Reflective Report on Industrial Talk

On 25 September 2018, all students of School of Electrical Engineering were invited to attend an industrial talk at Astana Hall, Kolej Tuanku Canselor, UTM, Johor Bahru from 2pm to 5pm. I, as the student of Electronics Engineering, had attended the talk. The talk consists of 2 slots – ‘Internet of Things in Industrial Applications’ by Anssi Ikonen, Senior Lecturer from Helsinki Metropolia University of Applied Sciences, Helsinki, Finland and ‘Machine Learning – from Buzzword to Value Creation’ by Mr. Lock Choon Hou, Design Engineer from Intel Corporation, Penang, Malaysia.

What is Internet of Things? Internet of Things (IoT) is defined as the network of physical objects that are provided with unique identifiers (UIDs) and the ability to transfer and exchange data over a network. Internet of Things can also refer to the connection of objects over the Internet. The concept of connecting any device with an on and off switch to the Internet includes washing machine, smartphones, wearable devices, lamps and anything else that have an on and off switch. We all know that Machine Learning and Internet of Things are interrelated. According to Tom Mitchell, a professor at Carnegie Mellon University, Machine Learning (ML) is a computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance on T, as measured by P, improves with experience E. The other definition of Machine Learning is the extraction of knowledge from data. Machine Learning is a subset of Artificial Intelligence. The philosophy behind Machine Learning is to automate the creation of analytical models in order to enable algorithms to learn continuously with the help of available data. In general, IoT devices used to store the data while ML applied on those data to predict the accurate outcome.

Mr. Anssi’s slot mainly focuses on the application of IoT in industrial. He first explained the Internet of Things with a simple formula:

physical object (‘things’) + controller (‘brain’) + sensors + actuators + networks (internet)

What enables IoT work effectively? Miniaturization is one of the enablers of IoT. By creating new and significantly smaller mobile form factors, it allows the use of personal mobile devices while on the move. Besides that, portability is also an important enabler. The size of hardware is reduced to enable the creation of computers could be physically moved around easily. Without networks, people cannot connect to the Internet. Thus, connectivity is an essential part of making devices connected. By developing devices and applications, users are allowed to be online and communicate via wireless data networks (WiFi, 4G LTE, Bluetooth, etc) anytime and anywhere.

Whenever we think of IoT systems, the most important and efficient application that stands out every time is Smart Home. Smart home is the one in which the devices have the capability to communicate with each other as well as to their intangible environment. A smart home gives owner the capability to customize and control home environment for increased security and efficient energy management. For example, you can switch on the air conditioner before reaching home or switch off lights even after you have left home as long as it is connected to the networks. Smart City is another powerful application of IoT generating curiosity among world’s population. Smart surveillance, automated transportation, smarter energy management systems, water distribution, urban security and environmental monitoring all are examples of internet of things applications for smart cities. Smart cities are the real substantial solutions for the troubles people usually face due to population outburst, pollution, poor infrastructure and shortage of energy supplies. Connected car is also the application of IoT in manufacturing. A connected car is a vehicle which is able to optimize its own operation, maintenance as well as comfort of passengers using onboard sensors and internet connectivity.

Slot 2 – ‘Machine Learning – from Buzzword to Value Creation’ was presented by Mr. Lock. There are 3 types of machine learning, which are supervised learning, unsupervised learning and reinforcement learning. Supervised learning is a type of learning with a labeled training set. For instance, email spam detector with training set of labeled emails. However, unsupervised learning is discovering patterns in unlabeled data. For example, cluster similar documents based on the text content. Reinforcement learning is a training method based on rewarding desired behaviors and/or punishing undesired ones. The use of video, computing vision and deep learning is growing rapidly. Machine learning is applied in different sectors such as financial services, manufacturing, autonomous vehicles, etc. Person/Vehicle Video Analytics Solution is using top-ranked deep and light-weight neural network. Person/Vehicle detection provides detection of people and 5 vehicle classes with landmarks. For example, detecting person and vehicle is one of the essential input of public surveillance system. Traffic Monitoring monitors traffic in downtown, crossroad and highway roads, however, Crowd Monitoring monitors crowds in downtown, crowded open spaces and airports.

After attending the talk, I felt amazed that the world today develops so rapidly. These are the things which happen around us and it is going to develop through worldwide. I, as a future engineer, should look into this and take action to catch up this rapid development. I will do more research in Internet of Things and Machine Learning in order to know more detail and how to expand this scope in our country. Maybe it might be a tough stuff for me but I will work hard to achieve my aspiration.

In conclusion, Internet and Things and Machine Learning really benefit people’s living. They can be applied in all sectors no matter what it is. Maybe someone might argue that it is not important to us. IoT and Machine Learning are not everything but it is definitely something that will change our future. We, as the students, take it seriously as it might be your future career. It always seems impossible until it is done.

References

1. <https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT>
2. <https://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things-that-anyone-can-understand/#3826029a1d09>
3. <https://www.quora.com/What-is-difference-between-machine-learning-and-IOT>
4. <https://www.analyticsvidhya.com/blog/2016/08/10-youtube-videos-explaining-the-real-world-applications-of-internet-of-things-iot/>
5. <https://internetofthingswiki.com/iot-applications-examples/541/>
6. <https://data-flair.training/blogs/iot-applications/>
7. <https://searchenterpriseai.techtarget.com/definition/reinforcement-learning>
8. https://www.sas.com/en\_my/insights/articles/analytics/machine-learning-algorithms-guide.html