VASIREDDY VENKATADRI INSTITUTE OF TECHNOLOGY

Approved by AICTE, Permanently Affiliated to JNTU Kakinada, NAAC Accredited with 'A' Grade, ISO 9001:2008 Certified,

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

(NBA Accredited and DST-FIST Sponsored Department)

JANUARY 2024

DEPARTMENT VISION

To produce globally competitive and socially responsible engineering graduates and to bring out quality research and education, generating knowledge in the frontier areas of Electronics and Communication Engineering

DEPARTMENT MISSION

1. To achieve self-sufficiency on all fronts to ensure qualitative Teaching-Learning practices.
2. To provide quality education, student-centred Teaching-Learning processes and state of art infrastructure for professional aspirants hailing from both rural and urban areas.
3. To impart technical education that encourages independent thinking, developing strong domain knowledge, contemporary skills and attitude towards holistic growth of young minds.
4. Responsiveness to both local and global industry needs and creating opportunities through incubation and implementation of innovative programs
5. To serve the community as disciplined responsible citizens in a rapidly changing and expanding global community.
6. Evolving this organization into a centre of academic and research excellence.

WIRELESS PROTOCOLS: PIONEERING THE FUTURE OF CONNECTIVITY

Wi-Fi (Wireless Fidelity) is the most popular **IOT communication protocols** for wireless local area network (WLAN) that utilizes the IEEE 802.11 standard through 2.4 GHz UHF and 5 GHz ISM frequencies. Wi-Fi provides Internet access to devices that are within the range of about 20 - 40 meters from the source. It has a data rate up to 600 Mbps maximum, depending on channel frequency used and the number of antennas. In Embedded Systems, ESP series controllers from Espressif are popular for building IoT based Applications. **ESP32** and **ESP8266** are the most commonly use wi-fi modules for embedded applications.

The journey begins in the 19th century, where Samuel Morse's ingenious invention, the telegraph, allowed messages to click and clack across wires. Soon, Guglielmo Marconi captivated the world with his wireless telegraphy, sending the first radio signal across the Atlantic in 1901. The 20th century saw the radio explode onto the scene. Crackling news reports, captivating music, and dramatic plays filled the airwaves, connecting people like never before. In the early 1970s the world introduced a revolutionary mobile phone. Cellular networks evolved from analog to digital, and data joined the voice call party, opening the door to a whole new era of mobile communication. *Wi-Fi Whirlwind*: The late 1990s witnessed the birth of Wi-Fi, transformed to learn, and play, ushering in an age of unprecedented mobility and connectivity. *The Future Unfolds:* Today, we stand on the cusp of even more thrilling advancements. 5G networks are rolling out, promising lightning-fast speeds and paving the way for the Internet of Things (IoT). Low-orbit satellite constellations like Starlink are beaming internet access to remote corners of the planet. *A Legacy of Innovation:* Connecting the World, One Signal at a Time. As we navigate the ever-evolving landscape of wireless communication. From Morse's code to Marconi's sparks, from bulky cell phones to Wi-Fi's liberating waves, each innovation has brought us closer together, shrunk distances, and expanded our horizons.

Wi-Fi 7: Hyperconnectivity On-Ramp-Wi-Fi 7, expected in 2024, promises blazing-fast speeds up to 40 Gbps, multi-channel operation, and improved latency for ultra-responsive networking. Think seamless VR/AR experiences, real-time data-hungry applications, and even faster downloads than you ever imagined. **Beyond Wi-Fi:** Alternative Players in the Game-Wi-Fi isn't the only star of the show. 6G, projected for 2030, is generating buzz with its terahertz frequencies and potential for mind-blowing data rates. Low-power wide-area networks (LPWANs) like LoRaWAN and Sigfox are already connecting remote devices across vast distances, making them ideal for the growing Internet of Things (IoT) landscape. **Security in the Spotlight:** Protecting the Wireless Future With increased connectivity comes heightened security concerns. Quantum-resistant cryptography is being explored to safeguard against potential future threats, while new authentication and encryption protocols are constantly evolving to keep hackers at bay. **Future Focus:** Emerging Technologies to Watch The future of wireless communication is brimming with possibilities. Keep your eyes peeled for advancements in Li-Fi (using light for data transmission), cognitive radio (adapting to frequency changes), and even brain-computer interfaces for an entirely new paradigm of wireless interaction.