Executive Summary of Industrial Seminar
ELEC222 / ELEC273

23rd March 2022

Abstract

The Department of Electrical Engineering at the University of Liverpool held the seminar on **UK Capabilities in Wireless Comms: Looking back to look forward**. The speaker, Professor Joe McGeehan, discussed the development of the modern communications industry and the future prospects of the industry. The problems encountered by the professor in his research and the corresponding solutions were also discussed at the seminar. Several key achievements in the field of wireless communication and key applications were also explained in detail by the professor. In addition, the speaker covered some of the new generations of communications technologies, which need further discussion and research.

1 Speaker, Venue, Audience

Professor Joe McGeehan led this industrial seminar on UK capability, and has played a major role in much of the research and teaching in the field of communications. He has even been called the '**godfather** of mobile communications**'**. The seminar was held on Wednesday 23rd March, at the University of Liverpool. Participants in the seminar included: undergraduate, postgraduate, and academic staff.

2 Seminar content

In this seminar, Professor Joe McGeehan presented the history and development of modern mobile communications. Moreover, the creativity of university research should be combined with the dynamism of the corporate and business world in the professor's opinion. In addition, the presenter explained in concrete terms the significant impact that modern communication technologies have made on the world. Through the continuous development of wireless communication technology, several important products have become widely accepted by the public and have profoundly influenced the course of the world. For example, a collection of digital video broadcasts, RF power amplifiers, the Tokyo Skytree, smart antenna arrays, 3G and 4G are all

important achievements in the field of wireless communications. Professor Joe also explained the current systems, networks, and industry standards in the field of mobile communications. Finally, the seminar also covered some specific areas of research into the next generation of wireless communication technologies, including technologies such as 6G and Internet of Things (IoT).

For future work, professor intended to continue to dig deeper into the field of CPS technology, building cyber-physical solutions and leading the company to build a platform for factory IoT systems.

3 Problems and solutions

The first problem the professor encountered was that the effects of interference could distort wireless communications. The approach taken by the professor was to use a computer to simulate the fading environment to find the best signal to obtain. The second problem was that a clean spectrum was difficult to obtain due to the effects of amplifiers and modulation distortions. The solution was to create a highly linear channel with a very narrow spectrum to eliminate the effects as much as possible. An amplifier with security code technology has been designed to meet unique channel requirements

5 Conclusion

Presenter Professor Joe McGeehan discussed the development of the wireless communication industry and his research motivation in this seminar. In addition, the professor presented the key applications and achievements of modern mobile communication technology and the future direction of the industry. Moreover, the problems encountered by the professor in researching wireless communications and the corresponding solutions are also covered. Finally, the building of a factory IoT platform was in presenter's future work.

6 Recommendations

With the help of artificial intelligence, the problems of carbon emissions and sustainability may be alleviated. In addition, breakthroughs in some digital technologies mean that a greater contribution could be made in these areas. Although some new technologies in the field of wireless communication technology are flourishing, the speaker believed that engineers should delve deeper into research and exploration for the marketability of these new areas of technology.