TECH BYTES

INSTITUTE VISION

"To mould true citizens who are millennium leaders and catalysts of change through excellence of education"

Institute Mission :

NCERC is committed to transform itself into a centre of excellence in Learning and Research in Engineering and Frontier Technology and to impart quality education to mould technically competent citizens with moral integrity, social commitment and ethical values.

We intend to facilitate our students to assimilate the latest technological know-how and to imbibe discipline, culture and spiritually, and to mould them in to technological giants, dedicated research scientists and intellectual leaders of the country who can spread the beam of light and happiness among the poor and the underprivileged.

DEPARTMENT VISION

Producing Highly Competent, Innovative and Ethical Computer Science and Engineering Professionals to facilitate continuous technological advancement

MISSION
1 To Impart Quality Education by Creative Teaching Learning Process

MISSION
2 To Promote cutting-edge Research and Development Process

MISSION
3 To Inculcate Entrepreneurship Skills amoung Students

MISSION
4 To Cultivate Moral and Ethical Values in their Profession

NEHRU GROUP OF INSTITUTIONS

Nehru Group of Institutions (NGI), among the top private engineering colleges in Thrissur and Palakkad-Kerala, intends to be an overall the world prominent academic association empowering splendid engineers! Nehru College of Engineering and Research Centre (NCERC), Thrissur, and Jawaharlal College of Engineering and Technology (JCET) – Palakkad and Nehru Institute of Engineering and Technology Coimbatore hold the title of best engineering colleges in Kerala and Tamil Nadu because of our perpetual vow to passing on pervasive training. Our instructive plans, imaginative demonstrating techniques, introduction to industry best practices, and experiential learning bases on making our engineering students work arranged! Being one of the top private Engineering colleges in Kerala, NGI has been cutting energetic and red hot characters into talented engineers prepared for working in various parts. Nehru Colleges have set its instructive plans at better principles than ensure that it passes on quality preparing.

Nehru College of Engineering and Research Center (NCERC), Thrissur is the Principal Engineering school in Kerala to offer a Computer Science and Engineering course, authorize by NAAC, and it holds the title of the best Engineering school in Kerala due to the association & perpetual guarantee to passing on common guidance. The Department of Computer Science and Engineering has a strong Undergraduate Program in Computer science and Engineering (B.Tech). The primary focus of our curriculum is to impart technical know-how to students, promote their problem-solving skills, innovation of new technologies and etc. Our department has distinguished record in teaching. The department have a group of experienced and enthusiastic teaching faculties and lab facilities with experienced lab staff, which in turn boosts the teaching-learning process. The department has structured an ambience of togetherness and cohesiveness.

ABOUT DEPARTMENT

The Department of Computer Science & Engineering (CSE) was established in the year 2001 . Over the years, the department has developed to become a center of excellence, providing in-depth technical knowledge and opportunities for innovation and research. The department has tie-ups with various industries and offers courses in collaboration with them. High-Performance Computing Systems, Computer Networks & Security, Knowledge Engineering, and Software Engineering.

MESSAGES

**Prof.Dr.Ambikadevi Amma .T
Principal,NCERC**

It gives me great pleasure to know that 'TECHBYTES 2020', NCERC's college magazine 2019-20 is ready for publication. True to its name, this magazine gives an insight into the range and scope of the imagination and creativity of our students and faculty members. I applaud the editorial team for the hard work and dedication they have invested in realizing this goal, and wish my dear students success in all future endeavors.

Dr. S Dhanabal
Professor & Head
Department of Computer Science and
Engineering

Tech Bytes is an technical magazine giving free access to the students to express their innovative ideas and present technical articles. Current trending technical know how are narrated as essays by our students to share the knowledge. It also gives them opportunity to convey their imaginations by their writings , paintings and photography. Continuous efforts will lead them to implement their ideas as projects and make it into reality.

COMPUTER ENGINEERING

DEPARTMENT VISION

Producing Highly competent, innovative and Ethical computer science and engineering professionals to facilitate continuous technological advancement

COMPUTER ENGINEERING

DEPARTMENT MISSION

MD1: To impart Quality education by creative Teaching Learning process

MD2: To promote cutting edge Research and development Process to solve real world problems with engineering technologies

MD3: To inculcate entrepreneurship skills among students

MD4: To cultivate moral and Ethical values in their profession

COMPUTER ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES

PEO 1: Graduates will be able to Work and Contribute in the domains of Computer Science and Engineering through lifelong learning.

PEO 2: Graduates will be able to Analyze, design and development of novel Software Packages, Web Services, System Tools and Components as per needs and specifications.

PEO 3: Graduates will be able to demonstrate their ability to adapt to a rapidly changing environment by learning and applying new technologies.

PEO 4: Graduates will be able to adopt ethical attitudes, exhibit effective communication skills, Team work and leadership qualities.

DIGITAL TWIN

A digital twin is a digital representation of a physical object, process or service. A digital twin can be a digital replica of an object in the physical world, such as a jet engine or wind farms, or even larger items such as buildings or even whole cities. As well as physical assets, the digital twin technology can be used to replicate processes in order to collect data to predict how they will perform. A digital twin is, in essence, a computer program that uses real world data to create simulations that can predict how a product or process will perform. These programs can integrate the internet of things (Industry 4.0), artificial intelligence and software analytics to enhance the output. With the advancement of machine learning and factors such as big data, these virtual models have become a staple in modern engineering to drive innovation and improve performance. In short, creating one can allow the enhancement of strategic technology trends, prevent costly failures in physical objects and also,

by using advanced analytical, monitoring and predictive capabilities, test processes and services. Digital Twin concept represents the convergence of the physical and the virtual world where every industrial product will get a dynamic digital representation. Throughout the product development life cycle, right from the design phase to the deployment phase, organizations can have a complete digital foot print of their products. These 'connected digital things' generate data in real time, and this helps businesses in better analyze and predict the problems in advance or give early warnings, prevent downtime, develop new opportunities and even plan better products for the future at lower costs by using simulations. All these will have a greater impact on delivering a better customer experience in business as well. Digital Twins which incorporate Big Data, Artificial Intelligence (AI), Machine Learning (ML) and Internet of Things are key in Industry 4.0 and are predominantly used in the Industrial Internet of Things, engineering, and manufacturing business space. The widespread reach and usage of the Internet of Things have made the Digital Twins more cost-effective and accessible for the business world. Digital Twin concept is the next big thing in most of the business sectors, which helps in accurately predicting the current state and future of

physical assets by analyzing their digital counter parts. By implementing Digital Twins, organizations can gain better insights on product performance, improve customer service and make better operational and strategic decisions based on these insights.

Trust-Based Multihop Routing for Vehicular Ad-Hoc Network

Vehicular ad-hoc network (VANET) is a brand of wireless technology that operates in an open environment, the specification of vehicle to vehicle (V2V) enables vehicles to share information related to the traffic status in real time. The communication in this wireless technology is self-organized and self-configured without the need of gateways. Security threat remains one of the disturbing challenges in the technology. Attack like packet drop could obstruct the performance and reliability of the communication. The article is aimed at enhancing multi hop communication by proposing Trust-Based scheme, the approach introduces the mechanism of portioning the communication signal into regions and zones and acknowledgment technique to provide holistic control and tracking of the packet flow from source node to the destination node. Key words: multi hop, packet drop, VANET, V2V, wireless. n Vehicle to Vehicle (V2V) communication, the vehicle communicates wirelessly with one another via wireless medium.

V2V is purely wireless communication between vehicles in ad-hoc mode; it enables data exchange platform for the vehicle to communicate and share information with other vehicle within a communication range. In V2V communication, each vehicle is a node and can work as a source, a destination and/or a router to re-transmit traffic related information to other vehicles. The vehicles communicate either directly or indirectly, this mean, the nodes within the same signal range communicate directly and for the nodes that are out of the same signal range communication via an intermediate nodes by establishing route in multihop mode, this enables forwarding of data to an individual or group of node. Multihop communication enables message propagations in vehicular networks based on the principles of mediator approaches, through carry-forward process by neighbouring vehicles until the desired dissemination target node is reached, the packet propagations are accomplishing through intermediary vehicles when a source vehicle send a message to destination vehicle. However, due to high mobility of vehicles and multipath propagation, communications in vehicular networks suffer from severe channel mutilations which make quality-of-service (QoS) provisioning in the networks seriously

Figure 1: MultiHop communication in vehicular network
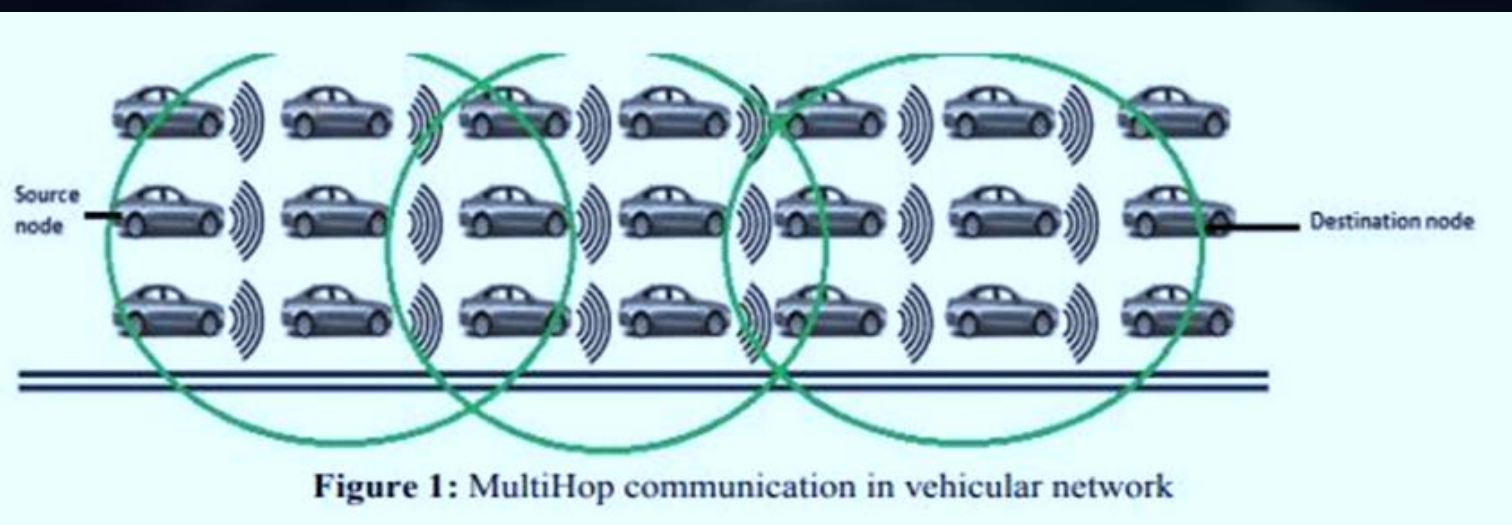
challenging. These have highlighted that, improving and securing the transmission reliability is critical issues in vehicular network.

Big Data Analytics for Cyber Security

Big data analytics will be a must-have component of any effective cyber security solution due to the need of fast processing of the high-velocity, high-volume data from various sources to discover anomalies and/or attack patterns as fast as possible to limit the vulnerability of the systems and increase their resilience. Even though many big data analytics tools have been developed in the past few years, their usage in the ¬field of cyber security warrants new approaches considering many aspects including (a) uni¬fied data representation, (b) zero-day attack detection, (c) data sharing across threat detection systems, (d) real time analysis, (e) sampling and dimensionality reduction, (f) resource-constrained data processing, and (g) time series analysis for anomaly detection.

Cyber Physical Power Systems (CPPS) are a critical infrastructure and therefore a favorable target of cyber attacks. In "VHDRA: A Vertical and Horizontal Intelligent Dataset Reduction Approach for Cyber-Physical Power Aware Intrusion Detection Systems," the authors proposed the use of the Non nested Generalized Exemplars (NNGE) algorithm and showed that it is among the most accurate and suitable classi¬fication methods for developing an intrusion detection system for CPPS because of its ability to classify multiclass scenarios and handle heterogeneous datasets.

Furthermore, VHDRA proposed mechanisms to improve the classi¬fication accuracy and speed of the NNGE algorithm and reduce the computational resource consumption. It achieves this by vertical reduction of the dataset features by selecting only the most signi¬ficant features and horizontally reduces the size of data while preserving original key events and patterns within the datasets using the State Tracking and Extraction Method approach. In "Integrating Traffics with Network Device Logs for Anomaly Detection," the authors presented Traffic-Log Combined Detection (TLCD), which is a multistage intrusion analysis system that overcomes the inefficacy of existing anomaly detection systems that search logs or traffics alone for evidence of attacks but do not perform further analysis of attack processes. TLCD correlates log data with traffic characteristics to reflect the attack process and construct a federated detection platform. Speci¬fically, it can discover the process steps of a cyber attack, react the current network status, and reveal the behaviors of normal users.

Role-based access control (RBAC) is a predominant access control model and is widely used in both commercial and research settings. A key requirement of RBAC is to identify appropriate roles that capture business needs. Role mining is a common approach to discover user roles from existing datasets using data mining. "e interdependent relationships between user permissions must be considered to prevent security vulnerabilities. In "RMMDI: A Novel Framework for Role Mining Based on the Multi-Domain Information," the authors proposed a role mining framework based on multi-domain information.
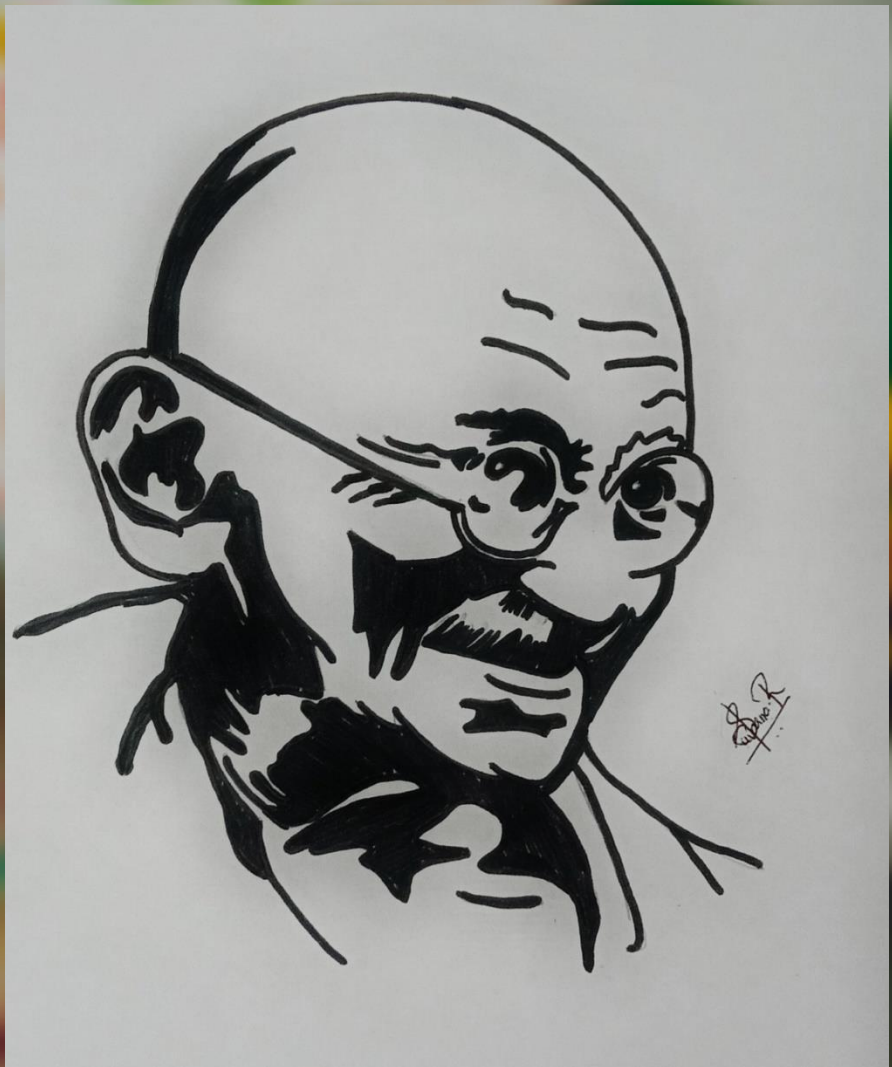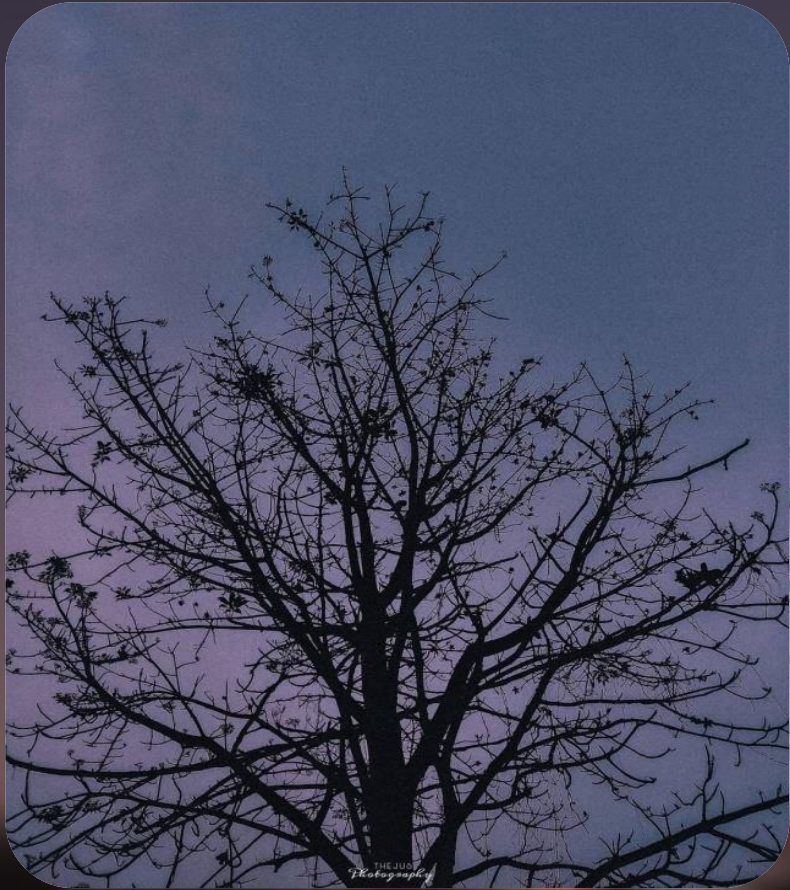
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