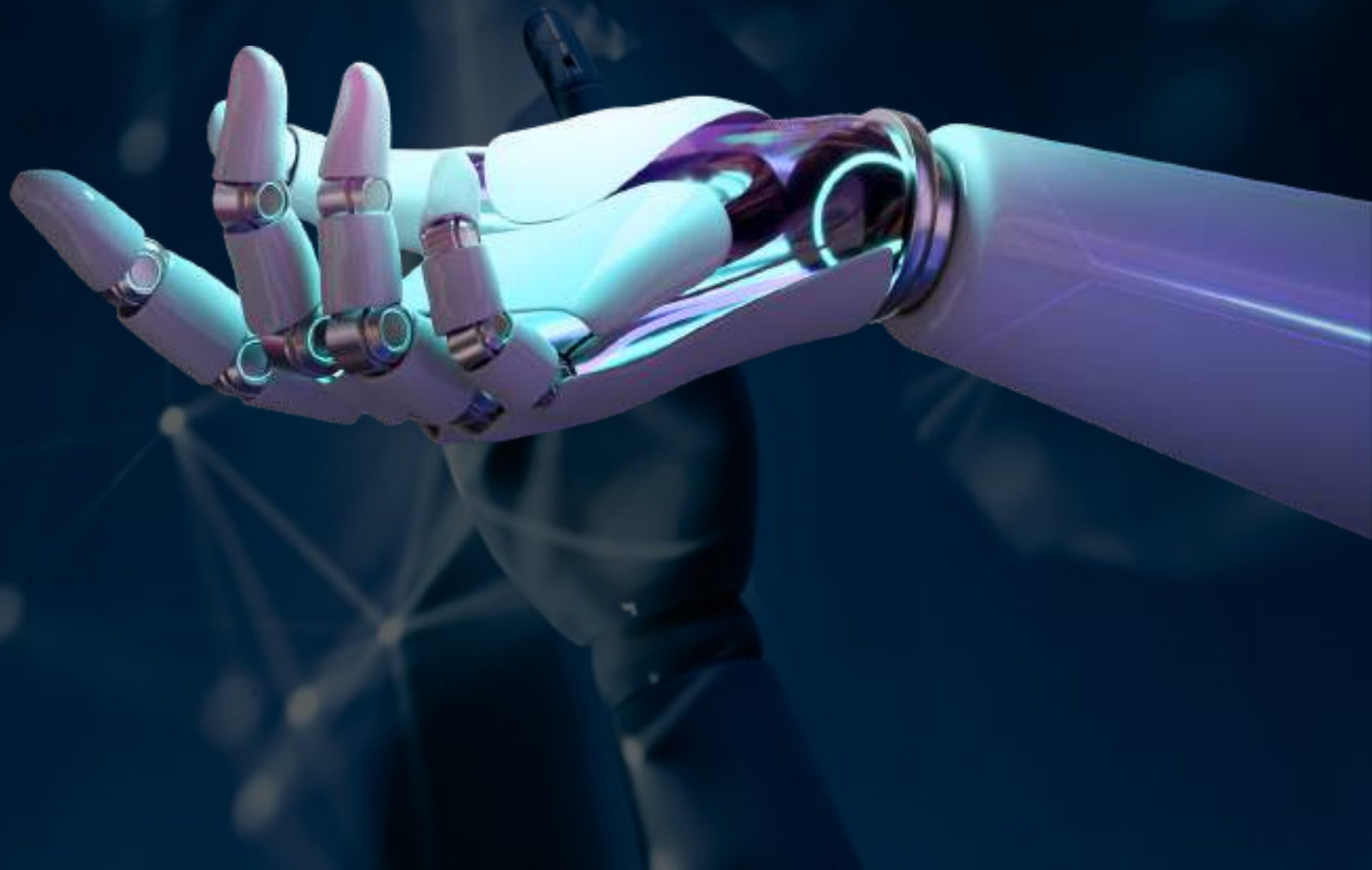


# AGAMA

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# SUPERHUMAN AI-SHOULD WE TO BE WORRIED??

BY-21251A0595

For years, there has been a surge in AI advancements. The technology has been helping many industries achieve their goals. But, amid the benefits come growing concerns about the development of superhuman artificial intelligence and how this can impact humanity. Some believe that while AI-enabled systems make jobs easier to do, others think they are *taking over their careers*.

## WHAT IS SUPERHUMAN AND, WHY DO PEOPLE FEAR IT?



A superhuman AI or superintelligent machine has the potential to pursue its goal, depending on how it is programmed. Compared with standard AI systems that are designed to perform a specific task, superhuman AI machines can do almost anything that a human can. And what people fear is that if these systems are not programmed to be friendly toward humans, they may do harmful things to achieve their goals.

## EXPERTS OPINIONS:

In the BBC meet, **Stephen Hawking** once said that: "The development of full AI could spell the end of the human race. Humans, who are limited by slow biological evolution, couldn't compete, and would be superseded."

But his vision is not matched by the views of one expert in AI. According to **Prof. Bishop**, because there are some key human abilities, such as understanding and consciousness which are fundamentally lacking in so-called "intelligent" computers. "This lack means that there will always be a 'humanity gap' between any artificial intelligence and a real human mind. Because of this gap a human working in conjunction with any given AI machine will always be more powerful than that AI working on its own". So, there are divergence of opinions.

## BUILDING ARTIFICIAL GENERAL INTELLIGENCE(AGI) IS POSSIBLE OR NOT!!

For superhuman AI to come into fruition, the technology's proponents must first build the "Artificial General Intelligence". At present, most systems are "narrow AI" devices, means they can only perform specific tasks. A system of capable of doing all kinds of jobs that humans can is one that has AGI. That machine does not yet exist but experts believe it can.

## SHOULD WE BE WORRIED?



While it is very hard to say with certainty that superhuman AI is nothing but a myth, we see no indications yet of its coming. AI has yet to overcome several hurdles before it can mimic human intelligence. That said, there is no cause to worry, at least, not yet.

# EXPLORING THE DARK WEB: A PEEK INTO THE HIDDEN SIDE OF THE INTERNET

BY-21251A0580

The internet has become an essential part of our lives, connecting us to people and information from all over the world. However, not all parts of the internet are accessible through traditional means. The dark web, also known as the darknet, is a hidden part of the internet that is not indexed by search engines and requires special software or configurations to access.



## What is the Dark Web?

The dark web is a part of the internet that is intentionally hidden and anonymous, making it a haven for criminal activities. The most common way to access the dark web is through the Tor browser, which provides users with an anonymous connection by routing traffic through a series of encrypted servers.

## How Does the Dark Web Work?

The Dark Web uses a technology called onion routing to encrypt and anonymize internet traffic. Onion routing works by encrypting data multiple times and then passing it through a series of servers before reaching its final

destination. Each server in the network can only see the previous and next servers in the chain, making it difficult to trace the origin of the data.

## Dangers of the Dark Web:

The anonymity of the Dark Web has made it a haven for illegal activities. Dark Web marketplaces offer illegal goods and services, such as drugs, weapons, and stolen personal information. The use of cryptocurrencies, such as Bitcoin, on the Dark Web has made it easier for criminals to conduct transactions without being traced. Additionally, the Dark Web has become a hub for hackers and cybercriminals who sell hacking tools, stolen data, and other illicit services.

## Law Enforcement and the Dark Web:

Governments and law enforcement agencies have made efforts to shut down illegal activities on the Dark Web. However, these efforts have been met with limited success. The decentralized nature of the Dark Web makes it difficult to track down and shut down individual sites. Additionally, as soon as one site is shut down, another one pops up to take its place. Some law enforcement agencies have also set up their own Dark Web sites to monitor criminal activity.



## Conclusion:

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The Dark Web is a hidden part of the internet that has both positive and negative uses. While it can be a place for illegal activities, it can also be a place for people to communicate and access information anonymously. As the internet continues to evolve, it is important to understand the role that the Dark Web plays in our digital world.

## Everything you need to know about Edge Computing

The world has become more connected than ever before, and it shows no sign of slowing down. The exponential growth of the Internet of Things (IoT) has created a need for a new computing paradigm that handles the sheer volume of data generated by these devices. This is where edge computing comes in. This emerging technology is changing the way we think about computing by shifting processing power from centralized data centers to the "edge" of the network, closer to where data is generated. In this post, we'll explore what edge computing is, how it works, and the benefits it offers. Whether you're a business owner or someone interested in the latest technology trends, this article is a must-read for anyone who wants to understand the future of computing.

### What is Edge Computing?



Edge computing is a distributed architecture that moves computing and data storage closer to the "edge" of a network, where devices produce and consume data. This reduces the distance and time required for data to travel to and from a central data center, resulting in lower latency and faster response times.

### Do we need it?

With the rise of the Internet of Things (IoT) and its billions of connected devices, the amount of data being generated is increasing exponentially. This data can overwhelm traditional cloud computing infrastructures, resulting in slow

response times and high network costs. Edge computing provides a solution by enabling data processing and storage at the edge of the network, leading to faster and more efficient computing. Edge computing has already laid a market of its own. Some of the leading players in the edge computing market include Amazon Web Services (AWS), IBM, and Microsoft.

### Are Edge Computing and Cloud Computing two different things?

While cloud computing relies on sending data away to centralized data centers, Edge computing brings computation and data storage closer to users. Edge computing offers faster response times, lower latency, and reduced bandwidth requirements compared to cloud computing. This is because data processing and analysis are performed locally, which reduces the need for data to be transmitted back and forth to remote data centers. However, edge computing can be more expensive than cloud computing due to the need for additional hardware and software infrastructure.

### Edge Computing is a game changer...

**Lower Latency** – By moving computing closer to the edge of the network, edge computing reduces the delay between data generation and processing.

**Better Security and Privacy** - Edge computing can enhance security and privacy by limiting the amount of data that needs to be transmitted over the network.

**Reduced Bandwidth Costs** - By processing data at the edge of the network, edge computing can reduce the amount of data that needs to be transmitted to a remote data center, resulting in lower bandwidth costs.

## Everything comes with a cost Challenges of Edge Computing:

- | **Limited Scalability:** Edge computing can be limited by the size and capacity of the devices located at the edge of the network. This can lead to scalability issues as the number of connected devices and the amount of data being generated increases.
- | **Data Management Issues:** Edge computing can create challenges in managing and synchronizing data across the network. As data is processed and stored locally, it can become difficult to maintain consistency and ensure data integrity across devices.

## Innovative Edge Computing Technologies

- | 5G networks that can support real-time data processing and analysis at the edge
- | Artificial intelligence (AI) algorithms that can be deployed at the edge to enable intelligent decision-making
- | Edge-to-cloud orchestration platforms that provide a unified view of cloud and edge computing resources

## Conclusion:

Edge computing is a powerful technology that provides businesses with faster data processing, improved security, and reduced costs. While there are challenges to implementing edge computing, its potential benefits make it a compelling choice for many industries. As technology continues to evolve, we can expect to see even more exciting innovations in the field of edge computing. By understanding its advantages, challenges, and key players, businesses can make informed decisions about whether to adopt this revolutionary technology and position themselves for success in the digital age.





# EDGE COMPUTING

-The New Evolving technology

Edge computing? Not familiar with this word...! If so may be as newly evolving technology.... then here is the brief intro of this EDGE COMPUTING which may become the one of the leading technologies in our future check it out here.....

## How Does Edge Computing Works?

- Edge computing works by capturing and processing information as close to the source of the data or desired event as possible. It relies on sensors, computing devices and machinery to collect data and feed it to edge servers or the cloud.

### Applications of Edge Computing

Edge computing finds applications in various industries. It is used to aggregate, process, filter, and analyze data near or at the network edge. Some of the areas where it is applied are:

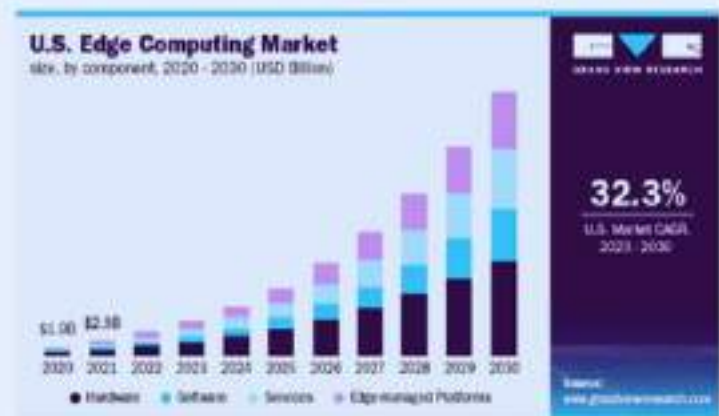
- 10T Devices
- Optimising Network
- Healthcare
- Agriculture
- Industries

### The Effect of Edge Computing in Future

- Edge computing is currently in its early phases of development. Its deployment and operating models have yet to evolve; And edge computing is expected to offer significant growth prospects in future
- The global edge computing market size was valued at USD 11.24 billion in 2022 and is expected to expand at a compound annual growth rate (CAGR) of 37.9% from 2023 to 2030.
- Precedence research has estimated the global edge computing market will reach \$51.2 billion in 2023 and surpass \$116.5 billion by 2030.

## What is Edge Computing?

- Edge computing is a distributed IT architecture which move computing resources from clouds and data centers as close as possible to the originating source. The main goal of edge computing is to reduce latency requirements while processing data and saving network costs.
- It is an emerging computing paradigm which refers to a range of networks and devices at or near the user. Edge is about processing data closer to where it's being generated, enabling processing at greater speeds and volumes, leading to greater action-led results in real time.



**"Edge is growing and will continue to evolve in the future"**

As we move towards a more connected world, we are generating more data than ever before. To manage this vast amount of data, traditional cloud computing models are no longer sufficient. This is where edge computing comes into play. Edge computing is a distributed computing architecture that brings computing power closer to the source of data generation.

Edge computing is a technology that moves computing resources closer to the edge of the network, where data is generated, instead of relying on centralized cloud computing infrastructure. Edge computing systems consist of a network of small, localized data centers that are spread out across different locations. These data centers are responsible for processing and storing data, as well as executing applications and services.

One of the primary benefits of edge computing is reduced latency. When data is processed at the edge of the network, it eliminates the need for data to travel to centralized cloud data centers, reducing the delay in data processing. This is especially important for applications that require real-time processing, such as autonomous vehicles and industrial automation. Edge computing can also improve network security by keeping sensitive data closer to the source of generation.

Edge computing has the potential to revolutionize several industries, including healthcare, manufacturing, and transportation. For example, in healthcare, edge computing can enable real-time monitoring of patients' vital signs and other medical data, allowing healthcare providers to deliver better and faster care. In manufacturing, edge computing can enable real-time data processing of sensor data from equipment, leading to more efficient production processes. In transportation, edge computing can enable real-time analysis of traffic data, allowing for safer and more efficient travel.

Despite the benefits, there are also some challenges associated with edge computing. One of the biggest challenges is managing the large number of edge devices and the associated data. There is also the challenge of ensuring data privacy and security, as sensitive data is often processed at the edge of the network.

In conclusion, edge computing is an exciting technology that has the potential to transform the way we process and manage data. Its benefits, including reduced latency, improved security, and real-time processing, make it an attractive option for several industries. However, the challenges associated with edge computing, such as data management and security, must be addressed to ensure its successful implementation. As technology continues to evolve, edge computing is likely to play a significant role in the future of data processing.

# IS DEEP LEARNING SUBSET OF MACHINE LEARNING?

BY-J. BHAVANA

21251A0578

CSE-2/4

Artificial intelligence (AI) is going through its golden era. Most AI applications are indeed using machine learning (ML) which is part of AI, and it currently represents the most promising path to strong AI. On the other hand, deep learning, a branch of ML, is becoming more and more popular and successful and is at the peak of developments by enabling more accurate forecasting and better planning for civil society, policymakers, and businesses.

Deep learning is a subset of machine learning that uses neural networks with multiple layers to analyze complex patterns and relationships in data. It is inspired by the structure and function of the human brain, and has been successful in a variety of tasks, such as image recognition, natural language processing, and speech recognition. Deep learning models are trained using large amounts of data and algorithms that are able to learn and improve over time, becoming more accurate as they process more data. This makes them well-suited to complex, real-world problems and enables them to learn and adapt to new situations.



Deep learning uses the artificial neural network and the recurrent neural network. The algorithms are created exactly just like machine learning but it consists of many more levels of algorithms. All these networks of the algorithm are together called the artificial neural network. In much simpler terms, it replicates just like the human brain as all the neural networks are connected in the brain, which exactly is the concept of deep learning. It solves all the complex problems with the help of algorithms and its process. Deep learning works by processing raw data and then applying feature extraction techniques followed by matching and labeling data which classifies and identifies data. Machine learning uses single level at each stage of processing raw data to suitable representation for detection, recognition and classification. Due to this single level of processing between input and output, may lead to less accurate result, On the other hand recently to increase accuracy and speed of processing, Deep-learning methods are used which uses learning methods but with multiple intermediate layers of representation. These layers are incorporated by non-linear modules which modify the representation at one level into a more conceptual representation at next level. Unlike machine learning feature extracting layers are not designed by human experts: they are learned from data using a generalpurpose learning procedure.

Deep learning algorithms require large amounts of data to train the neural networks, but can learn and improve on their own as they process more data where as ML requires less data than deep learning but the quality is important. Based on the input data we provide DL algorithms are classified into supervised, partially supervised and unsupervised. Due to its universe learning approach, robustness, generalisation, scalability and accuracy, deep learning has wide range of applications for real world problems.

# AUGMENTED REALITY

## - THE FUTURE IMMERSIVE TECHNOLOGY

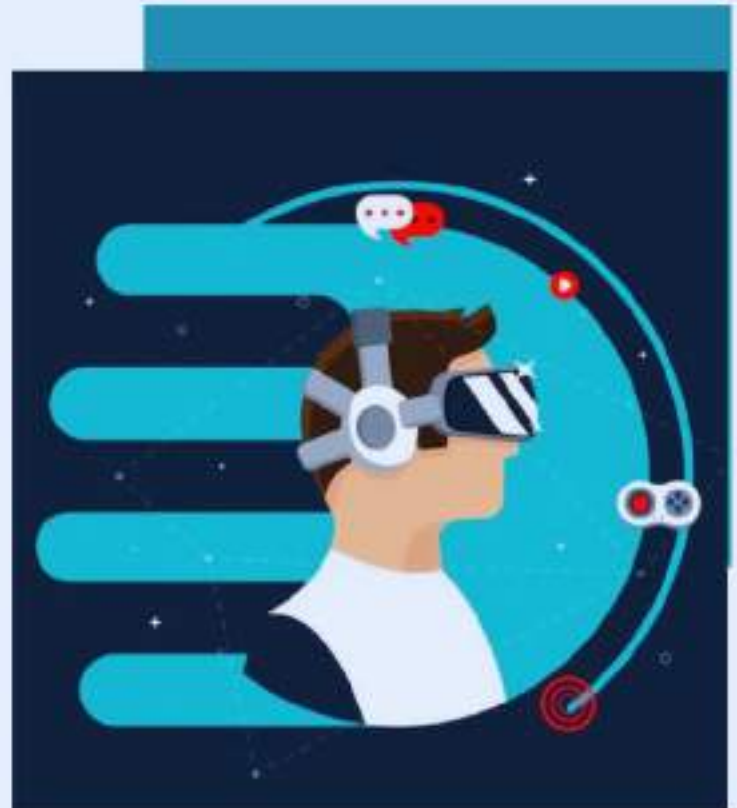
BY-C.APOORVA  
2121A05A2

Augmented reality (AR) is an exciting technology that has captured the world's attention of technical and businesses alike. AR enhances the real world with digital content, allowing users to interact with their surroundings in innovative ways.

AR works by superimposing digital content onto the real world. This is done through the use of a device, such as a smartphone or a headset, which overlays the digital content onto the user's view of the real world. The result is an immersive experience that combines the real world with digital content.

One of the most popular uses of AR is in gaming. Games such as Pokemon, allowing players to interact with virtual creatures and objects in the real world. These games use the camera on a smartphone to capture the user's surroundings, and then superimpose digital content onto the screen.

AR is not just limited to gaming. The technology of AR has also been used in education, allowing students to interact with virtual models of complex concepts such as the human body or the solar system. AR can also be used in advertising, allowing brands to create immersive experiences that engage consumers in new and innovative ways. The potential uses for AR are virtually limitless. As the technology continues to evolve, we can expect to see more innovative and creative uses for AR in a variety of industries. From gaming to education to healthcare, AR has the potential to transform the way we interact with the world around us. In conclusion, augmented reality is an exciting and rapidly evolving technology that has the potential to transform the way we live, work, and play. Whether you are a gamer, a student, or a healthcare professional, there is no doubt that AR will play an increasingly important role in the years to come.



# AUGMENTED REALITY AND VIRTUAL REALITY: A GAME CHANGER FOR DIFFERENT INDUSTRIES

BY-KAVYA  
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CSD-2/4

Augmented reality (AR) and virtual reality (VR) are two technologies that have become popular in recent years. They have the ability to transform businesses by providing experiences and enabling companies to interact with new customers.

The potential of AR and VR across industries are as follows:

## **Game industry:**

One of the biggest beneficiaries of AR and VR technologies is the gaming industry. AR and VR allow players to interact with the game environment and characters for an immersive experience. They provide a new level of reality, allowing players to feel as if they are there.

## **Retail:**

Retail is another industry that can benefit from AR and VR technology. AR can help shoppers imagine what a product would look like in their home or on their own. At the same time, virtual reality can provide shoppers with a virtual shopping experience, enabling them to shop in a virtual store without leaving their home.

## **Education:**

Augmented and virtual reality technologies can provide students with immersive and interactive learning experiences. They can be used to create virtual classrooms where students can participate in group work and lectures from anywhere. AR can also be used to bring educational content to life by displaying digital information on real-world objects.

## **Medical:**

AR and VR technologies can help doctors train and prepare for surgery and other medical procedures. They can also be used to provide virtual therapy to patients or to create experiences to help them cope with stress and pain.

## **Real estate industry:**

AR and VR technology can be used in the real estate industry to provide buyers with virtual tours of properties. They can also be used to help architects and interior designers visualize their designs and present them to clients.

## **Tourism:**

Augmented and virtual reality technologies can provide tourists with immersive experiences in popular travel destinations. They can also be used to create virtual tours for museums, historical sites, and other attractions.

AR and VR technologies together can transform businesses by providing immersive experiences and enabling businesses to interact with new customers. With the constant advancement and widespread use of technology, it is likely that an increasing number of businesses will utilize augmented and virtual reality to enhance their operations and improve customer experiences.

# THE FUTURE OF DRIVING : THE RISE OF AUTONOMOUS VEHICLES

BY-M.SHRADHA RAO

21251A0583

CSE-2/4 (B)

As technology evolves, so does the way we commute. Autonomous vehicles, also referred to as self-driving cars, are at the forefront of this revolution. These vehicles employ a range of sensors, cameras, and artificial intelligence algorithms to navigate roads, interpret traffic signals, and make real-time decisions based on their surroundings, all without human intervention. While this technology is still in its early stages, it has already been tested on public roads in several countries.

The advent of autonomous vehicles has brought about numerous advantages, with safety being one of the most significant. Human error is the leading cause of road accidents worldwide, with over 1.3 million road traffic fatalities annually, according to the World Health Organization. By eliminating the need for a human driver, autonomous vehicles could drastically reduce the number of accidents and save countless lives. Additionally, they could increase road efficiency and decrease traffic congestion, which would ultimately save drivers time and money.

However, there are potential drawbacks to this technology, with the primary concern being the potential for job losses in the transportation industry. If autonomous vehicles become ubiquitous, it could lead to a significant decrease in driving-related jobs, including those of taxi and truck drivers. Additionally, concerns over the reliability of the technology and the potential for cybersecurity threats remain.

Despite these challenges, several tech giants are investing heavily in this technology. Companies such as Tesla, Google, and Uber are pioneering autonomous vehicle development and making considerable strides. As these companies continue to enhance the technology, we can expect to see autonomous vehicles becoming a more common sight on our roads, reshaping the way we travel.

In conclusion, autonomous vehicles are an incredibly exciting technological development that has the potential to transform our daily commute. While there are potential pros and cons, it is evident that self-driving cars can improve road safety and efficiency, ultimately benefiting society. As we continue to witness technological progress in the transportation industry, it will be interesting to see how autonomous vehicles impact the future of commuting.

Blockchain is a revolutionary technology that is transforming the way we conduct transactions and share data. It is a decentralized, digital ledger that allows for secure and transparent transactions without the need for intermediaries such as banks or financial institutions.

At the heart of blockchain technology is a network of nodes or computers that work together to verify and validate transactions. Each transaction is recorded in a block, which is then added to the chain of blocks in a tamper-proof manner. The blockchain is essentially a public ledger of all transactions that have taken place on the network.

One of the key benefits of blockchain technology is its security. Because the blockchain is decentralized, there is no central authority that can control or manipulate the data. Transactions are verified and validated by the network of nodes, which makes it extremely difficult for hackers to alter or tamper with the information.

In addition to its security benefits, blockchain technology is also faster and more cost-effective than traditional transaction methods. Transactions can be processed quickly and efficiently, with lower fees, because there are no intermediaries involved.

The potential applications of blockchain technology are vast and varied. It can be used for supply chain management, voting systems, and digital identity verification, among other things. Blockchain has the potential to disrupt traditional industries and create new business models in the digital age.

Overall, blockchain technology is a game-changing innovation that is transforming the way we conduct transactions and share data. As the technology continues to mature, it is likely that we will see more and more applications of blockchain across different industries, making it an exciting time for innovation and entrepreneurship.



# DRONES MODERN WARFARE

Drones have become a game-changer in modern warfare, providing military forces with new capabilities and advantages on the battlefield. Drones, or unmanned aerial vehicles (UAVs), are aircraft that can be controlled remotely or operate autonomously. They come in a variety of sizes and shapes, from small handheld devices to large, weaponized drones.

Here are some of the ways drones are being used in modern warfare:

**Intelligence, Surveillance, and Reconnaissance (ISR):** Drones are extensively used for ISR purposes, providing military forces with real-time information on enemy movements, positions, and activities. They can cover large areas and operate at high altitudes, making them ideal for surveillance and reconnaissance missions.

**Target Acquisition:** Drones equipped with advanced sensors and cameras can accurately locate and track targets. This capability is particularly useful in urban areas, where it is difficult for ground forces to locate and engage targets without putting themselves at risk.

**Precision Strikes:** Weaponized drones can carry out precision strikes on enemy targets, reducing the risk of civilian casualties and collateral damage. Drones can deliver missiles, bombs, and other munitions with pinpoint accuracy, making them a valuable asset in modern warfare.

**Logistics Support:** Drones can also be used for logistics support, delivering supplies and equipment to troops in the field. This capability is particularly useful in remote or inaccessible areas where traditional transport methods are not feasible. **Psychological Operations:** Drones can also be used for psychological operations, broadcasting propaganda messages or warning signals to enemy forces. This capability can be used to influence the morale and behavior of enemy troops and civilians.

However, drones also present some challenges and risks in modern warfare. For example, drones can be vulnerable to electronic jamming and hacking, making them susceptible to interception or hijacking by enemy forces. There are also concerns about the legality of using drones in certain situations, such as targeted killings of enemy combatants.

Despite these challenges, drones continue to play an increasingly important role in modern warfare. As technology continues to advance, drones are likely to become even more versatile and capable, providing military forces with even greater advantages on the battlefield. It is essential for military forces to adopt appropriate policies and procedures for the ethical and responsible use of drones in warfare.

# EMERGING THREATS TO CYBERSECURITY IN THE DIGITAL AGE : PREVENTION TECHNIQUES

BY-NATASHA TANOOM  
212510552  
CSE-2/4 (A)

## What is Cybersecurity?

Protecting electronic equipment, computer systems, networks, and sensitive data against theft, damage, or unauthorized access is known as cybersecurity. This technique helps to thwart cyber attacks, spot security gaps, and efficiently handle crises.

Cybersecurity is now more crucial than ever in the current digital era. The hazards posed by cyber attacks have gotten worse and more complicated as we rely more and more on technology in every part of our lives, from private communications to corporate transactions. Because of this, cybersecurity experts continually have to adapt to new and emerging threats and create efficient mitigation measures to defend against them.

## Ransomware, AI/ML Attacks, and Phishing : Emerging Cybersecurity Threats

Ransomware attacks are one of the biggest new risks to cybersecurity. A form of malicious software known as ransomware encrypts a victim's data, making them inaccessible, and then demands money in return for the decryption key. Attackers are employing a range of strategies to avoid detection and get around security measures, which has led to an increase in the frequency and sophistication of ransomware assaults in recent years. The use of artificial intelligence (AI) and machine learning (ML) to perform attacks is a new danger to cybersecurity. By automating the process of locating weaknesses in computer systems and launching assaults, these technologies can increase the effectiveness and efficiency of such operations. At the same time, by automating threat identification and response, AI and ML may also be utilized to strengthen cybersecurity defenses.



Cybersecurity is still seriously threatened by phishing assaults. In order to get sensitive information like passwords, credit card numbers, and other personal information, these assaults utilize social engineering tactics to deceive people. As technology develops, phishing assaults get more complex as hackers use AI and ML to personalize and strengthen their attacks.



#### **4. Regularly do security audits**

Regular security audits can help you find possible weaknesses in your systems and data so you can address them before a cyber-attack happens. This involves routinely checking your network for malware, looking at access logs to spot strange behavior, and doing penetration tests to find any possible security holes in your systems.

#### **5. Network segmentation should be used.**

The practice of segmenting your network into smaller, more secure subnetworks is known as segmentation. This can lessen the effect of a breach if it happens and minimize the spread of malware and other cyber dangers.

#### **6. Invest in Advanced Security Tools**

Finally, investing in cutting-edge security solutions like intrusion detection and prevention systems, anti-malware programs, and behavioral analytics may dramatically increase your organization's capacity to recognize and respond to cyberattacks. Even though these solutions can be pricey, the cost of a data breach or cyber-attack may be much higher than the investment in cutting-edge protection technologies.

Cybersecurity dangers are increasing in today's digital world, making it more crucial than ever to take preemptive measures to safeguard yourself and your business from cyberattacks. While cybercriminals' methods are always changing, there are a variety of mitigation techniques that can assist to protect your systems and data.

#### **1. Put in place strong password guidelines**

Implementing secure password policy is one of the simplest yet most crucial measures you can do to safeguard yourself against cyberattacks. This entails creating strong passwords that are different for each account and changing them frequently to lower the possibility of a data leak.

#### **2. Authenticate with several factors Effective Mitigation Techniques to Strengthen Your Cybersecurity Defenses**

The use of MFA, or multi-factor authentication, is yet another powerful method of thwarting cyberattacks. Before gaining access to a system or account, MFA requires users to submit several pieces of identity, such as a password and a biometric scan. Even if a password is stolen, this can considerably lower the danger of unwanted access.

#### **3. Maintain Software Updates**

Given that new security patches and updates are frequently produced in response to growing threats, keeping your software up to date is essential for defending against cyber-attacks. Ensure that you often check for and apply operating system, application, and security software updates.

# REVOLUTIONIZING HEALTHCARE: THE INTERSECTION OF TECHNOLOGY AND MEDICAL SCIENCE

BY-NATASHA TANOOM

212510552

CSE-2/4 (A)

The investigation of medicine has undergone a technological revolution, with new methods for illness detection, treatment, and prevention emerging. Technology integration has significantly improved healthcare, from wearable devices to artificial intelligence. The opportunities to improve patient outcomes are limitless as we keep innovating and looking for new ways to use technology.

The capacity to swiftly and easily access and exchange patient information is one of the most important advantages of technology in healthcare. Healthcare professionals can access a patient's medical history, including diagnoses, prescriptions, and test results, all in one location thanks to electronic health records (EHRs). The quality of care can be increased and errors can be decreased by sharing this information across healthcare professionals.

Surgery is another field where technology has made a huge difference. Robotic surgery entails employing a machine to carry out procedures with more accuracy and precision than human hands. The use of this technology shortens patients' recovery times and lowers the risk of problems.

Through the use of telemedicine, technology has also made it possible to offer medical services remotely. Patients in rural or remote places who might not have access to medical services will find this to be especially helpful. Telemedicine eliminates the need for travel and increases access to care by enabling patients to get medical attention from the convenience of their own homes.

Another technological advancement that is revolutionising healthcare is artificial intelligence (AI). Healthcare practitioners can make better decisions regarding patient care by using machine learning algorithms to analyse large volumes of medical data. Healthcare professionals can use AI to identify illnesses, create individualised treatment regimens, and even forecast patient outcomes.

Finally, technology has changed how we think about healthcare. Technology is enhancing patient outcomes and quality of life in a variety of ways, including robotic surgery, telemedicine, and AI. We may anticipate seeing even more cutting-edge solutions that enhance patient care and results as technology develops.

## Did You Know?

Did you know that researchers have created a smart pill to help track medication compliance? When the pill comes into contact with stomach acid, a tiny sensor inside it activates. The wearable device relays the information to a smartphone app after receiving a signal from the sensor. This technology can assist medical professionals in keeping track of their patients' medication compliance, making it simpler to make sure patients are receiving the right care and lowering the likelihood of complications.



# THE NEUROMORPHIC FRONTIER:- EXPLORING THE FUTURE OF EFFICIENT AND INTELLIGENT COMPUTING

**BY-THARUNYA**  
**20251A0542**  
**CSE-3/4 (A)**

*"Imagine a world where our devices are not only smart, but also energyefficient. Neuromorphic computing is the key to making this a reality."*

Computing has come a long way since the first computer was created, but there is still a long way to go. As we continue to rely more and more on technology, there is a growing need for efficient and intelligent computing systems that can keep up with our demands. This is where neuromorphic computing comes in.

Neuromorphic computing is a new type of computing that is inspired by the structure and function of the human brain. It uses spiking neural networks (SNNs) that are designed to mimic the behaviour of neurons and synapses in the brain. These networks are based on the idea that neurons in the brain communicate through electrical pulses, or spikes, and that the timing of these spikes is important for processing information. SNNs are designed to perform computations using these spikes, enabling efficient and low-power processing of complex data .This technology has the potential to revolutionize computing by enabling high-performance computing with significantly reduced power consumption.

The main use of neuromorphic computing is its ability to perform image and speech recognition with less power consumption than traditional computing. One of the most interesting and exciting applications of neuromorphic computing is in the field of autonomous vehicles. These vehicles require high-performance computing with low power consumption, which is exactly what neuromorphic computing can provide. Neuromorphic computing can also be used in drones and IoT devices, which need to process large amounts of data with low power consumption

The major drawback of neuromorphic computing is the absence of standardized hardware and software, which makes it hard to compare and evaluate different systems. Another challenge is the need for large datasets and benchmarks to assess the performance of these systems. Lastly, as a new technology, there is still much research to be done before it can be widely adopted.

In conclusion, the neuromorphic frontier is an exciting and promising technology that has the potential to revolutionize computing as we know it. With its low power consumption and high-performance capabilities. Although there are challenges to this technology, its benefits are considerable and it can facilitate new applications that are currently not feasible with traditional computing systems. As research continues to advance in this field, we can expect to see further progress in the technology and its use in various industries. The neuromorphic frontier presents an exciting and promising path in computing, and it is definitely worth exploring.

*“Neuromorphic computing is not just a technology, it's a paradigm shift in how we approach computing. It's about creating machines that can learn and adapt, just like us.”*

# 5G(FIFTH-GENERATION WIRELESS)

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CSM - 3/4



Fifth-generation wireless(5G) is the latest iteration of cellular technology, engineered to greatly increase the speed and responsiveness of wireless networks. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks, it is designed to provide increased connectivity compared to previous generations of wireless networks. With 5G, users can expect download speeds of up to 10 Gbps and upload speeds of up to 1 Gbps. In addition to providing faster internet speeds, 5G is also expected to enable the Internet of Things (IoT) and enhance virtual and augmented reality experiences. It's currently being rolled out worldwide, with many countries and mobile network operators upgrading their infrastructure to support 5G technology.

## EVOLUTION OF 5G TECHNOLOGY:



- **FIRST GENERATION(1G)**

The First Generation of cellular networks(1G) was introduced in the 1980s by several companies and it used analog technology to transmit voice signals over the airwaves but analog cellular phones are insecure. Anyone with an all-band radio receiver can listen in to the conversation.

- **SECOND GENERATION(2G)**

The Second Generation(2G) cellular networks, introduced in the late 1980s, is based on digital transmission and enabled highly secure voice calls, text messages, and limited mobile internet. Digital transmissions offer several benefits over analog. It provided better voice quality and improved network reliability. Different approaches to 2G have been developed in the US and Europe.

- **THIRD GENERATION(3G)**

The third generation of wireless networks(3G) was introduced in the early 2000s and is a generation of standards for mobile phones and mobile telecommunication services fulfilling the International Mobile Telecommunications-2000 (IMT-2000) specifications by the International Telecommunication Union. Application services include wide-area wireless voice telephone, mobile Internet access video calls, and mobile TV, all in a mobile environment and enabling the use of mobile broadband and the adoption of smartphones.

- **FOURTH GENERATION(4G)**

4G stands for the fourth generation of mobile networks, is a successor to the 3G and 2G families of standards. It offered even faster data transfer rates and lower latency than 3G networks. 4G networks use packet-switching to offer IP-based voice calls and text messages in addition to high-speed mobile data. LTE is the 4G technology for both UMTS and CDMA2000.

- **FIFTH GENERATION(5G)**

Fifth-generation mobile networks(5G) are the next major phase of mobile telecommunications standards beyond the 4G/IMT-Advanced standards effective since 2011. It offers average download speeds of around 150 to 200 Mbps. It is the latest generation of mobile networks enabled by the New Radio technology (NR). 5G networks can offer latencies as low as one millisecond. The maximum bandwidth in 5G is higher than in 4G LTE networks. As a result, 5G NR networks can accommodate higher data rates than 4G LTE.





## KEY FEATURES OF 5G

### 1. Faster Speed

5G networks are designed to provide significantly faster data transfer rates than previous generations of wireless networks. It delivers up to 20 Gigabits-per-second (Gbps) peak data rates and 100+ Megabits-per-second (Mbps) average data rates. The maximum download speed of 5G is around 10 Gbps, which is much faster than the maximum download speed of 4G, which is around 1 Gbps.

### 2. Lower Latency

5G networks are designed to provide lower latency, which is the time it takes for a signal to travel from a device to a network and back again. This is important for applications such as gaming, virtual reality, and autonomous vehicles, where even a small delay can have significant consequences.

### 3. Increased Bandwidth

5G networks use higher frequency bands than previous generations of wireless networks, which provides more bandwidth for data transfer. This means that more devices can be connected to a 5G network at the same time, without experiencing network congestion.

### 4. Support for IoT Devices

5G networks are designed to support the growing number of Internet of Things (IoT) devices, which require low power consumption, low latency, and high reliability. This will enable a wide range of new applications and services, such as smart homes, connected vehicles, and industrial automation.

## ADVANTAGES:

- 5G networks provide an improved user experience so that users can enjoy high quality content and smoother interactions.
- Enhanced Mobile Broadband: Users can download and upload data much faster, enabling new applications and services that were not possible before.
- 5G networks will enable the development of new applications and services, which will drive innovation and economic growth.
- 5G networks are designed to support the growing number of IoT devices, which require low power consumption, low latency, and high reliability.
- 5G networks will provide enhanced connectivity for users in areas with high network traffic, such as cities and other densely populated areas.

## CONCLUSION

5G represents a significant step forward in wireless network technology, with faster data transfer rates, lower latency, and enhanced connectivity. This technology has the potential to enable new applications and services, drive innovation and economic growth, and support the growing number of IoT devices.

However, there are also potential disadvantages of 5G, such as higher costs, coverage gaps, the need for new infrastructure, the risk of interference and cyber attacks, and concerns about potential health effects. While these issues are being addressed, it's important to consider them as 5G networks continue to be deployed and used.

Overall, 5G technology is a significant advancement in wireless networking, and it has the potential to transform the way we live, work, and communicate.



Quantum computing is a rapidly emerging technology that uses the principles of quantum mechanics to perform calculations. Unlike classical computing, which relies on binary digits (bits) that can be either 0 or 1, quantum computing uses quantum bits (qubits) that can be in multiple states at once, allowing quantum computers to perform multiple calculations simultaneously. In this article, we will explore the basics of quantum computing, its potential applications, and the challenges that come with it.

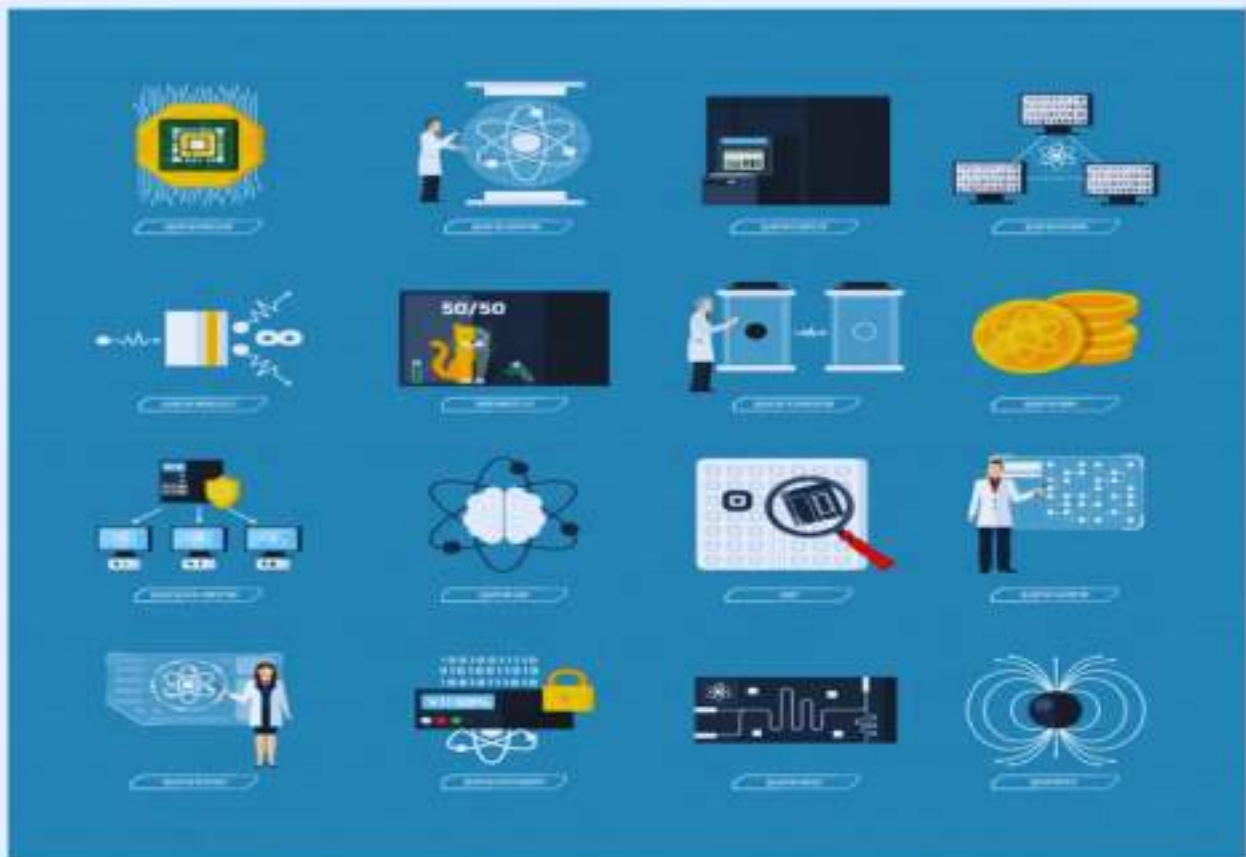
## Basics of Quantum Computing

At its core, quantum computing is based on two fundamental principles of quantum mechanics: superposition and entanglement. Superposition refers to the ability of qubits to exist in multiple states at once, while entanglement refers to the ability of qubits to become correlated with each other, even if they are separated by large distances. These principles allow quantum computers to perform calculations that are impossible for classical computers, such as factoring large numbers, searching large databases, and simulating complex chemical reactions.

## Types of Quantum Computing

There are several types of quantum computing, each with its own strengths and weaknesses. The most common types of quantum computing are:

1. Gate-based quantum computing: This is the most widely studied form of quantum computing, where qubits are manipulated using quantum gates to perform calculations. This type of quantum computing is often referred to as circuit-based quantum computing.
2. Adiabatic quantum computing: This type of quantum computing uses quantum annealing to find the lowest energy state of a system. This approach is particularly useful for optimization problems, such as finding the shortest path between multiple points.
3. Topological quantum computing: This is a relatively new approach to quantum computing that uses exotic materials, such as topological insulators, to create robust qubits that are less susceptible to errors.



## Applications of Quantum Computing

Quantum computing has the potential to revolutionize several industries, including finance, healthcare, and transportation. Some potential applications of quantum computing include:

- 1. Cryptography:** Quantum computers can break traditional encryption algorithms, making them an ideal tool for secure communication. However, quantum computers can also be used to develop new forms of encryption that are resistant to quantum attacks.
- 2. Drug Discovery:** Quantum computing can be used to simulate complex chemical reactions, accelerating the drug discovery process. By simulating the interactions between molecules, researchers can identify potential drug candidates much faster than with traditional methods.
- 3. Financial Modeling:** Quantum computing can be used to perform complex financial modeling, such as simulating the behavior of markets and predicting the outcomes of investments.

## Challenges of Quantum Computing

Despite the tremendous potential of quantum computing, there are several challenges that must be overcome before it becomes a practical technology. Some of these challenges include:

- 1. Quantum Decoherence:** Quantum systems are highly sensitive to environmental noise, which can cause qubits to lose their quantum properties. This is known as quantum decoherence, and it can limit the number of qubits that can be used in a quantum computer.
- 2. Scalability:** Quantum computers are notoriously difficult to scale up, as the number of qubits increases exponentially with the complexity of the problem being solved.
- 3. Error Correction:** Quantum systems are prone to errors, which can cause calculations to fail. To overcome this, researchers are developing new techniques for error correction, such as quantum error correction codes.

## Conclusion:

Quantum computing is a rapidly evolving technology that has the potential to revolutionize the computing industry. With its ability to perform calculations that are impossible for classical computers, quantum computing is poised to unlock new discoveries and applications across a wide range of fields. While there are still many challenges to overcome, the potential benefits of quantum computing make it a field worth watching in.

## **ADVANTAGES:**

- 5G networks provide an improved user experience so that users can enjoy high quality content and smoother interactions.
- Enhanced Mobile Broadband: Users can download and upload data much faster, enabling new applications and services that were not possible before.
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Overall, 5G technology is a significant advancement in wireless networking, and it has the potential to transform the way we live, work, and communicate.

The image features a dark blue background with a fine, diagonal grid pattern. A bright, glowing blue beam of light enters from the top left and extends towards the bottom right. In the lower right quadrant, two other glowing blue beams intersect at a point, forming an 'X' shape. A large, white, stylized oval graphic is centered in the middle of the image, with the word "AGAMA" written across it in a white, blocky, sans-serif font.

AGAMA