A.V.C COLLEGE OF ENGINEERING, MANNAMPANDAL

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

"FORCE (FORum of Computer science and Engineers') Newsletter"

Volume: 6 **Month: Jan'2020** **Issue: 02**

HOD'S DESK

I heartily wish that this year brings to you more strength and more dedication and I do pray that you are able to achieve all your goals with your commitment and sincerity. Students must learn from your past mistakes and accomplish your targets for future with your strength and dedication.

"The day you take complete responsibility for yourself, the day you stop making any excuses, that's the day you start to the top"

Dr.S.Padmapriya, HOD/CSE

7 Essential Leadership Skills:

1. Communication
2. Motivation
3. Positivity
4. Creativity
5. Feedback
6. Displays technical or professional expertise
7. Respectful to others
8. Relationship Builder

Faculty Corner

5G AND STARLINK: A NEW ERA IN INTERNET CONNECTIONS

Mr.P.SIRENJEEVI, AP/CSE

Introduction:

5G and Starlink are two complementary technologies whose goal is to make the entire planet connected ensuring efficiency and versatility to network applications.

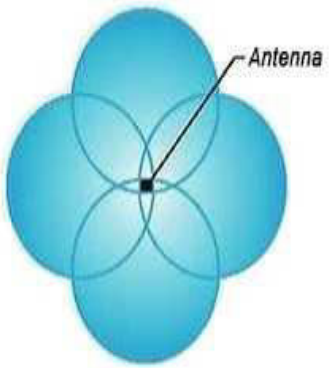
5G

5G indicates a set of latest generation technologies that stands as evolution compared to 4G and promises a new era in internet connections. The global diffusion, started in 2019, has caused a stir from the media point of view.

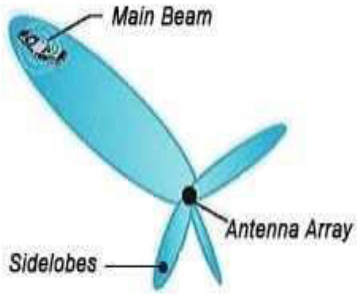
The goal with 5G is to meet the increase in transmission speed low latency (the response speed of a system to a pulse) and high density (simultaneous access to the network without impacting on speed).

5G is therefore characterized by:

- **Beamforming** or the possibility of directing and concentrating the signal towards the actual physical position of the users. Therefore, the antenna will not have a constant emission but will adapt according to the users to be served. The antennas used for this approach are called mMINO (massive Multiple Input Multiple Output)



Conventional Array



Beamforming Array

- Low band antennas with a frequency range between 694 and 790 MHz, mid band with a frequency range between 2.5 and 3.7 GHz and high band with a range frequency range between 25 and 39 GHz. The wider the frequency range, the lower the antenna range. The 5G in the medium band, by far the most common, reach very high speeds obviously at the expense of the range compared to a low band.
- Low latency. The variables and disturbing factors affecting a 4G antenna are the same as affecting 5G ones. The aspiration would be to be able to reach an air latency of 1ms-5ms.
- Speed Boost: Midband 5G speeds are slightly faster than advanced 4G networks. In fact, the 4G network is still close to the Shannon limit but lower than 5G. Using Shannon's theorem:

$$C = B * log_2(1 + S/N)$$

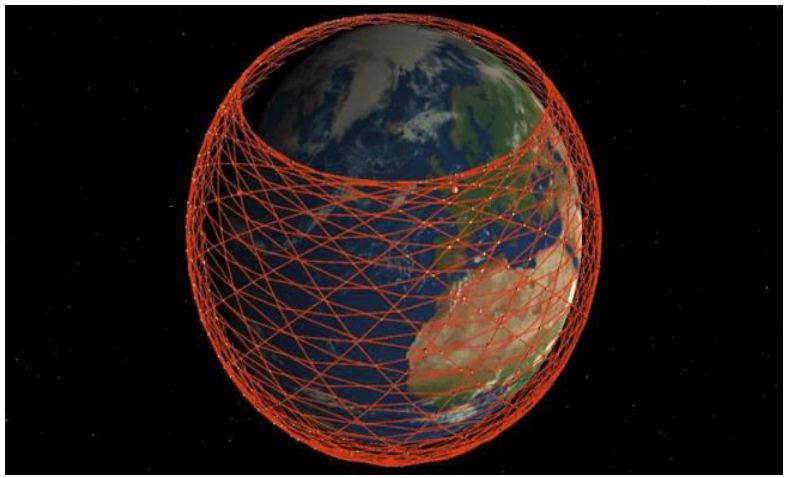
- C: Throughput capacity of the system
- B: the width of the band given by the frequency * antennas number. 5G uses a wider range of frequencies and more antennas and this means that the size B is greater than that of 4G.
- S / N: *Signal to Noise Ratio* (or SNR) is a numerical quantity that relates the power of the useful signal to that of the noise in any acquisition system, processing or transmission.

Starlink

Starlink, despite having been less successful in the media, is the patron of what will be a very near future in which everyone will be connected anywhere in the world. This satellite internet connection project, the fruit of Elon Musk's visionary mind, aims to offer instant activation times and costs that are expected to be revolutionary.

Starlink is in fact a constellation of satellites in LEO (Low Earth Orbit, an orbit between

300 and 1000 km), more precisely at 550km, which work in tune with terrestrial transceivers for internet access via satellite in broadband and low latency.



At the moment Starlink has about 700 satellites launched in non-geostationary orbit and the first constellation will count about 1600 satellites.

The Starlink satellites are equipped with:

- A thruster that uses Krypton to hold its orbit automatically and avoid collision with debris.
- A solar panel capable of powering all routers.
- A set of lasers. The intention is to use them as a means of finalizing a "backhaul" network. The goal is to optically connect nearby satellites to find the shortest path between any two stations on earth.

Conclusion

When Starlink is active and 5G will be more accessible, there will be a significant growth in internet traffic. This will mainly be due to being able to connect anywhere in the world and at any time with excellent browsing speed.For this reason, companies will have to adapt their sizing to traffic capacities different from the current ones. Sizing is in fact, as reported in the article Coronavirus: IT infrastructures must adapt sizing, a key factor to ensure operational continuity and reliability in the provision of services.

Student Corner

HUMAN AUGMENTATION

M.RUBIGA, IV CSE

Introduction:

Human augmentation is "technologies that enhance human productivity or capability, or that somehow add to the human body". We would add that in order for something to be an augment, it must become so integrated into the user's life that it becomes an extension of them. For instance, a hammer is only relevant when you need it and thus would not be an augment. But a sufficiently discreet exoskeleton could become as normal to your life as your ability to walk, and thus would be an augment. So, following this rule, a laptop would not be considered an augmentation, but a smartphone—and especially a mobile smartwatch—could easily be considered an augmentation. It's almost always with (or on) you, and it augments your ability to access any information at any time.

Types of Human Augmentation:

It can be divided into three main categories with different functions:

Replicating human ability: Human augmentations that restore or replicate typical human abilities fall into the category of replication. This includes things like prosthetic limbs for the disabled, hearing aids for the deaf, and voice synthesizers for the mute.

Supplementing human ability: Human augmentations that improve our ability to do something fall under the category of supplementation. This includes devices that artificially increase our strength, enhance our sight beyond normal limits, or increase our intelligence.

Exceeding human ability: Human augmentations that allow us to do things that we cannot do on our own fall into the category of exceeding augmentation. This includes things like the ability to fly, breathe underwater, see ultraviolet or infrared light, and smell chemicals not currently detectable by the human olfactory sense.

Five Examples of Human Augmentation:

Many parts of the human body can be augmented, but here are five examples that show some of the directions augmentation can take:

- EksoWorks creates exoskeletons for industrial and rehabilitation purposes. Their products are devices that users wear on their body (typically from the torso up) for artificial strength and endurance. These devices come in multiple variations for different tasks, to help users in areas like construction, auto manufacturing, and even physical therapy.
- SolarEar is a low-cost, solar-rechargeable hearing aid. It provides the hard of hearing and near-deaf with an affordable alternative to traditional hearing aids, bringing the technology into countries and regions that previously weren't able to afford such devices.
- The Teslasuit is a wearable outfit that can control the wearer's temperature, provide haptic feedback, and track the wearer's movements. While this tech is currently being used for VR immersion, the ideas that have gone into its development can be translated easily into the realm of augmentation.

- Skylight, a platform by Upskill, has partnered with Google to create smart glasses for aviation engineers. The glasses aid in the tightening of B-nuts, which are a critical component of jet engines. These nuts have to be tightened perfectly or the engine could fail. The Skylight glasses can detect when a worker is tightening a B-nut, and they use a wi-fi connected torque wrench to determine when a B-nut has been tightened perfectly.
- Brain-Computer Interfaces (BCI) is interfaces that allow an individual to interact with a computer or machine using only their mind. While most of this technology is still conceptual, the possibilities are limitless. BCI is not just about sending information to a computer, but also allowing humans to receive new types of information from their computers in return. Computers may one day be able to digitally replicate aspects of the human experience, allowing individuals to experience software through all of their five senses.

Push your ideas to

Faculty: M.Kavitha,AP/CSE

Student Coordinator:

1. V.GokilaVani, IV CSE
2. M.Kanagaraj, III CSE
3. J.Rukshana Safrin, II CSE

Editors-Force Newsletter

Mail-id:forcenewsletter@gmail.com

Institution Vision

To blossom into a cynosure of technological innovations.

Mission

To participate in the noble cause of nation building by offering professional education, research and training in engineering and technology especially to the rural based poor students.

Department Vision:

To excel in the field of Computer Science and Engineering with technological innovations.

Department Mission:

1. To impart quality technical education to the students through creative teaching learning process especially to the rural based students.

2. To create facilities and expertise in cutting-edge computer technologies through industry institute partnership.

3. To motivate the students to apply their innovative ideas to construct research models.

4. To transform the students into socially and ethically responsible professionals.

Programme Educational Objectives (PEOs):

Graduates of this B.E Computer Science and Engineering will be able to

PEO 1: To enable graduates to pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs.

PEO 2: To ensure that graduates will have the ability and attitude to adapt to emerging technological changes.

PEO 3: To effectively communicate ideas in oral or written and to promote collaboration with other members of engineering teams.

Programme Outcomes (POs):

By the time of graduation, graduates will attain the following programme outcomes:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

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

9. Individual and team work: Function effectively as an individual, and as a member or

leader in diverse teams, and in multidisciplinary settings.

10. 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.

11. 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.

12. 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 Objectives (PSOs)

1. To analyze, design and develop computing solutions by applying foundational concepts of Computer Science and Engineering

2. To apply software engineering principles and practices for developing quality software for scientific and business applications

3. To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems.