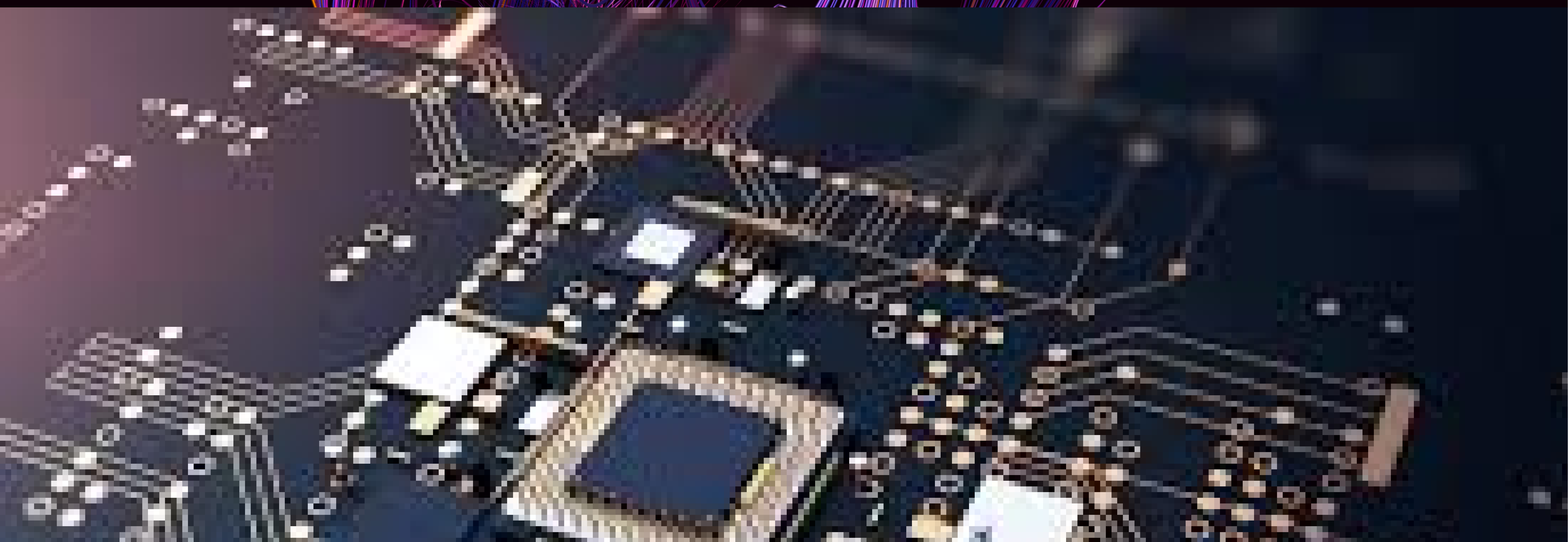
SRI VENKATESWARA COLLEGE OF ENGINEERING
(AUTONOMOUS)

Department of Electronics and Communication Engineering

RISE MAGAZINE

Recent Innovations In Sophisticated Electronics



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

RISE-MAGAZINE

Recent Innovations In Sophisticated Electronics

INSIDE THIS ISSUE:

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ECE

DEPARTMENT PROFILE

- Electronics and Communication Engineering has emerged as the major driving force in the present day Information Technology revolution. It is acting as a bridge between different disciplines of engineering and technology. It has penetrated into other prominent sectors such as health care, instrumentation, agriculture, automation, signal processing, remote sensing etc.., The recent developments such as IoT, Artificial Intelligence and the mercurial advancements in the field of communication.

Vision

- To be a focal centre for academic excellence in competing global standards and dynamics in the field of Electronics and Communication Engineering with research and services focusing on effective communication skills, entrepreneurial, ethical and social concern.

Mission

- To impart quality technical education in Electronics and Communication Engineering with well established infrastructure, state of the art laboratories, core instructions and cognizant faculty.
- To prepare the young and dynamic Electronics and Communication Engineers professionally deft and intellectually adept with knowledge, behaviour and information competency.
- To enable the learners for changing trends in the field of Electronics and Communication Engineering with a focus on career guidance, placements and higher education by Industry-Institute relationship.

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: Graduates should be cognizant in basic science, fundamental engineering stream along with core related domains in ECE and Allied fields.

PEO2: Graduates should understand issues related to design, problem solving, and intellectually adept with knowledge, behavior and information competency.

PEO3: Graduates should demonstrate their technical, communication, research, aptitudes along with leadership skills in professional environment to empower employability, higher education and entrepreneurs successfully through industry-institute interaction.

PEO4: Graduate should be motivated with high ethical, human values and team work towards development of the societ.

PROGRAM OUTCOMES

PO1: ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: PROBLEM ANALYSIS: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: DESIGN/DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: MODERN TOOL USAGE: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: THE ENGINEER AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: ENVIRONMENT AND SUSTAINABILITY: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: ETHICS: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: COMMUNICATION: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: PROJECT MANAGEMENT AND FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO1: An ability to get an employment in Electronics and Communication Engineering field and related industries and to participate & succeed in competitive examinations like GRE, GATE,TOEFL, PSUs, etc.

PSO2: Should be able to design and test various electronic systems that perform analog and digital processing functions.

Imaging AI

At the annual meeting of the American College of Radiology in 2016, noted oncologist and health care policy expert Ezekiel Emanuel, M.D., caused a considerable stir with his keynote lecture titled "The End of Radiology?" In his talk, which was subsequently published in the Journal of the American College of Radiology, Emanuel outlined three threats to the future of the specialty:

1) The move away from hospital-based care to the outpatient setting, and an anticipated decrease in utilization of medical tests, especially imaging;

2) Ongoing efforts to reduce costs, which will inevitably drive reductions in reimbursement for imaging studies beyond the already significant reductions that have occurred over the past 10-15 years;

3) Machine learning, which he termed the "ultimate threat" to radiology. It will become a powerful tool in the next 10-15 years, and he believes it could "end radiology as a thriving specialty."

Just to be sure the rest of the medical community got the message, Dr. Emanuel made essentially the same point in an article he coauthored in the New England Journal of Medicine. The non-medical world has picked up on this theme, and a recent article in the lay press had the provocative title, "If You Look at X-rays or Moles for a Living, Artificial Intelligence (AI) is Coming for You!" All these comments have left many young radiologists questioning their choice of specialty, and has led to concern that medical students will no longer choose radiology as a specialty for fear that it will follow the job of buggy whip maker into oblivion. How realistic are these fears, and what is the promise and peril of the rapid development of AI for imaging over the past few years?

The bulk of the radiologist's workday is spent viewing images, looking for deviations from normal anatomy, and interpreting the significance of those observations. Such work has become much more challenging with the explosion in the number of images most radiologists see in a day. In the era before crosssectional imaging modalities such as CT, MRI, and ultrasound were widely available (the 1970s, when this author began in the field), radiologists might have viewed about 50 studies each day, with most consisting of two or three images each. A fluoroscopic study might have had 20 or 30 images, and a complex angiogram a few dozen, or even 100 images.

Today, the same physician may read far greater numbers of CT and MR exams. The average CT study has 200-500 images, and MRI exams typically have even more. Human ability to look for small abnormalities in this vast amount of visual information is often overwhelmed, and most of the images are normal, making finding the pathology akin to finding the proverbial needle in a haystack. Demands for ever greater productivity, longer working hours, and the demand for 24/7/365 services has increased observer fatigue, further worsening performance. And it is precisely here that computers excel: searching large data sets very rapidly, and identifying subtle variations.

Early approaches to AI have been used in radiology for several decades, especially in CAD programs that aid interpretation of mammographic screening exams. Although the number of images in each study is small (typically four), the radiologist may be viewing several hundred exams each day.

While AI has great promise in imaging, a number of challenges must be overcome as the field moves forward. Although the hype suggests that AI is mature, and the demise of radiologists is just around the corner, the reality is a bit more sobering.

Alas, it failed completely in the field. As the computer was incapable of explaining what it was doing, it was only after extensive analysis that it was discovered that the training photos with tanks in the woods were taken on a sunny day.

-----------------------23BFA04467- T Raja Sri

Big data technologies

In the 21st century with the tremendous increase in the usage of internet and extreme advancement in Technology huge amount of Data is generated every second. This Data is combination of structured semistructured and unstructured data which is called as Big data. Being able to use this data provides huge opportunities and to turn these opportunities into reality, people need to use data to solve problems. Handling Big data has various challenges like Storage, Search, analysis, sharing, visualization, transfer and privacy violations. Big data analytics can help better and faster decision making, modeling and predictive analysis for enhanced business intelligence. In this paper the authors have done the survey on different types of Big data technologies.

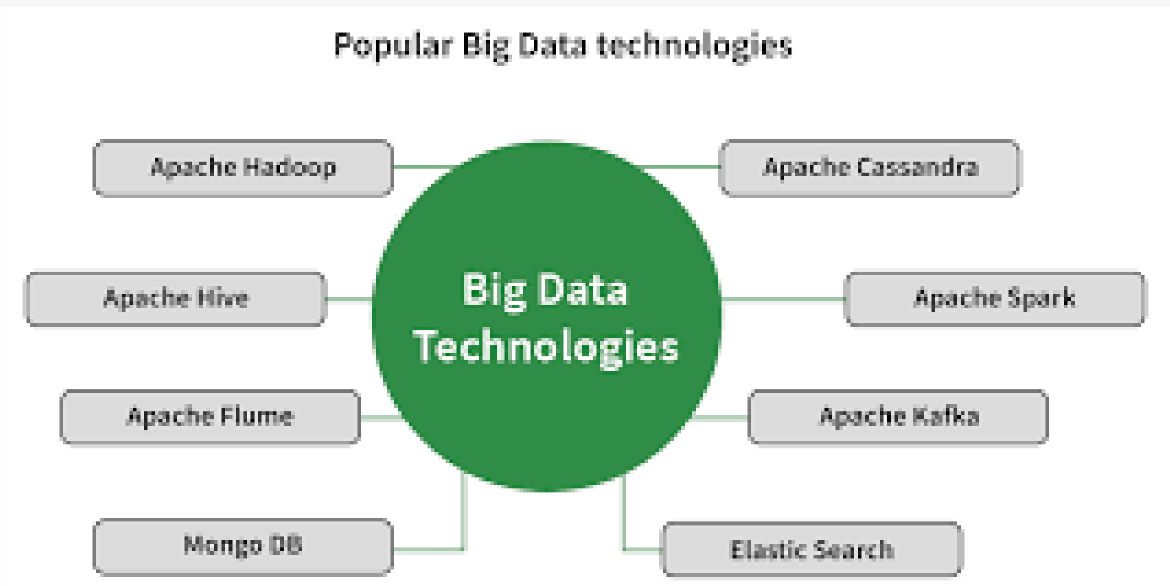
In Today's World so much Data is generated every second due to the surge in internet usage and advancement in technologies. Examples of massive sources of data generation social media is the major contributor other then that medical devices such as MRI and other scan machines generate huge data, stock markets, banks, telecom service providers are the other major sources, Boeing jet generates 1tb of data per flight,.it's a data driven world according to author at twitter, they process approximately 400 billion events in real time and generate pet byte (pb) scale data every day.

Facebook generates 4 petabytes of data per day according to "www.statista.com" the facebook reported over 2.9 billion monthly active users in the first quarter of 2022 .

It is a field dedicated to the analysis, processing and storage of large collections of data which cannot be handled by current technology infrastructure.

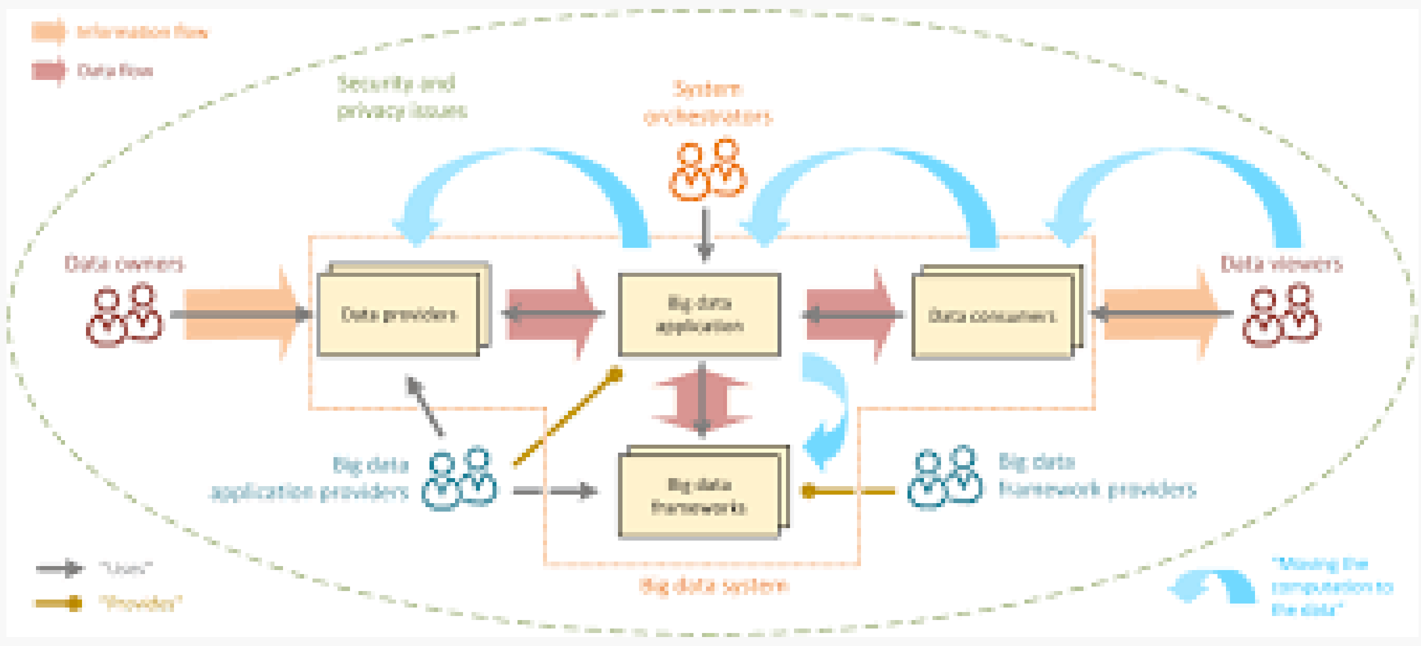
Data Storage

Big data storage is a technique that makes use of efficient infrastructure which helps in storing , managing and retrieving large amounts of data. Big data is concerned with storing and managing data in and efficient way and fulfilling the requirement of applications which require huge data.



Hadoop

Hadoop is a beneficial technology for data analysts. There are many important features of Hadoop which makes it important and user-friendly. The system is able to store and process enormous amounts of data at an extremely fast rate. A semi-structured, structured and unstructured data set can differ depending on how the data is structured. Hadoop Enhances operational decision-making and batch workloads for historical analysis by supporting real-time analytics. Organizations have the facilities to store the raw data and processors filter it for specific analytic uses when required. Hadoop is scalable and therefore organizations can handle more data by adding more nodes into the systems.



Hive

Hive is a data storage system used to analysis structured data. Important functionalities for which hive is deployed are data summarization,data analysis and data query. The query language supported by hive is hiveQL. HiveQL translates SQL-like queries into MapReduce jobs for deploying them on Hadoop..Using Hive, we can also avoid the traditional approach of writing complex MapReduce programs. Hive also supports Data Definition Language (DDL), Data manipulation Language (DML), and User Defined Functions (UDF).

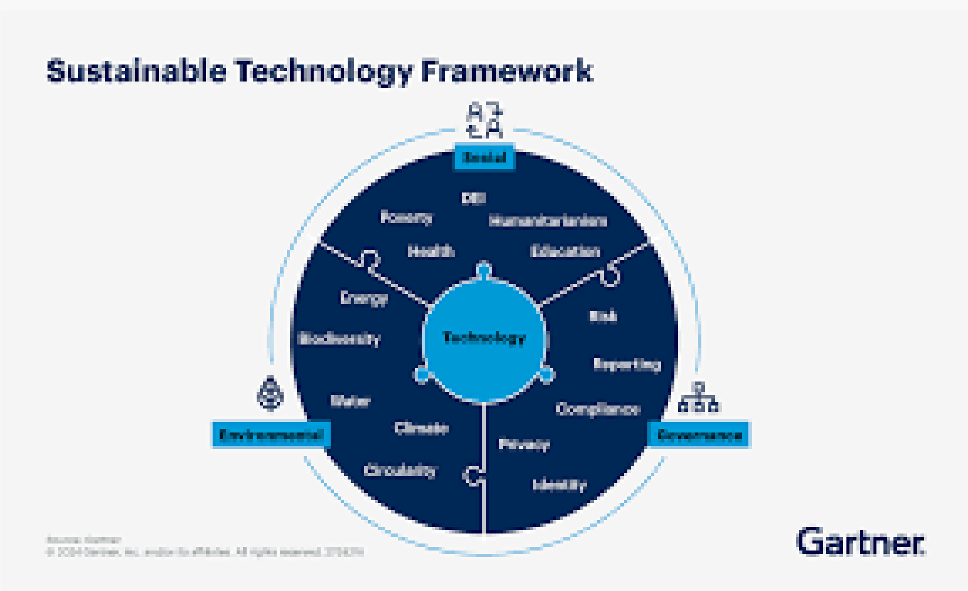
Mongodb

Mongodb is a data storage technique which is an open-source document-oriented database and is used to store a large amount of data. It is categorized under the NoSQL (Not only SQL) database as the storage and retrieval of data are not in the form of tables.-----------------**23BFA04473- T Nithya Sree**

Sustainable Technology

This research paper focuses on the concept of green technology that has emerged from the point of distress developed due to ecological imbalance. Therefore, environmental protection has become a key concern worldwide. It is caused by the prevailing ecological dif iculties. The range of studies that have been included in green technology is to design, modify, and transform products towards sustainable development. This also includes modification in the production method, packaging process, and promotional activity to create environmental consciousness among consumers. Today, the focus of our society is to attain sustainable development in all aspects. The research paper reviews the literature based on the green technology intercession approach and sustainable development for solving environmental issues in the present scenario. This comprises of ecological well being by virtue of socio- economic needs through environment-friendly product and methods for the present and future generation. It makes an effort for interlinking green technology with sustainable development for environmental safety.

The term green technology and envirotech are seen as elements of innovative green supply and value chain process. The progress in green Technology shall direct towards sustainable performance without changing our traditional ideas of technology practices. The approach to environmental, eco-technology and green technology belongs to the cluster which addresses the gap between the traditional method and the ecological reliability of the environment. The concern towards the environment in combination with technology management has gradually been surfaced as green technology. The core and indispensable element of green technology are sustainability (Charter, 1992). The green approach towards utilization and production comprises of deriving pleasure from the present standard of living without destroying the future standards as preached by McDonagh and Prothero, 1998.



The term environmentalism has rapidly turned out to be a global phenomenon. The impact of environmental challenges has been accepted as an opportunity by manufacturing and production industry. This opportunity is converted to profitability by implementing green technology strategies. Social challenges coming up due to environmental problems have now been transferred to technology problems. Sustainability is societal objective, once attained will practically transform everyone"s behaviour (Van Dam and Apeldoorn, 1996). The positivity of adapting green technology is increasing among Indian consumers. Therefore, the concept of green technology is not new to the business organization. Several companies have acknowledged their accountability and responsibility towards protecting the environment. The conception of "go green" has been introduced by companies by producing greenproducts and adapting production process that adds towards minimizing pollution and built profitability at the same time (Hart, 1997). The activities executed by companies that are addressing the environmental problems and satisfying consumer need by delivering greenare termed as green technology (Soonthonsmai, 2007).

Sustainable development is one of the most fundamental and crucial issues of countries all across the globe. Despite the fact that the focus on sustainable development is of recent years The United Nations in 1987 published their report on research work carried out by analyzing the impact of growth on the environment and this report was titled as the Brundtland Report. This report defines sustainable advancement as a procedure for the purpose of mitigating the wants of the present without compromising the ability of future generations to meet their requirement. Ever since the report was issued by the United Nations, industry practice has cuddled the concept that sustainability originated from focusing on the triple bottom line. A triple bottom line is a holistic approach for attaining sustainability through the incorporation of three dimensions that are environment, society, and economy.

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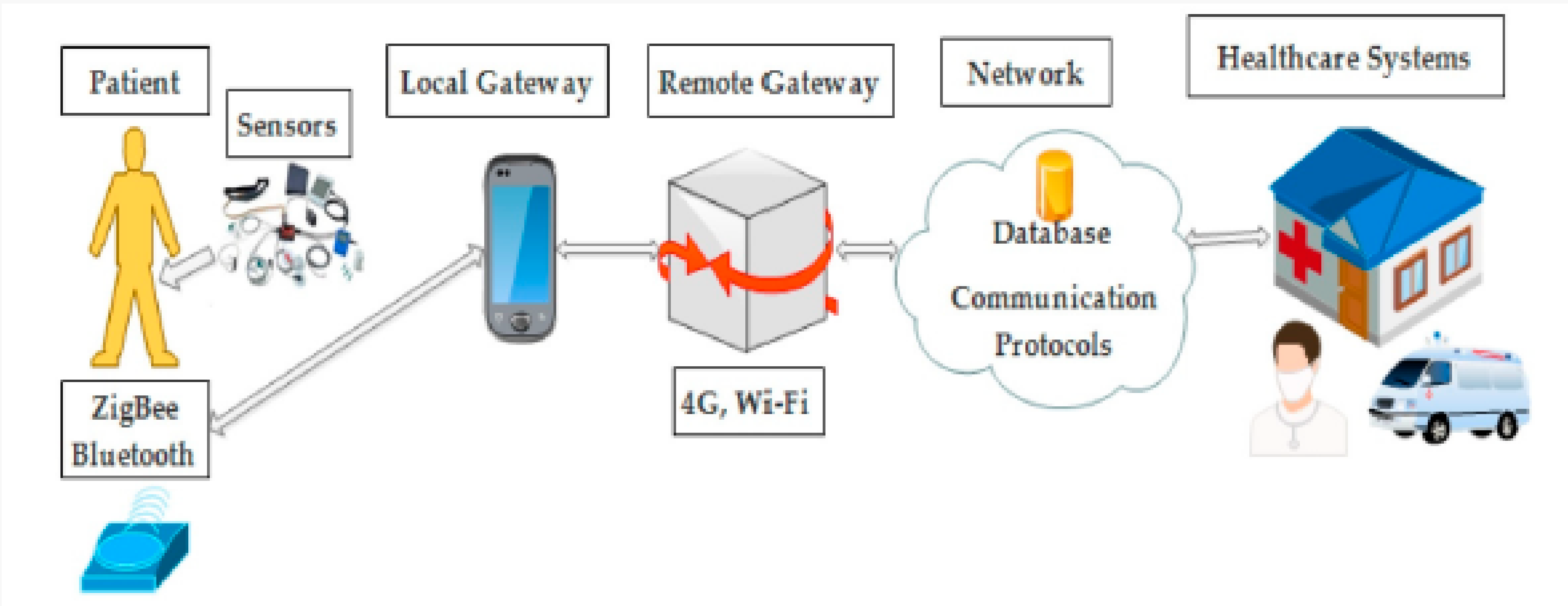
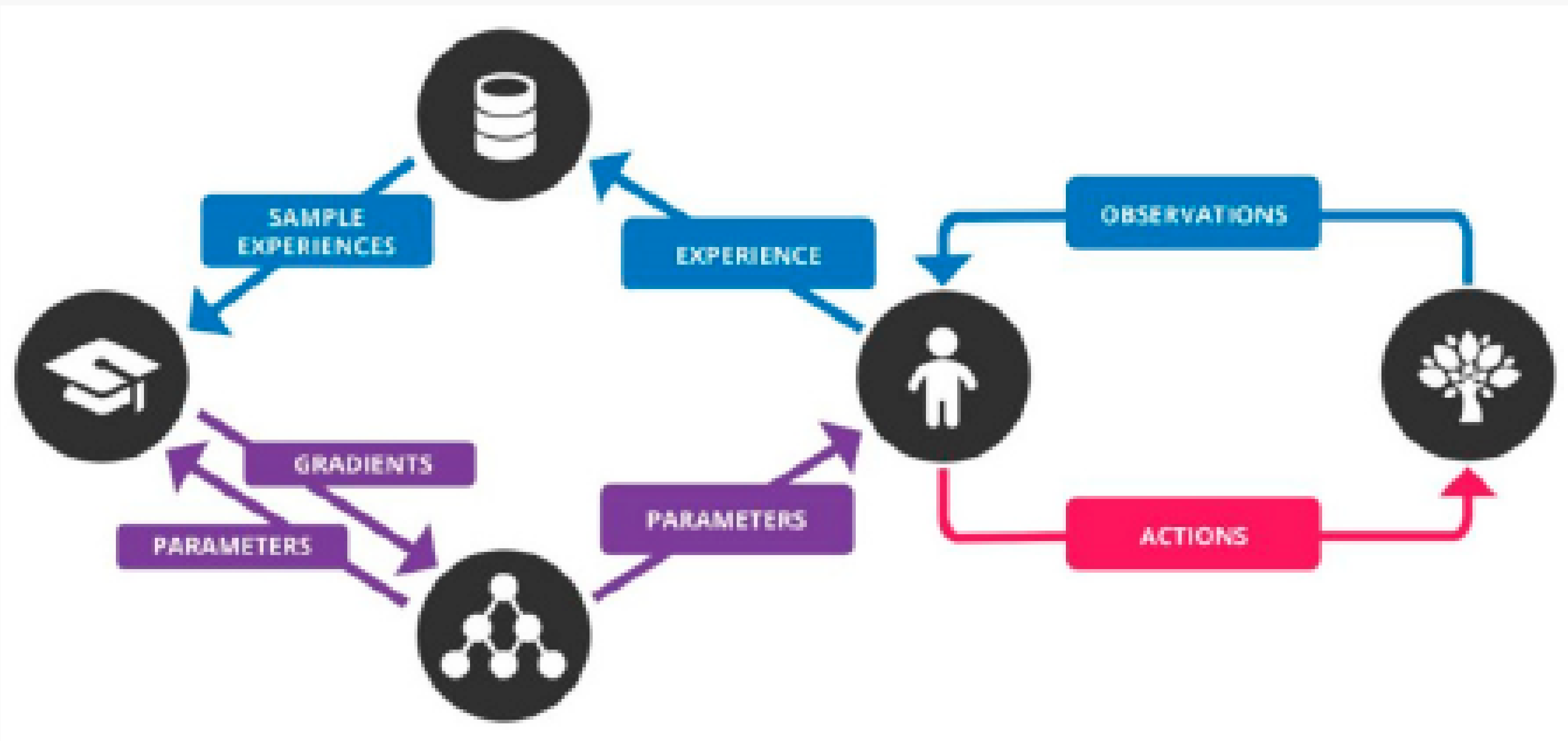
Secure Healthcare Model Using Multi-Step Deep Q Learning Network in Internet of Things

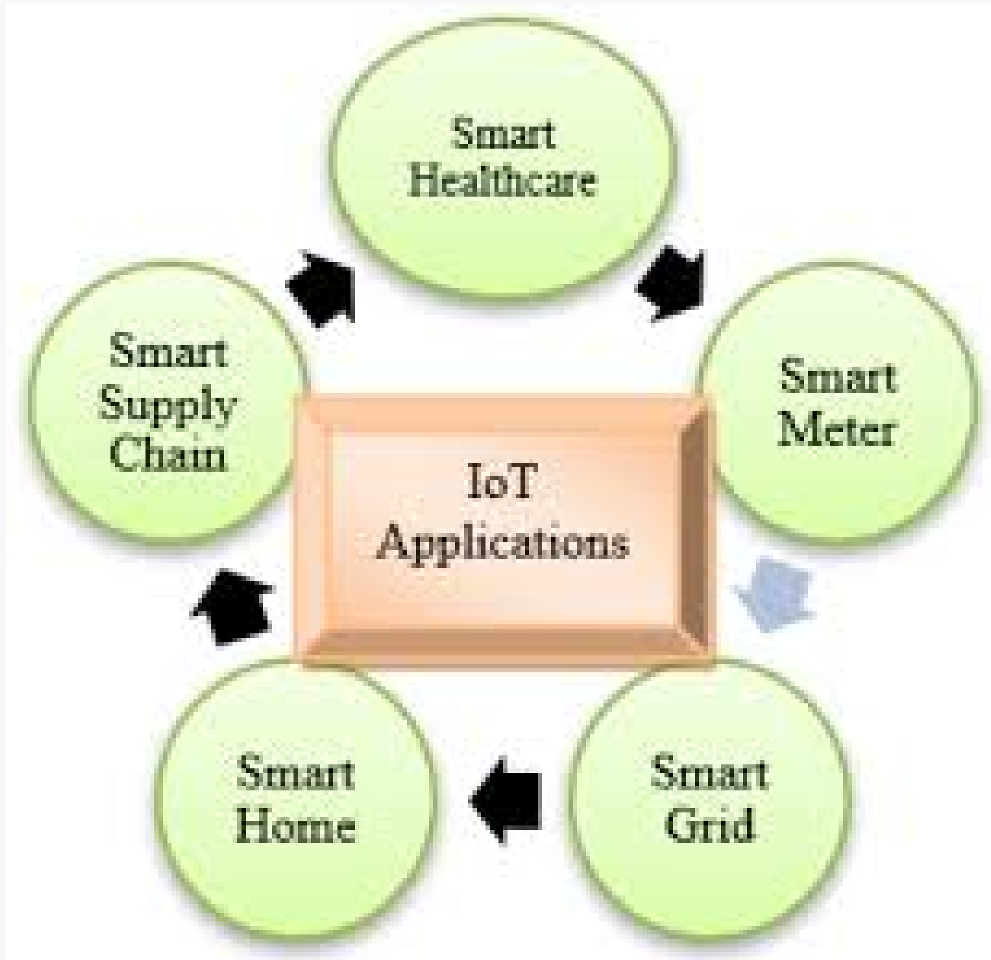
Internet of Things (IoT) is an emerging networking technology that connects both living and non-living objects globally. In an era where IoT is increasingly integrated into various industries, including healthcare, it plays a pivotal role in simplifying the process of monitoring and identifying diseases for patients and healthcare professionals. In IoT-based systems, safeguarding healthcare data is of the utmost importance, to prevent unauthorized access and intermediary assaults. The motivation for this research lies in addressing the growing security concerns within healthcare IoT. In this proposed paper, we combine the Multi-Step Deep Q Learning Network (MSDQN) with the Deep Learning Network (DLN) to enhance the privacy and security of healthcare data. The DLN is employed in the authentication process to identify authenticated IoT devices and prevent intermediate attacks between them. The MSDQN, on the other hand, is harnessed to detect and counteract malware attacks and Distributed Denial of Service (DDoS) attacks during data transmission between various locations. Our proposed method's performance is assessed based on such parameters as energy consumption, throughput, lifetime, accuracy, and Mean Square Error (MSE). Further, we have compared the effectiveness of our approach with an existing method, specifically, Learning-based Deep Q Network (LDQN).



Internet of Things (IoT) is a vast global infrastructure that integrates various components, including physical or virtual objects with attributes, Auto-IDs, and self-configuration capabilities in standard communication systems. Through IoT, devices such as smartphones, physical sensors, and smart buildings can interconnect and exchange data seamlessly, utilizing both wired or wireless communication channels.

Within the context of Industry 4.0, which focused on enhancing industrial environments, the integration of Cyber-Physical Systems (CPS) and IoT is gaining momentum, particularly in electrical systems and machinery. One notable development is the emergence of machine learning (ML)-based IoT platforms designed to mitigate cyber-attacks while ensuring secure and reliable status monitoring of devices like induction motors. Additionally, IoT is revolutionizing traditional methods of observation, for example by introducing a unique IoT architecture for real-time monitoring of gas-insulated switchgear. This convergence not only offers exciting possibilities, like real-time monitoring and enhanced cybersecurity, but also plays a significant role in modernizing electric power plants. In today's world, ML methods have proven effective for addressing issues like chatter recognition across various applications.



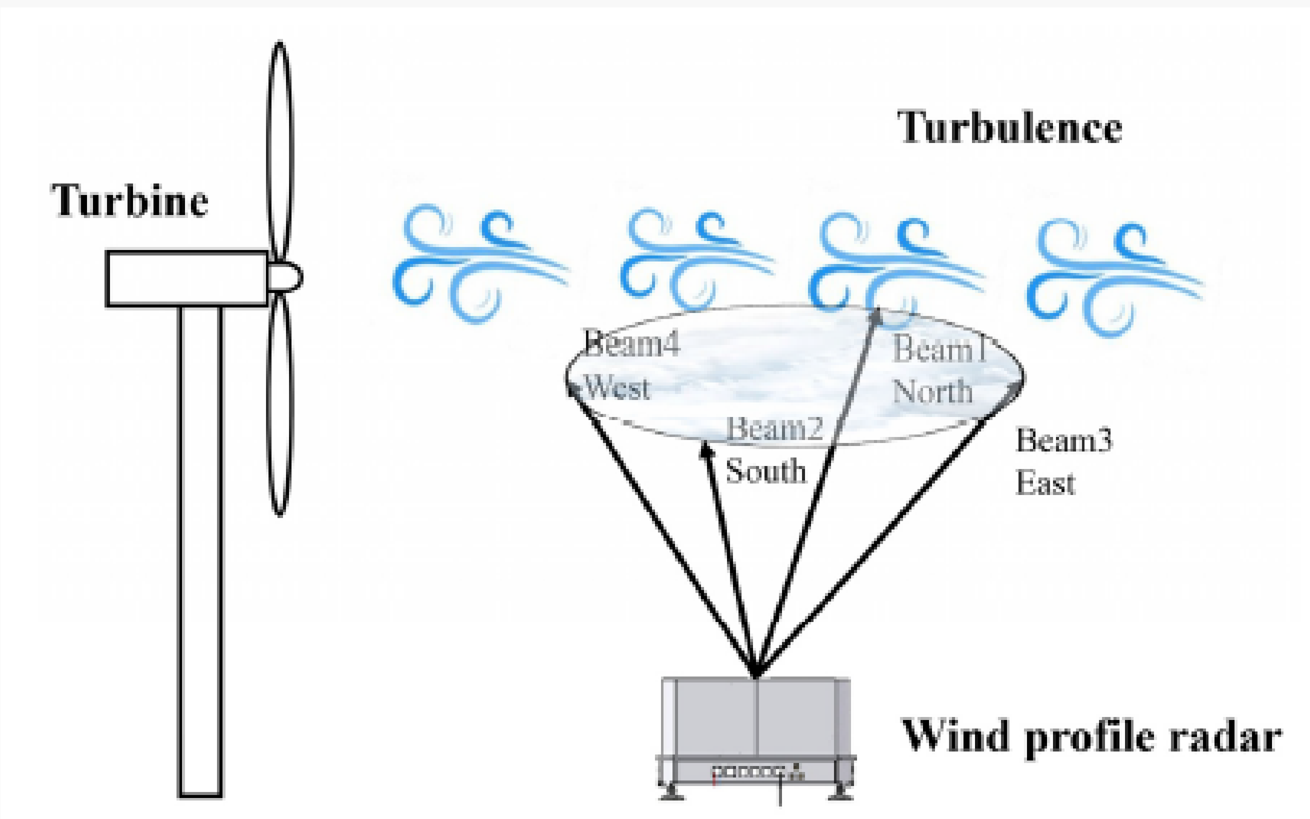


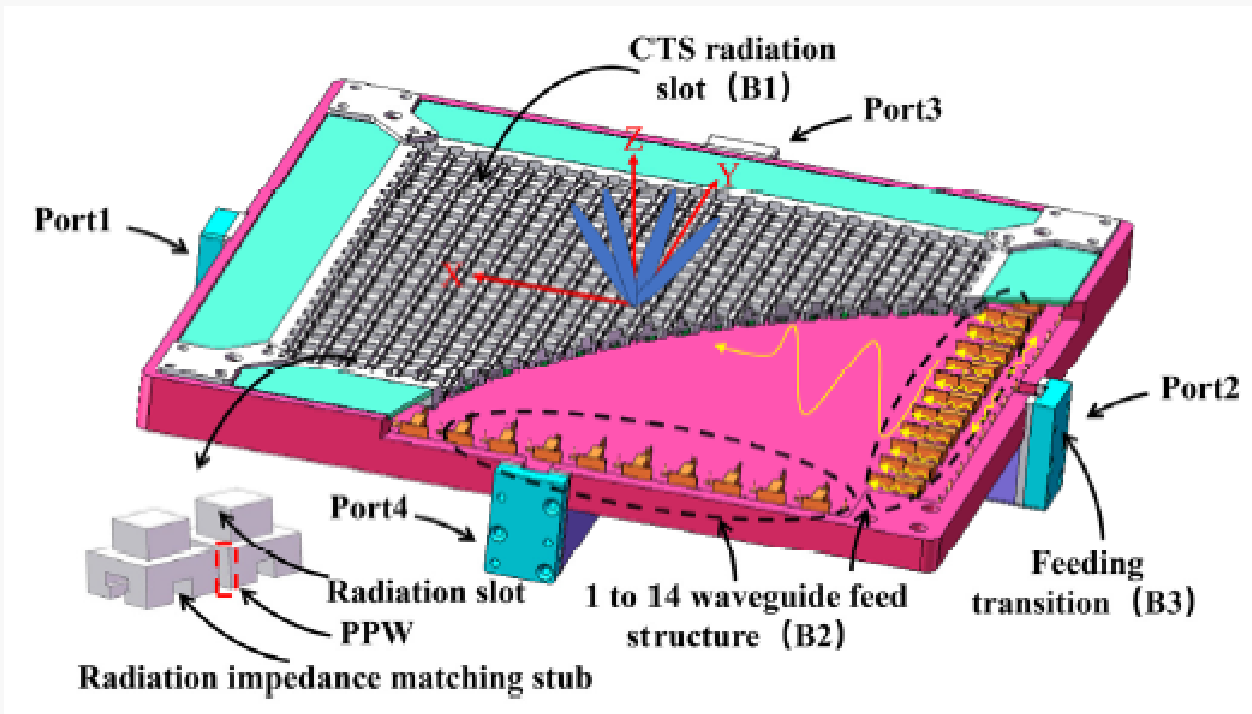
The DLN verifies the IoT device as to whether it is an authenticated device or not and removes the intermediate attacks. The performances of proposed method are better than the conventional classifiers, such as QLN and DQN. The DLN uses four signal features to minimize data leakage, such as received strength of the signal, impulse response of the channel, state information of the channel and received signal strength indicator. Then the MSDQN uses the traffic features along with signal features for detecting the malware and DDoS attack during the data transmission. This helps to preserve the medical data from malware and DDoS attack. In the proposed method, the energy consumption is 38 J, throughput is 1620 bps, lifetime is 398 s, MSE is 0.09. The accuracy of the proposed method with 60 IoT devices is 99.24%, which is high when compared to the QLN and DQN.

-----------------21BF1A04G3- N Gowtham

A Dual-Polarized CTS Array Antenna with Four Reconfigurable Beams for mm-Wave Wind Profile Radar

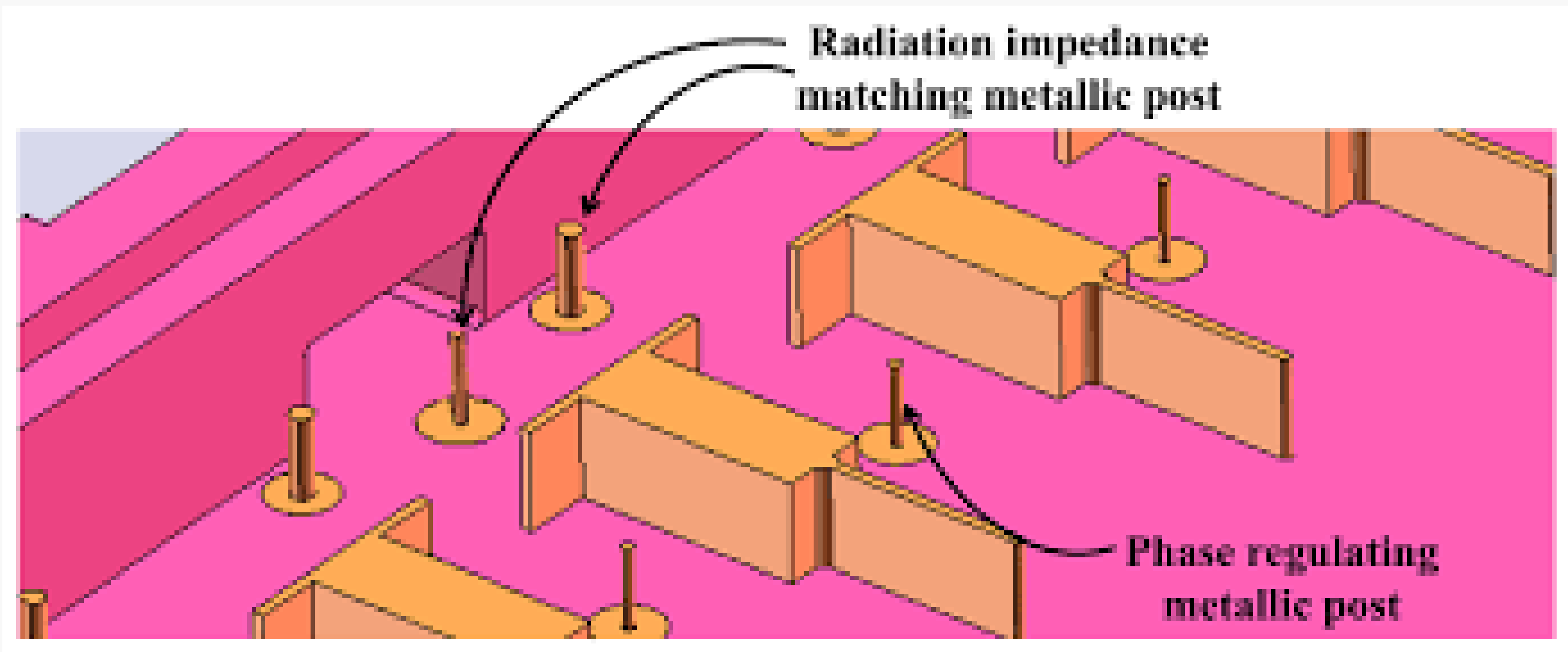
The wind profiler radar (WPR) system requires a dual-polarized antenna with multiple low-sidelobe and high-gain beams to facilitate the detection of weak signals reflected by atmospheric turbulence. This paper proposes a dual-polarized continuous transverse stub (CTS) K-band antenna with four reconfigurable beams, which comprises a series-fed CTS array and four 1-to-14 power dividers as line source generators (LSGs) to generate a high-quality quasi-TEM wave. The CTS element incorporates a stepped transition radiation stub design and employs a short cutoff stub on the upper surface of the series-fed parallel plate waveguide (PPW) to achieve optimal impedance matching. The entire antenna is an all-metal structure with remarkably low loss, and low-cost standard fabrication processes are employed for the prototype, which achieves fast reconfigurable four-beam scanning to 15 ◦ , with a gain of 31.09 dBi and sidelobe levels below −17.6 dB. Measurement results in an anechoic chamber agree well with simulations, demonstrating the antenna's ease of manufacture, stability, and suitability for wind profile radar applications.

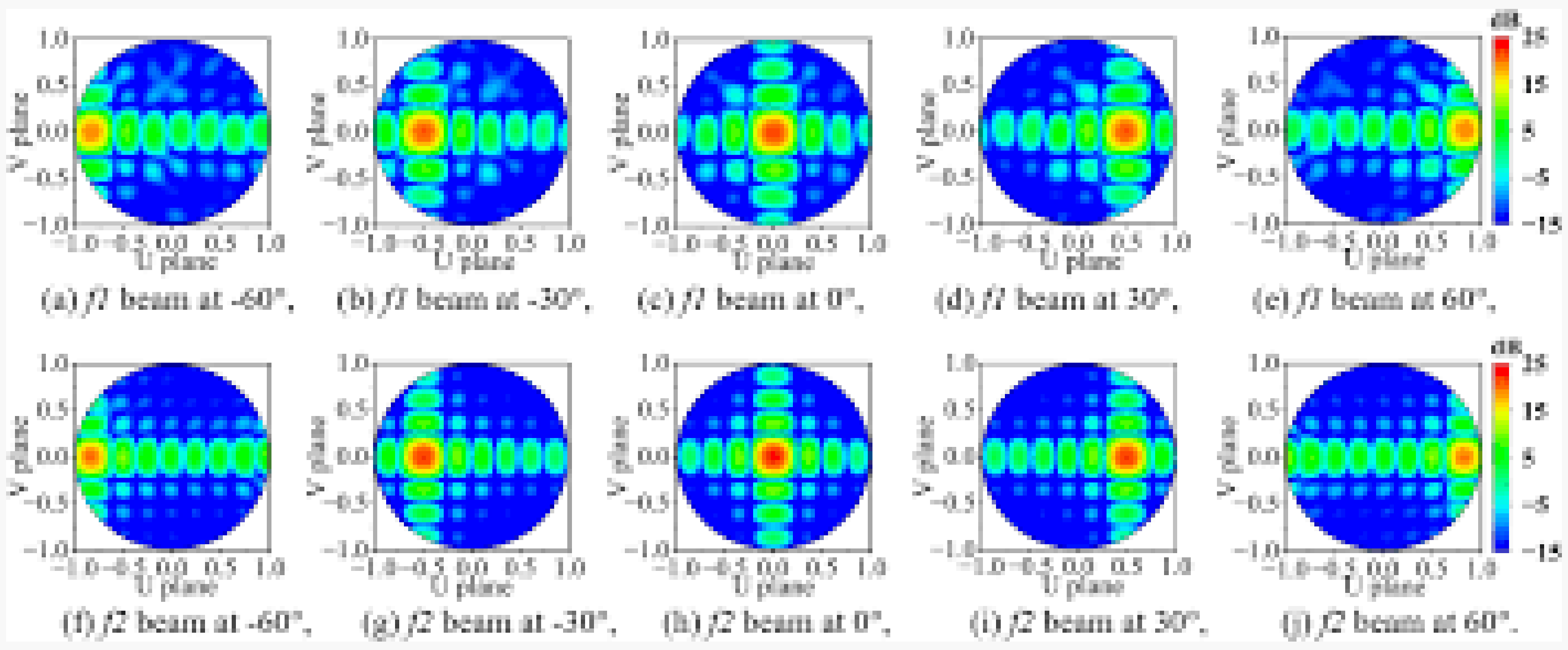




The growing urgency surrounding global warming and low-carbon living has recently spurred demand for green technologies to reduce carbon emissions. Wind power, heralded as the foremost cost-effective and environmentally benign form of renewable energy, has emerged as a pivotal focal point for energy transition in major economies around the world. In the year 2023, China achieved a record-setting installed capacity for wind power, experiencing a cumulative augmentation exceeding 30 gigawatts. The escalating prominence of wind power is anticipated to assume a progressively significant role within China's energy sector.

While wind power generation offers a nonpolluting and readily accessible energy source, its inherent attributes of stochasticity, uncertainty, and intermittency present notable challenges to the stability and safety of energy systems. Therefore, accurately and stably predicting the response of wind turbines in this constantly changing environment is an urgent issue for the operation planning, scheduling, and real-time balancing of large-scale wind power integration. On the other hand, one of the most critical factors affecting power generation efficiency is the directional control of wind turbines, and the parasitic loads generated by yaw misalignment can adversely affect the lifespan of components, potentially leading to consequential losses. Adjusting the status of wind turbines based on real-time and accurate wind farm information is crucial for improving economic efficiency and solving operation and maintenance issues.





presented a 24 GHz CTS array antenna with a high-gain, low-sidelobe, reconfigurable, dual-polarized, and low-profile design. The CTS array configuration was realized by integrating CTS radiation stubs, four 1-to-14 LSG series-fed feed structures, and coaxial-to-waveguide transition structures. This design achieved a four-beam fast switching scanning configuration with ±15 ◦ deflection, tailored for the specific requirements of millimeter-wave wind profile radar applications.

-----------------21BF1A0434- B Shyam Sundar