Abstract - This research investigates the effectiveness and use cases of artificial intelligence (AI) on 5G cellular networks, particularly the development of 5G that leads to an emerging innovation over a period of time. In addition, I'd like to discuss the understanding of the 5G cellular network in a variety of real-world applications and on standard platforms, as well as the architecture of 5G and the transformation it is bringing about. Likewise, the goal of this paper is to get a greater understanding of and implications of AI on 5G cellular networks. To accomplish this purpose, the study will also explore the use case of 5G and its impact on connectivity over, the Internet of Things devices and the variables that might contribute to the creation of a high-quality connection for IoT devices. Moreover, due to the vast volume of data that traverses the internet, I will focus on the security and privacy risks of the 5G network, as well as the worries surrounding the network's secrecy over time and the dangers presented by cyberattacks. In conclusion, I will be intending to look at the future of artificial intelligence specifically, the influence that AI will have on 5G in the future.

Keywords: 5G Technology, Artificial Intelligence, Deep Learning, Reinforcement Learning, Networking, Cellular Network.

I. INTRODUCTION

Artificial intelligence (AI) and fifth-generation (5G) cellular networks are two of our day's most exciting technological advances. They may unlock many new possibilities and uses when put together.

The primary objective of artificial intelligence (AI) research is to develop computer models of human intellect that are capable of completing complex intellectual tasks. A large number of different kinds of learning algorithms are provided, some of which include machine learning, deep learning, natural language processing, and reinforcement learning. Computers are able to analyze large volumes of information, recognize patterns and trends, and estimate future events through the algorithms that they use.

On the other hand, 5G is the most current upgrade to cellular network technology, and it promises faster internet speeds, more throughput, and reduced latency. This makes the Internet of Things, self-driving cars, virtual and augmented reality, smart cities, and other applications possible. Artificial intelligence (AI) and fifth-generation (5G) wireless networks may have far-reaching effects across a variety of sectors. AI-enabled drones with 5G connectivity for traffic control, security awareness, intelligence investigation, disaster preparedness and prevention, and emergency rescue support.
"A revolutionary architecture is essential that can manage the complicated data streams and processing needs of AI algorithms assuming ML is going to be incorporated with 5G technology. If carefully implemented, this design will allow for parallelization, network virtualization, cloud computing, and deployment of intelligent apps and devices like intelligent traffic management systems, smart energy grids, and autonomous vehicles is only the beginning of the transformation that AI on the 5G network will bring about,
Extra use instances and solutions will unavoidably emerge as AI and 5G continue to develop, smart cities and agriculture are two good examples, as are individualized healthcare and digital assistants. Nevertheless, important security, privacy, and ethics difficulties must be overcome before the full promise of AI with 5G can be realized. It will be necessary to solve a number of challenges before AI and 5G can realize their full potential" [1].

The latest iteration of cellular phone firms is constructed utilizing expandable and malleable enabling technologies to keep up with the increased demand for mobile phone services. Other companies may find value in these services, which go beyond the norm for mobile networks and their customers. Moreover, it must be able to keep up with the ever-increasing requirements for data storage and network connection. By 2026, there will most likely be 8.8 billion mobile phone users. Fifty percent of all worldwide communications will be M2M connections (mobile to mobile) by 2023 [2].

I'll expand by saying that mobile and wireless technologies will be responsible for half of the connections. In such a scenario, the availability of AI inside the 5G network will be an alternative for handling the aforementioned duties, which need a solid connection free from fluctuations, interruptions, high speed, low latency, security, intelligent systems, automation approaches, and dependability.
In a similar vein, it is crucial to handle the Internet of Things (IoT), autonomous cars, healthcare, virtual reality technologies, and robots, with an emphasis on enhancing mobile broadband, assuring super-low latency interconnections, and simplifying interactions between very big machines, a faster cellular connection, like 5G, is necessary to achieve this goal [3].
In addition to the rapid development of new technologies like artificial intelligence and the Internet of Things, both have positive and negative consequences on 5G cellular networks, when compared to 3G and 4G which have improved security and privacy. Likewise, several of the same old security and fault concerns that plagued the 3G and 4G networks have already begun to afflict the young 5G network. In this case, companies might benefit from both AI and IoT advancements because of the increased connectivity made possible by 5G networks and the advent of multipurpose devices. The market for consumers of electronics is booming, and the data and bandwidth needs of these devices will grow as technology improves. To continue, foresight into patterns in data or materials, or the capacity to analyze human speech in real-time, are just two examples of the kinds of things that may be achievable with future technology. So, information like this may help businesses succeed in many ways, for instance, increased profits, increased production, and the capacity to automate the manufacturing process. There will soon be 5G networks available in a world where technology is always improving, 5G networks will meet the demand for bandwidth from data-hungry devices. The evolution of AI has resulted in a wide range of new tools and technologies, from basic research equipment to sophisticated professional applications [4].

In summary, the superior networking architecture made possible by 5G networks has opened up numerous new fields of application. In comparison to the previous generation (4G), the 5G mobile network delivers a new networking architecture and several new services, the majority of 5G research is devoted to enabling futuristic features like massive device-to-device connections and higher mobile broadband capacity and density than 4G networks. 5G private networks for B2B (Business to Business) applications are founded on 5G network-oriented large devices, dependable low-latency communication, and augmented mobile broadband using 5G new radio technologies, Thus, 5G networks require intelligent network security against constantly changing assaults on huge IoT devices and edge services. The rapid detection of network intrusions closer to suspicious network actions or behaviors is one of the main challenges to 5G device safety and dependability. afterward, AI has improved 5G security's ability to detect network intrusions and cyber threats [5].

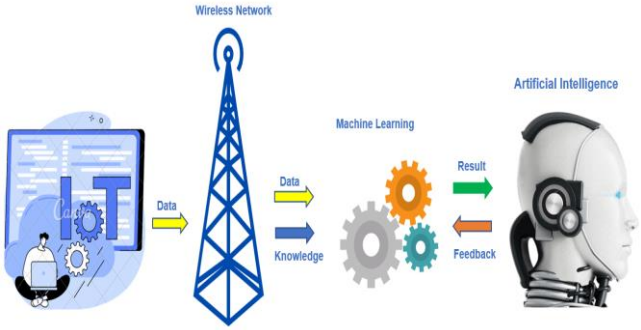

Figure 1: AI and ML to IoT with support of 5G [6]-(Self-explored)

II. Literature Review

A. *Understanding AI Vision and Aspiration on 5G*

There are many competing goals and strategies for how AI will be used in 5G networks. The possible effects of these strategies on network efficiency and services are discussed in scholarly journals and other public information.

Exploring AI for use in 5G networks is being done with the end goal of improving network efficiency. Specifically, this entails putting AI systems to work keeping tabs on network activity in real-time and making changes to maximize efficiency. This has the potential to improve network stability, lessen customer wait times, and acts overall network overcrowding. The same is true for 5G networks, where AI has been shown to be extremely effective in improving network performance by enhancing coverage, decreasing delay, and expanding capacity [7]. Another vision for exploring AI in 5G networks is to use it to enhance network security, this involves using AI to detect and prevent cyberattacks on the network, as well as to detect anomalies in network traffic that could indicate a security threat. Moreover, AI can be effective in enhancing cyber-attacks through the 5G cellular network, and it has been used to detect and classify malware, spyware, and cyber threats in real-time using supervised and unsupervised learning by highly accurate algorithms such as SVM, Random forest, logistic regression, decision trees, naive bayas and more [8].

The ultimate goal of artificial intelligence research in 5G networks is to develop ground-breaking new services and apps, new uses like holographic and virtual reality can be made possible through the use of AI to facilitate smart city services like clever traffic control and environmental tracking, possible the IoT devices to operate appropriately and so on. Furthermore, AI has been used to create driverless cars and smart city apps, and it can be effective in allowing new services and applications in 5G networks [9]. The difficulty arises from the networks' inherent intricacy. In order to successfully handle the intricacy of 5G networks, it can be challenging to create AI programs. The absence of a defined structure for incorporating AI into 5G networks is another obstacle that can make it hard to create efficient solutions.

B. *Historical Context of Cellular Network*

The roots of artificial intelligence research in cellular networks and 5G technology can be found in the advent of digital communication,1979 was the first introduction of cellular networks, which paved the way for the creation of today's advanced cellular networks. Over the succeeding decades, advancements in cellular network technology brought about the advent of 2G, 3G, and eventually 4G networks [10].

"Telecommunications is just one industry that has benefited from the advancements in AI and machine learning that started in the middle of the 20th century. In the 1990s, scientists started investigating the potential of artificial intelligence in cellular communication systems for enhancing network efficiency and user satisfaction" [11].

The foundations for 5G networks were laid in 2016. To accommodate emerging use cases like driverless cars and smart city services, 5G was designed to improve upon previous generations' networks in terms of throughput, latency, and capacity. Researchers started investigating the potential of AI in 5G networks as the technology matured, with the goal of improving network efficiency and opening the door to new service deployments [12].

Some landmarks on the road to 5G and the widespread use of AI in cellular networks

- The first iPhone was released in 2007, ushering in a new age of mobile contact and laying the groundwork for today's devices and mobile apps [13].
- Faster data speeds and improved network coverage compared to earlier versions of cellular networks were among the main selling points of the first 4G networks, which debuted in 2010 [14].
- The 5G public and private partnership was introduced in 2016 by the European Commission as a study project to advance 5G technology and encourage its usage in Europe [15].
- Several telecommunications firms began rolling out 5G networks in 2018 in a number of pilot markets, signalling the beginning of the technology's commercial implementation [16]

- In 2020, the COVID-19 epidemic drove home the need for fast and dependable mobile communication, prompting many nations to speed up the rollout of 5G networks to facilitate telecommuting and telehealth [17].

We can say, the significance of AI in improving network efficiency and paving the way for new services in the 5G network is highlighted by the above developments so far.

C. *Architecture of 5G cellular network*

With a focus on software-defined networking (SDN) and network function virtualization, the architecture of 5G cellular networks is meant to be more flexible and adaptable than that of earlier generations of cellular networks.
Radio Access Network (RAN), Core Network, and Service Layer are the three pillars of the 5G network architecture.
The radio access network (RAN) is made up of base stations or cell towers that talk wirelessly with user devices and is responsible for connecting such devices to the network. The radio unit (RU) and the DU make up the RAN's two primary subsystems. Moreover, while the DU handles data processing and forwarding between the RU and the core network, the RU handles processing the wireless signal from user devices, similar to how the core network manages the whole network and is capable of complex data processing and routing, the core network also delivers these features to its users.
In this case, the user plane function (UPF), control plane function (CPF), and network slice selection function (NSSF) are the three primary subsystems that make up the core network. The CPF manages network resources and controls network operations, while the UPF manages the processing and routing of user data. Each user's network slice is chosen by the NSSF according to their individual requirements and preferences [18].
Furthermore, the service layer is the last layer in a network's architecture, and it's responsible for communicating with the programs and services that are built on top of it. There are two basic parts to the service layer: the application function and the network exposure function NEF is in charge of making network services available to other applications, and AF handles those that are unique to the application itself.
Finally, we can say that beamforming massive, multiple-input multiple-output (MIMO), and network slicing are just a few examples of the cutting-edge technology utilized to provide 5G networks the pliability and adaptability they need [19].

Smartphones, Internet of Things gadgets, and autonomous cars are just some of the devices and use cases that may benefit from the network's ability to dynamically assign resources and adapt to changing needs thanks to these innovations [20].

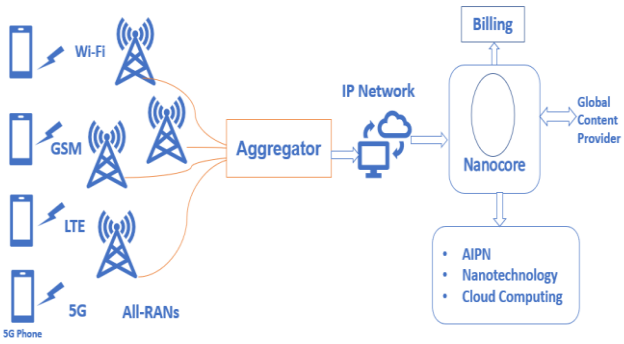

Figure 2: Architecture of 5G cellular *network [20]-(Self-explored)*

D. *Revolution of 5G Cellular Network*

a) *First Generation (1G)*

Nippon Telegraph and Telephone Japan's 1G network was launched in 1979 for Tokyo citizens and expanded to the rest of the country in 1984. Ameritech introduced 1G in 1983, in the United States, and later that year Motorola shipped the DynaTAC the first cell phone that could connect to a network. There was no security in 1G, bad speech clarity and service, no mobile support, and a slow transfer speed of 2.4 kbps, and anyone with a radio sniffer could listen to 1G which was this product limitation and weakness [21].

b) *Second Generation (2G)*

2G cellular networks replaced analog cellular networks in late 1979 and early 1992, 2G networks introduced digital cellular technology and allowed SMS texting and rudimentary data transmission. Moreover, time division multiple access (TDMA) was the main feature of 2G networks, allowing numerous users to share a frequency band by splitting it into time slots. this optimized bandwidth utilization and served more people at once. GSM standardization began with 2G networks and the GSM standard is still extensively used worldwide. 2G networks supported caller ID, call waiting, and SMS messaging, and data transmission rates were 9.6 to 14.4 Kbps [21].

c) *Third Generation (3G)*

The 3G cellular networks, which emerged in the early 2000s, were implemented as a substitute for the 2G networks and marked a significant progression in data transfer capabilities and network efficiency. CDMA was the predominant technology employed in 3G networks. It facilitated the sharing of a single frequency band among multiple users by allocating them distinct codes. Likewise, the optimization of bandwidth utilization resulted in increased efficiency and facilitated the attainment of elevated rates of data transmission. 3G networks facilitated enhanced data transfer functionalities, including but not limited to mobile internet accessibility and video communication. Additionally, 3G networks accommodated various other sophisticated services, such as mobile television and music streaming. In contrast to contemporary benchmarks, the 3G networks exhibited relatively sluggish performance, characterized by average data transfer rates

spanning from 200 kilobits per second to 2 megabits per second. Moreover, notwithstanding these constraints, the emergence of 3G networks constituted a significant progression from 2G networks, thereby facilitating the extensive acceptance of mobile internet and other sophisticated amenities. Subsequently, 3G networks were superseded by more sophisticated 4G and 5G networks, which provided enhanced data transfer rates and more advanced functionalities [22].

d) Fourth Generation (4G)

The Fourth-generation (4G) cellular networks were launched during the late 2000 and early 2010, implying a significant progression over the earlier generations of cellular networks in relation to network performance and data transfer speeds. long-term evolution (LTE) was the predominant technology employed in 4G networks, facilitating significantly accelerated data transfer rates compared to prior iterations of wireless communication networks. Furthermore, the LTE technology applied a confluence of sophisticated techniques, including orthogonal frequency division multiple access (OFDMA) and multiple input, multiple outputs (MIMO), to augment the quantum of data that could be transmitted through the network at any given instant. Moreover, the implementation of 4G networks facilitated the provision of sophisticated services, including, high-quality video streaming, internet-based gaming, and virtual communications as well as augmented reality applications. The enhanced data transfer rates and network efficacy of fourth-generation (4G) networks facilitated the emergence of novel technologies, including autonomous vehicles and the interconnected network of physical devices, commonly referred to as the (IoT) Internet of Things [22].

e) Fifth Generation (5G)

In March 2019, 5G was first introduced in South Korea which can be 20 to 200 times as quickly as 4G in different parts of the world. Likewise, the first cities in the United States to offer 5G coverage were Chicago and Minneapolis in April 2019. In 2020, 15.8 million people in the United States used 5G. As a result, by 2021, there were 161% more consumers, totaling 41.3 million. 5 G's huge benefit apart from all is the speed that reduces waiting for data to be sent or received compared to 4G, which has an average delay of 50ms. Furthermore, the statistics show that 5G has a much-reduced latency of 10ms in comparison to 4G. As well as, 5G operates in the 30GHz - 300GHz frequency band, making it compatible with a wide variety of supplementary technologies. This makes 5G such a game-changer in the pursuit of ever-more-advanced smart technologies is not just its promise, but also the fact that its capability helps the Internet of Things (IoT). In addition, the 5G network's main emphasis is on machine-to-machine communication, AI and machine learning can be used over 5G respectfully due to high bandwidth and low latency. The United States is at the forefront of the 5G network, because of the substantial expenditures it has made in this area [21].

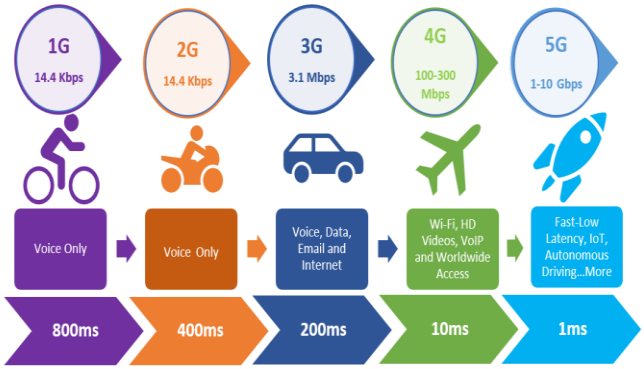

Figure 3: Evolution of 1G to 5G [23]-(Self-explored)

E. 5G network approaches based on various schools of AI

Each school of thought brings a unique perspective to the exploration of AI in cellular networks and 5G technology, some of the different ways the topic has been approached are based on different schools of thought on achieving AI.

One of the important approaches focuses on developing a rule-based system that uses symbolic logic to make decisions in cellular networks and 5G. Symbolic AI can be used to create rules that govern network behavior and optimize network performance. This approach is based on the idea that AI can be achieved through logical reasoning and rule-based decision-making [24]. Another approach focuses on developing neural networks that can learn from data and improve their performance over time in cellular networks and 5G called connectionist AI. Likewise, connectionist AI can be used to train neural networks to recognize patterns in network traffic and optimize network performance based on that information. This approach is based on the idea that AI can be achieved through learning and adaptation [25]. Moreover, evolutionary AI has the potential to significantly contribute to the improvement and optimization of 5G cellular networks in a variety of important ways. The optimization of networks, beamforming, network slicing, changeover management, artificial intelligence model optimization, security, and service placement are all important applications. In order to address the unique problems posed by 5G networks, scientists may use evolutionary AI algorithms developed via methods including genetic algorithms, genetic programming, and swarm intelligence. It will be possible to gauge how much of an effect evolutionary AI approaches could have on the efficacy of 5G networks as a whole by evaluating the efficiency with which these algorithms execute in relation to key network parameters [26]. Nevertheless, the combination of elements of symbolic, connectionist, and evolutionary AI achieves better performance than any single-approach hybrid. 5G network, hybrid AI can be used to optimize network performance by combining rule-based decision-making, machine learning, and evolutionary optimization techniques. This approach is based on the idea that AI can be achieved through a combination of different techniques and approaches [27].

Each theoretical framework for AI advancement has its own advantages and disadvantages, and the optimal strategy will vary from issue to problem. Researchers have used a variety

of methods based on these schools of thought to investigate the role of AI in cellular networks and 5G. Symbolic AI is effective at solving problems that can be easily represented by rules and logic while, connectionist AI is effective at solving problems that require pattern recognition and learning. Likewise, evolutionary AI is effective at solving complex optimization problems; and hybrid AI combines the strengths of different approaches to achieve better performance.

F. AI use cases in 5G

With the assistance of AI algorithms, 5G networks may be optimized for optimal performance with few disruptions. There are several ways in which artificial intelligence may be employed to improve network performance. Edge computing, which enables data to be processed in real-time at the network's periphery, may also be optimized using artificial intelligence approaches. Applications such as autonomous vehicles and smart factories may benefit from the reduced latency and better performance provided by this solution. ITM (Intelligent Traffic Management) may similarly enhance 5G networks by offering real-time traffic monitoring and optimization. This has the potential to significantly improve traffic flow and congestion in crowded urban areas. 5G networks accomplish optimal energy usage via the use of intelligent energy management, which also enables more efficient resource use and reduced costs. This information is used by predictive maintenance to predict when equipment may break down, allowing for preventative repairs to decrease the effect on operations. Real-time video analysis also makes feasible applications such as face recognition and object recognition when traversing 5G networks with the assistance of virtual assistants, users may get personalized ideas and real-time advice. Transportation, energy, and public safety are just a few of the sectors that benefit from the administration and optimization of smart city management. "5G networks may also be used to connect medical devices and enable remote patient monitoring in order to assist healthcare practitioners make better, more timely decisions, artificial intelligence may be used to analyze this data in real-time and communicate the findings with healthcare professionals.

In addition, 5G networks may facilitate the introduction of autonomous vehicles, and artificial intelligence might help these vehicles in making real-time decisions by analyzing huge amounts of data from sensors, cameras, and other sources, self-driving cars, for example, may benefit immensely from AI's capacity to help them navigate the road, recognize and avoid risks, and make split-second decisions to guarantee passenger safety [28] [29].

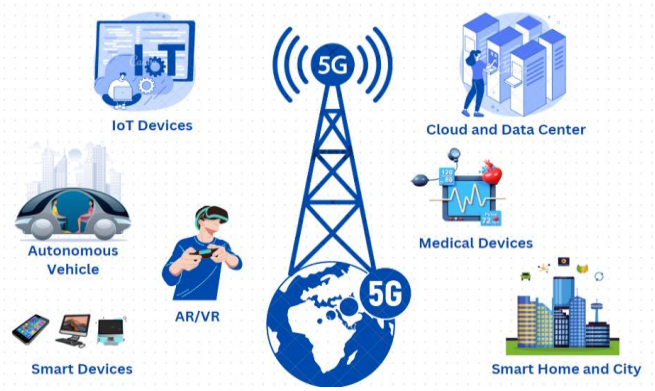

Figure 4: 5G use cases on 5G cellular network [30]- (Self-explored)

G. AI and IoT devices for 5G network

"With their high throughput and minimal lag, 5G networks are ideal for supporting IoT hardware and software. With the advent of 5G networks, it will be feasible to connect and enable real-time communication and data transfer amongst a large variety of Internet of Things (IoT) devices, from smart home appliances to industrial sensors. So, it's possible that efficiency, productivity, and quality of life might significantly improve. Likewise, reduced latency is a key benefit of 5G for Internet of Things gadgets. Perhaps as low as 1 millisecond, 5G's latency will allow for immediate data and action processing. This is critical relevance for use in autonomous vehicles and telemedicine, both of which operate in real-time. In addition, 5G can handle many devices in a single area, making it a good fit for Internet of Things (IoT) applications that use many sensors or devices in a small area. In smart factories, for instance, 5G may be used to link a slew of industrial IoT sensors and devices in order to boost efficiency, cut down on downtime, and improve the quality of the final product.
The emergence of the 5G network for IoT devices expresses concern about privacy and security, more and more devices are becoming internet-enabled making them an easier target for cybercriminals. For this reason, it is essential to protect the privacy of your data by securing your IoT devices, and building secure and reliable 5G networks is crucial to ensuring the widespread adoption of IoT devices and realizing the full promise of this technology" [31].

H. Security and Privacy Concerns in 5G

The larger number of devices and access points makes 5G technology more technically complicated than its predecessors. The possibility of a cyberattack on an organization's infrastructure or its users' data has increased as a result. As 5G networks generate vast amounts of data, such data might be mined to track the movements and actions of its users. Meanwhile, customers' privacy may be at risk since they aren't aware of the entire extent to which their data is collected, stored, and used. The network is being created in a country with less stringent data privacy standards, but it is vital to note that many 5G components are produced in nations with tighter restrictions. The security of the whole network might be compromised as a result of these heightened risks to the supply

chain. Another challenge with 5G is that it is still a relatively new technology, despite its fast growth, and so there are no well-established industry-wide standards for it. This compromises the whole system's security and compatibility. Because of their complexity, 5G networks are especially vulnerable to attacks from malicious insiders like disgruntled workers or freelancers.
There has to be strict security and confidentiality rules and procedures in place. Included in this strategy are measures like encrypted data at rest, requiring two-factor authentication for users, and routinely updating and safeguarding the infrastructure. There must be no vulnerabilities in the network's security or incompatibility in its hardware and software, background checks should be exhaustive, and both new hire and vendor orientations should be comprehensive [32].

I. The future of AI and 5G networks

Edge computing, in which information is processed closer to the source rather than being transferred to a central cloud, is becoming more popular as 5G networks' data processing capabilities become more widely used. As a result, network latency and congestion may be reduced, and more sophisticated AI applications can be implemented. More ludicrous distributed AI models, in which a number of devices and systems collaborate to collect and analyze data, are expected to appear as 5G networks continue to develop. This has the potential to pave the way for cutting-edge uses, such as driverless cars and smart cities. With the advent of 5G networks driven by artificial intelligence, there will be a greater need to protect sensitive user information. This calls for constant monitoring and testing to spot vulnerabilities and implement fixes, as well as the creation of new privacy and security policies. In addition, 5G networks' high speed and low latency are well suited to facilitating augmented reality software. Everything from simultaneous language translation and educational opportunities to fully immersive gaming and entertainment experiences might fall under this category.

Furthermore, as 5G networks become more commonplace, there will likely be an increase in the popularity of "smart homes" and "smart cities," in which sensors and gadgets are utilized to automate and optimize a broad range of activities. AI will be essential for enabling these applications because of its ability to handle and analyze the massive volumes of data produced by these systems [33].

J. Challenges or barriers with AI and 5G network

To further advance existing understanding and practice, several important hurdles and obstacles must be resolved, despite the substantial success made in investigating AI on cellular and 5G networks. Some of the major obstacles are as follows

- The lack of a defined structure for incorporating AI into wireless networks and 5G is a significant barrier to adoption. This complicates the task of designing workable solutions that can be seamlessly incorporated into pre-existing infrastructures.
- Because of their complexity, cellular networks and 5G technology are still in their infancy. Creating AI systems that are up to the task of handling such intricacy is no small feat.
- Users' anonymity is in danger when artificial intelligence (AI) is deployed in wireless networks and 5G networks to improve efficiency and allow new services without their knowledge or permission. This prompts questions about personal information security and the need for more stringent laws and standards.
- A major social worry is a possibility that AI systems will reinforce pre-existing biases and forms of prejudice. Fair and impartial AI systems are essential for distributing the advantages of AI in a just and equitable manner.
- Concerns have been raised about the security of AI systems as they become increasingly integral to the improvement of network efficiency and the introduction of new services in wireless networks and 5G technology. Protecting the privacy and welfare of individuals using AI is a major moral issue.
- Developing and deploying AI solutions in the area of wireless networks and 5G technology can be hampered by the high costs associated with doing so.

In order to overcome these issues, more study and innovation are required. Standardized protocols should be established for incorporating AI into cellular networks and 5G technology, AI algorithms should be developed that can successfully handle the intricacy of these systems, and efforts should be made to ensure that AI systems are equitable and impartial and that they are secure and safe for users. The advantages of AI should be shared equally and evenly, and lawmakers and business leaders should collaborate to resolve social issues related to data protection [34].

III. FINDINGS AND DISCUSSION

Artificial intelligence (AI) may help 5G networks function better. With the aid of AI algorithms, the 5G network may be able to cover more ground, store more data, and use less power. Artificial intelligence's capacity to foresee and avert network problems is a big selling feature, alongside its improved dependability and reduced latency. Conversely, AI has the potential to boost internet security. Artificial intelligence (AI) is being examined for use in 5G networks for a variety of applications, including intrusion detection and prevention, identity and access management, and the detection and prevention of attacks such as malware and distributed denial-of-service (DDoS). More than that, however, the combination of AI with 5G networks opens up a wide variety of potential applications and revenue streams. Future technology such as autonomous vehicles and smart cities might be examples of Industry. Likewise, major scientific, regulatory, and moral obstacles persist in the industry. In spite of the many ways in which AI has improved 5G networks, there are still issues that must be resolved. One example is the ethical use of AI, but there are also concerns about data security and privacy. Experts in computer science, engineering, telecommunications, and the government will need to collaborate to ensure a smooth transition to 5G networks that support AI. To overcome its obstacles and reach

its full potential, this burgeoning area needs the help of academics from other fields. The combination of AI with 5G networks may open up interesting new avenues for research and development in the field of telecommunications. There are, however, obstacles that must be overcome to guarantee the safe and long-term viability of the technology's progress.

IV. Conclusion

To put in nutshell, by enhancing system performance, security, and privacy while enabling new use cases and business models, artificial intelligence's incorporation into 5G cellular networks has the ability to fundamentally overhaul the telecoms sector. Network latency and dependability may be improved, while coverage, capacity, and energy efficiency can all be optimized with the help of AI algorithms. Artificial intelligence can also manage identities and access, identify and prevent cyberattacks, and aid in intrusion detection and prevention. Challenges remain, though, and they pertain to network interoperability, data security and privacy, and the appropriate use of AI, if we want to see these technologies, continue to advance in a sustainable manner. The potential advantages and difficulties that AI and 5G technologies offer to the telecommunications sector and society as a whole must be considered as research and development of these technologies continue to evolve.

Acknowledgment

I desired to seize this occasion to express my gratitude to my family and friends for their unwavering support throughout my studies and initiatives. Their encouragement empowered me to continue to innovate in the field of artificial intelligence with a great deal of vigor and effort. Special thanks and thoughts are conveyed to Dr. Abinaya Sowriraghavan, who has served as an amazing source of support for me as I've pursued my interest in the topic of wealth imbalance and also who has always been the best leader for me to approach in my position and ascend to my goal. She has been a tremendous source of motivation for me as I explored my fascination with wealth inequality.