inception, which can improve the performance by increasing the depth and width of the network while keeping the computational budget constant. Subsequently, Christian et al. (2016) explores ways to scale up networks in ways that aim at utilizing the added computation as efficiently as possible by suitably factorized convolutions and aggressive regularization.
In this paper, we propose a novel multi-scale attention network (MSA-Net) for image inpainting to fill the irregular missing regions. For extracting the multi-scale context gradually, we design a multiscale attention group (MSAG), which consists of several multi-scale attention units (MSAUs). MSAU is the structure to capture features from various receptive fields, in which dilated convolutions with different dilation rates can be regarded as the various scales. Furthermore, three attention mechanisms are introduced to analyse the locally spatial components of each scale and internal semantic characteristics of multiscale features, which consist of the fusing spatial attention, augmented channel attention and progressive channel-spatial attention. Moreover, in order to get a realistic and accurate results, the max pooling-based mask update method is introduced to predict the missing parts from the border regions to the inside. Finally, the experimental results have demonstrated the superior performance of our proposed MSA-Net on restoration of damaged image.

Conclusion:

In this article, we propose a novel multi-scale attention network (MSA-Net) for image inpainting to fill the irregular missing regions. For extracting the multi-scale context gradually, we design a multiscale attention group (MSAG), which consists of several multi-scale attention units (MSAUs). MSAU is the structure to capture features from various receptive fields, in which dilated convolutions with different dilation rates can be regarded as the various scales. Furthermore, three attention mechanisms are introduced to analyse the locally spatial components of each scale and internal semantic characteristics of multiscale features, which consist of the fusing spatial attention, augmented channel attention and progressive channel-spatial attention. Moreover, in order to get a realistic and accurate results, the max pooling-based mask update method is introduced to predict the missing parts from the border regions to the inside.

Finally, the experimental results have demonstrated the superior performance of our proposed MSA-Net on restoration of damaged image. However, the proposed algorithm may exist blurriness in the generated contents when the missing areas are large, which is still a challenge in the image inpainting to restore the large missing regions accurately and realistically. Aiming at this problem, we will further extend the work to explore the connection between the missing regions and the available information of the corrupted image, in which the texture and multi-scale structure will be combined to improve the performance of inpainting network.

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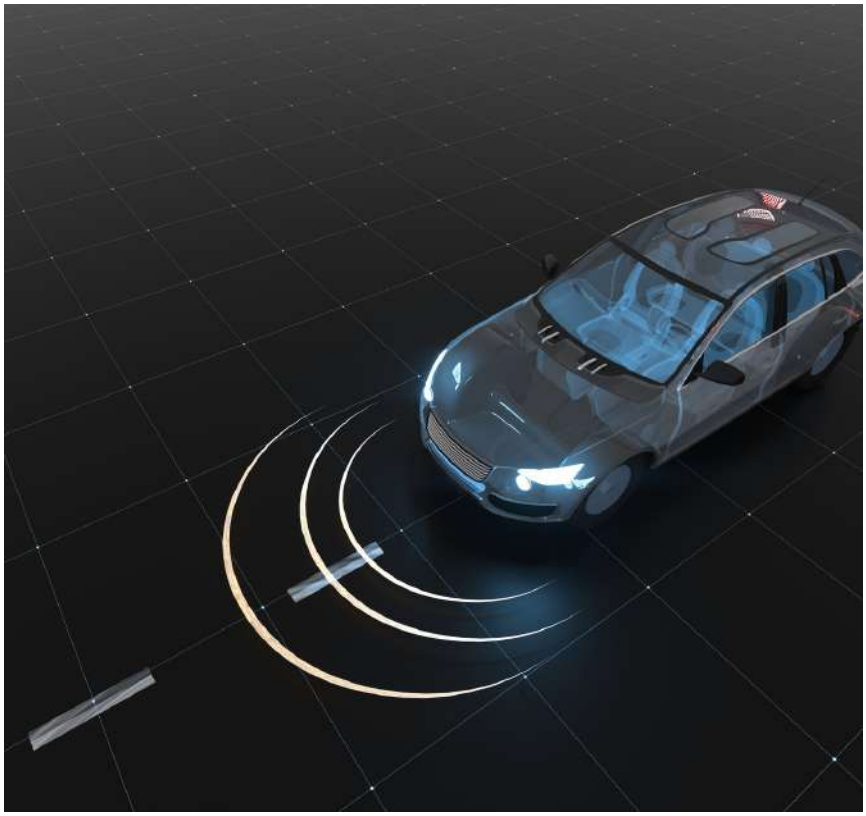
03.

Machine learning algorithm used in autonomous driving”

-Pratik Sonar (BE)



Abstract::

Today, machine learning is frequently utilised to develop answers to problems like market prediction, self-driving cars, and many more. Machine learning may be used more often to carry out new functions in cars by integrating sensors into the centralised electronic control unit. Without human intervention, driving a car requires a complex network of sensors that can record information about the vehicle as well as its surroundings. These sensors include LiDAR, video, cameras, RADAR, and others that continually and in real time produce a large quantity of data about the area around the automobile. We'll talk about the machine learning algorithms utilised in autonomous vehicles in this essay.

Keywords: Self-driving cars, Machine learning, LiDAR, RADAR.

INTRODUCTION:

Machine learning is a branch of artificial intelligence that focuses on enhancing a machine's ability to carry out its intended function. Intelligent systems built using machine learning techniques have the capacity to learn from prior knowledge and historical data. Making computers automatically learn without human intervention or aid is the main objective. Machine learning is being employed in many different domains, including classification, prediction, image processing, regression, and medical diagnosis. Algorithms for supervised and unsupervised learning make up machine learning. Supervised algorithms learn from a reference dataset and keep learning until they are confident that they have reached their aim. The supervised algorithms can be used for regulation, classification, and the identification of abnormalities or decrease in dimension. Unsupervised algorithms, however, attempt to extract value from the data. The study and grouping of interaction rules may be separated into several categories using unsupervised methods. Continuously constructing the environment and foreseeing any changes to that environment are two of an autonomous vehicle's main responsibilities. Four subtasks make up the main task:

1. Object detection.
2. Object identification or classification of objects.
3. Localization of object
4. Movement prediction.

The following four classifications can be used to broadly group machine learning algorithms: algorithms for decision-based matrices, algorithms for clustered data, algorithms for finding patterns, and algorithms for regression.

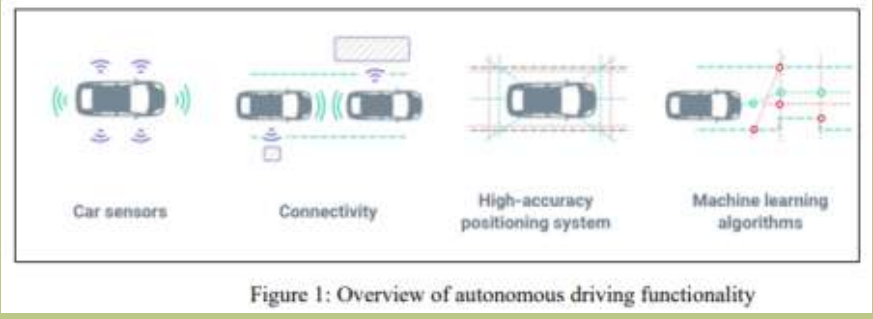


Figure 1: Overview of autonomous driving functionality

Decision matrix:

The performance of the link between the values of information and data is recognised, assessed, and rated by the Decision Matrix algorithm. These kind of algorithms are mostly employed for decision-making. Depending on how confident the algorithms are when spotting, categorising, and estimating the following drive of Objects, the vehicle may need to halt or make a left or right turn.

Clustering Algorithms:

The building from data arguments is defined by the clustering methods. It characterises class methods and class issue as regression. Modelling approaches like hierarchical and centroid-based modelling systematise clustering techniques. K - means, neural networks, and multi-class clustering algorithms are the most often utilised.

Pattern recognition algorithms (Classification):

In Advanced Driver Assistance Systems (ADAS), the quantity of pictures collected by sensors includes all types of outside world data; images filtering is required to establish the category of an object by excluding the unsuitable data-points, which is accomplished by pattern recognition algorithms. Pattern recognition is a crucial stage in a data collection before the artifacts are classified. These algorithms may also be referred to as data reduction algorithms.

Regression algorithms:

These algorithms are ideal for predicting events. Regression techniques like Bayesian regression, decision-forest-based regression, neural-network regression, etc. are utilised in autonomous vehicles. In the analysis of regression, the link between two or more variables is estimated, and the variables' properties are gathered on a separate scale.

1. Regression line shape.
2. Types of dependent variables.
3. Number of dependent variables

LITERATURE SURVEY:

XU Qian, et. al. [1] [2014] have suggested a positioning strategy. The technique focuses on map-matching and environmental awareness for the autonomous automobiles and entails microscopic exact placement in addition to macroscale path alignment. The real-time location of autonomous vehicles was the main topic of this work, which also introduced a method that is entirely dependent on map matching and ambient sensing.

Xue-Mei Chen, et. al. [2] [2017] have suggested using a crude set approach to extract decision-making in a busy, complicated metropolitan setting. This rough set approach handles massive data and quick operations. To gather experimental data, vehicle dynamics were simulated using a dynamical 6-DOF model based on MATLAB/Simulink. To lessen the impact of data discretization, the authors utilised an equidistant discretization strategy.

Kichun Jo et. al. [3] [2015] offered a design and development framework for self-driving vehicles based on the system's distributed architecture. This kind of development has made it possible to create autonomous vehicles with advantages including reduced computing complexity, fault tolerance, and system flexibility. The deployment of the autonomous driving system is also discussed, serving as a case study for this development technique.

Claudiu Pozna, Csaba Antonya [4] [2016] have spoken about the key cultural aspects of driverless automobiles and offered a control architecture with the following levels: strategical, tactical, and operational. The objective of the tactical level is to deal with situations that are expected but not foreseen in the previous level. The job that is specified from the tactical level is then used in the final operational level, which reads sensors and controls actuators on autonomous vehicles, among other things.

Branislav Kisačanin [5] [2017] has talked about the most recent advancements in the science and art of autonomous driving. The development and application of computationally more difficult Deep learning networks used in autonomous vehicles has been covered in the article. The author has provided examples of how the tools are used.

Betina Carol Zanchin et. al. [6] [2017] have outlined the basic terms for autonomous vehicles. To entice the community to deeply comprehend the area, they have offered a conversation on the categorization and instrumentation of self-driving autos. As autonomy becomes more prevalent, more sensors will be employed in more functions and rates, which will enhance the vehicle's ambient sensing.

Mochamad Vicky Ghani Aziz, et. al. [7] [2017] have argued that a number of topics, including deep learning, computer vision, the fusion sensor, locating and controlling, and path planning, need to be studied in greater detail in order to solve the challenge of autonomous automobile research. The results of using the Cipollarang toll road identification algorithm as a component of the automotive system are detailed here. Python allows for detection of the full application process with greater than 90% accuracy. The findings indicated that some parameters would need to be added to this method in order to enable parameter modification both during the day and at night.

CONCLUSION:

In the upcoming years, the area of autonomous vehicles will have a significant influence on the transportation industry. According to several evaluations, artificial intelligence-related technologies like machine learning and deep learning are extremely important and promising for understanding and analysing the robotic behaviour of these embedded systems. The primary focus of scientific investigation on autonomous vehicles is their capacity for perceptual control and decision-making. For object recognition and categorization in common road traffic settings, deep neural networks may be widely deployed.

04.

Web3

-Mrunmayee Gokhle(BE)

Do you recall when you first learned about Bitcoin? Perhaps there was a whisper of a revolutionary new technology that will upend everything. Even while it wasn't immediately obvious what the "money" might actually be used for (very expensive pizza?), you might have experienced a hint of FOMO as the people who arrived first soon accumulated a sizable fortune. Even if you didn't really care one way or the other, you might have just questioned whether your organisation should be developing a cryptocurrency strategy in case it did take off in your market.

There was probably a crash not long after Bitcoin came to your attention, whatever that may have been. The value of bitcoin has fallen about every two years. Every time it does, doubters jump to declare it dead, complaining that it was nothing more than a fringe curiosity promoted by techno-libertarians and those who despise banks. They contend that it was always a fraud for geeks and criminals. They'd argue that Bitcoin didn't have a future alongside legitimate tech businesses, after which they'd forget about it and carry on with their lives.

Naturally, it would return as well.

Now, it feels like bitcoin is everywhere. Many of us missed the gradual mainstreaming of cryptocurrencies because of all the demands on our attention. Before long, celebrities like Paris Hilton, Tom Brady, and Jamie Foxx were peddling them in commercials, Larry David was promoting them during the Super Bowl, and a truly horrific mechanical bull honouring Bitcoin was unveiled in Miami. What was initially an interest and subsequently a speculative niche has grown into a significant industry.
But crypto only represents the very beginning. Blockchain, the underlying technology, is what's known as a "distributed ledger"–a database hosted by a network of computers rather than a single server–that gives users an immutable and transparent means to store data. Blockchain is increasingly being used for other purposes, like recording the ownership of nonfungible coins or unique digital items in "digital deeds." In 2022, NFTs have proliferated, apparently out of nowhere creating a $41 billion market. For instance, Beeple made headlines last year when a non-framed piece of his art for $69 million at Christie's. DAOs, or "decentralised autonomous organisations," are even more esoteric relatives that function like headless corporations: They raise and spend money, but all decisions are voted on by members and carried out by encoded rules. Recently, one DAO raised $47 million in an effort to purchase a valuable copy of the US Constitution. DeFi (or "decentralised finance") proponents are lobbying Congress and selling a world without banks. DeFi intends to reshape the global financial system.

The culmination of these initiatives is referred to as "Web3." The name serves as a handy abbreviation for the initiative to rewire how the web operates by utilising blockchain to alter how information is stored, shared, and owned. The monopolies on who controls information, who generates money, and even how networks and organisations operate might theoretically be destroyed by a blockchain-based web. Advocates claim that Web3 would usher in a new era of the internet by establishing new online economies, product categories, and services. They also claim that Web3 will bring democracy back to the web. Web3 will eventually happen, much like the Marvel bad guy Thanos. Or is it? While it's undeniable that energy, money, and talent are surging into Web3 projects, remaking the web is a major undertaking. For all its promise, blockchain faces significant technical, environmental, ethical, and regulatory hurdles between here and hegemony. A growing chorus of skeptics warns that Web3 is rotten with speculation, theft, and privacy problems, and that the pull of centralization and the proliferation of new intermediaries is already undermining the utopian pitch for a decentralized web. Businesses and leaders are currently attempting to understand the promise and perils of a rapidly shifting environment that might yield significant rewards for those who get it right. While some have experienced significant success with Web3, many businesses are testing the waters and finding that the temperature is too hot for them or their clients. Of fact, most people have no idea what Web3 is at all. When HBR readers were randomly surveyed on LinkedIn in March 2022, nearly 70% of them admitted they had no idea what the term meant.

Welcome to the complex, contentious, fascinating, utopian, fraudulent, destabilising, democratising, and (maybe) decentralised Web3 world. What you should know is as follows.

Scientists W. Scott Stornetta and Stuart Haber established the first blockchain in 1991 as a project to time-stamp digital documents, sowing the seeds for what would eventually become Web3. However, the concept didn't fully take off until 2009, when Satoshi Nakamoto, a fictitious inventor, introduced Bitcoin in the wake of the financial crisis (and at least in part as a reaction to it). It operates in the same way as the underlying blockchain technology in that: When a user wants to move their cryptocurrency, "miners" process the transaction by solving a challenging math problem, adding a new "block" of data to the chain, and creating newly produced bitcoin as payment. Ownership of the cryptocurrency is kept on a shared public ledger. Newer blockchains give other choices, whereas the Bitcoin chain is only used for money. A cryptocurrency and platform for creating additional cryptocurrencies and blockchain projects, Ethereum was introduced in 2015. One of its cofounders, Gavin Wood, referred to Ethereum as "one computer for the entire planet," where computing power is dispersed globally and is not centrally managed. After more than ten years, supporters of a blockchain-based web are now announcing the advent of a new age known as Web3.

Simply put, Web3 is a cryptocurrency extension that uses blockchain in novel ways to achieve novel goals. The amount of tokens in a wallet, the conditions of a self-executing contract, or the source code for a decentralised programme can all be stored on a blockchain (dApp). Although not all blockchains operate in the same way, in general, currencies are given to miners as rewards for processing transactions. Solving the difficult arithmetic problems required to execute transactions is energy-intensive by design on "proof of work" chains like Bitcoin. Processing transactions on a "proof of stake" chain, which is newer but becoming more popular, just requires that the chain's stakeholder verifiers concur that a transaction is legitimate. This is a much faster procedure. Although users' wallets are only uniquely identified by a cryptographically generated address in both circumstances, transaction data is public in both. Because blockchains are "write only," you can only add data to them; you cannot remove it.

The "permissionless" blockchains used by Web3 and cryptocurrencies have no centralised management and don't require users to have any prior knowledge of or trust in other users in order to transact with them. Most of the time, when someone mentions blockchain, they are referring to this. Chris Dixon, a partner at the venture capital firm a16z and one of Web3's leading champions and investors, adopts the concept from Web3 adviser Packy McCormick: "Web3 is the internet owned by the builders and consumers, managed using tokens." This is significant because it alters the fundamental dynamic of the modern web, in which businesses pressure consumers to provide as much data as possible. "The underlying problem with centralised networks," according to Dixon, "where the value is gathered by one firm, and the corporation ends up fighting its own customers and partners," is fixed by tokens and shared ownership.

In a groundbreaking blog post from 2014, Ethereum's Wood outlined his vision for the new era. According to him, Web3 "reimagines the kinds of activities we presently use the web for, but with a fundamentally different model for the interactions between parties." "We post information that we believe to be public. We record information on a consensus-ledger that we believe to be agreed-upon. We keep information hidden and never divulge it that we believe to be private. In this scenario, identities are concealed and all communication is encrypted. We design the system, in essence, to quantitatively verify our presumptions because it is unreasonable to trust any government or institution. Since then, the concept has changed, and new use cases have begun to materialise. Better terms for musicians are promised by the Web3 streaming service Sound.xyz. Blockchain-based games let players make money while they play, such as the Pokémon-like Axie Infinity. As improvements to the world financial system, so-called "stablecoins," whose value is tied to the dollar, the euro, or some other external reference, have been promoted. Additionally, crypto has grown in popularity as a method of cross-border payment, particularly for users in unstable situations.

Dixon informs me that "Blockchain is a new type of computer." Similar to how it took years to realise how much PCs and smartphones changed how we use technology, blockchain has been in an extended incubation period. He asserts that "I believe we may be in the Web3's golden age, where all the entrepreneurs are entering." Even while the Beeple sale and the outrageous price tags have gotten most of the attention, the situation is more complicated. He says that, like Sound.xyz, "the great majority of what I'm seeing is smaller-dollar enterprises that are lot more about communities." Engagement is a better predictor of what might succeed in Web3, as opposed to scale, which has historically been a crucial measure of a Web2 organisation.

Dixon has staked a lot on this outcome. He and a16z began investing in the sector in 2013 and last year made $2.2 billion in Web3 startups. In 2022, he intends to increase it by double. In 2021, there were about 18,000 active developers working on Web3 code, a rather small increase when compared to global figures but nonetheless noteworthy. Most significantly, there is undeniable buzz surrounding Web3 initiatives as they have entered the zeitgeist.

References:

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