A Seminar on 5G Technology

Event Name: Exploring 5G Technology with Prof. Sasindran, Part -A

Date of Event: 8th October, 2024

Venue: Aryabhatta Seminar Hall, Dept. of ECE, KSSEM

Number of Participants: 65

Targeted Audience: 2nd Year ECE Students

The Department of Electronics and Communication Engineering, KSSEM, in association with the IEEE KSSEM Student Branch, organized an interactive session on 5G technology on 8th October 2024 at 11:30 AM as part of the IEEE Day celebrations.

The event commenced with a warm welcome from the host. The significance of IEEE Day, a celebration recognizing the founding of IEEE in 1884 and acknowledged by the IEEE Bangalore Section, Region 10, was emphasized. The KSSEM IEEE Student Branch marked this occasion by organizing a seminar on 5G technologies, a revolutionary leap forward in wireless communication.

Speaker Introduction:

Ms. Tanushree, IEEE member, introduced the speaker, Prof. Sasindran Madhava Prabhu, whose illustrious career includes:

- Senior IEEE Member since 1992.
- Life Fellow of IETE, with over three decades of experience in telecommunications and project management.
- Former Senior Solution Architect at Tech Mahindra, where he worked on global telecom projects with major clients.
- Currently teaching and mentoring students at KSSEM in Wireless Technology, AI/ML, and project development.

Discussion

The seminar focused on the evolution of mobile networks from 1G to 5G and how each generation transformed communication. **Prof. Sasindran Madhava Prabhu**, Senior IEEE Member and the keynote speaker highlighted how the journey of mobile networks began with 1G and led to the advanced 5G we are discussing today.

1G (First Generation) – Analog Voice

Prof. Prabhu explained that 1G, introduced in the 1980s, was the first generation of wireless telecommunication. It was primarily analog and only supported voice calls. While it allowed people to be mobile and connect without landlines, 1G had several limitations, such as poor voice quality, lack of encryption, and limited capacity.

2G (Second Generation) – Digital Voice and Text:

The 1990s saw the advent of 2G, which brought digital technology to mobile networks. This enabled clearer voice communication, and most importantly, allowed text messaging (SMS) for the first time. 2G also introduced better security features through encryption and gave users more talk time due to better spectrum efficiency.

3G (Third Generation) – Mobile Data:

As mobile phones evolved, so did the need for data. The early 2000s marked the beginning of 3G, which was built to support data services like internet browsing, email, and multimedia. With 3G, users could stream audio and video, but at much slower speeds than what we're accustomed to today. This generation paved the way for the rise of smartphones.

4G (Fourth Generation) – High-Speed Internet and Streaming:

4G was a huge leap forward in the late 2000s, offering significantly faster data speeds compared to 3G. It made high-definition video streaming, online gaming, and fast web browsing a reality for users. 4G brought about mobile applications that became a core part of everyday life, such as social

media, GPS services, and video calls. However, with increasing data consumption and connected devices, 4G started to show limitations in terms of speed, latency, and network congestion.

5G (Fifth Generation) – Ultra-Fast, Low-Latency, Massive Connectivity

The current era, which Prof. Prabhu focused on, is marked by 5G technology, introduced globally in 2019-2020. He explained that 5G is not just a new generation of mobile networks but a paradigm shift in communication technology. It offers significantly faster data speeds (up to 100 times faster than 4G), ultra-low latency (critical for real-time applications like autonomous vehicles), and the ability to connect a massive number of devices (key for the Internet of Things).

Prof. Prabhu emphasized that 5G's capabilities go far beyond just improved mobile internet. It can transform industries like healthcare, manufacturing, and transportation by enabling technologies like smart cities, autonomous vehicles, remote surgeries, and advanced AI-powered applications. 5G's infrastructure allows massive device connectivity, paving the way for the full realization of IoT (Internet of Things).

He also touched upon the challenges that come with 5G deployment, such as the need for significant infrastructure upgrades, spectrum allocation, and ensuring network security in an increasingly connected world.

Future Prospects of 5G

5G is expected to unlock new possibilities for innovation across industries, from enhancing AR/VR experiences to improving remote work and education. The network's ultra-reliable low-latency communication (URLLC) feature is critical for mission-critical applications like autonomous driving, industrial automation, and telemedicine.

Key Takeaways: Prof. Prabhu concluded by explaining that 5G represents a future where digital and physical systems are integrated seamlessly, reshaping not only how we communicate but how industries operate. Students gained valuable insights into how they can contribute to and prepare for this technological transformation, especially in fields like telecommunications, AI, and smart infrastructure.

Acknowledgments

After the seminar, **Ms. Shrilakshmi** expressed her gratitude to **Prof. Sasindran Madhava Prabhu** for his enlightening and engaging talk. She also thanked the **Head of the Department, Dr. Senthil Babu**, for his support in organizing the event, as well as **Dr. Renuka V Tali**, Branch Councilor for IEEE KSSEM Student Branch, for her guidance in making this event a success.

Photo Gallery:

Fig 1. Speaker and audience present in the event

Fig 2. Speaker addressing the event

On behalf of all IEEE members, a vote of thanks was extended to the management, the principal, and the teaching and non-teaching staff for their contributions to the success of the seminar.

Co-ordinator **Signature of HOD, ECE**