

**UHIT2302-37 PE**

**SCIENCE AND TECHNOLOGY THINKING**

**REPORT**

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**I****ntroduction**

This seminar purposely organized for the students in (UICL2302) Thingking Of Science and Technology. The talk given was related in the field of the student course.

The speakers for the seminar, Prof. Datin Dr Rubiyah Yusof is a influential professor in the area of artificial intelligence, machine vision, pattern recognition and image processing. Currently, she is a professor at the center known as CAIRO in UTM Kuala Lumpur. She was trained as electrical and electronic engineer and earn bachelor and master degrees in University of Loughborough, United Kingdom. She continued her studying and earn Ph.D (Control System) in University of Tokushima, Japan.

One of the center in UTM known as CAIRO, Center For Artificial Intelligence and Robotics has a vision to be the leading center in AI and Robotics for good of mankind. This center develop frontier intelligent system industry purposes. They also provide and disseminate the knowledge of AI and Robotics technologies. Other than that, the good of AI would also provided to the society by them.

The seminar talk shared the world industry pattern and go thoroughly on AI which is the main focus in this era.

**Industry Revolution 4.0**

In this era, we have reach the Industrial Revolution 4.0 which is based on cyber physical system. The industrial revolution started all in the end of the 18th century when the world was introduced by mechanical production machines powered by water and steam because of no electricity available yet. The revolution continued on the beginning of the 20th century, beginning of 1970s and till now.

Today, industrial revolution has made a lot of impact in manufacturing industry and society. Therefore, most industry around the world today are seek to focus on cyber physical system. It is a system of collaborating computational elements Cyber Physical System (CPS) together with Internet of Things, Big Data, Cloud Computing and Industrial Wireless Networks are the core technologies allowing the introduction of the fourth industrial revolution, Industry 4.0.. They allow us to add capabilities to physical system by merging computing and communication with physical process. The results from a real industrial environment show good performances in terms of real time behaviour, virtual reality and visualization features, usability and readability.

Industry 4.0 has changed a lot compared to Industry 3.0. As example, the biggest company in 1990 known as Detroit is the central of a lot companies in which hold a market capitalization of $36 billion. The company hold 1.2 million numbers of employees. In 2014, the Silicon Valley which has a market capitalization of $1.09 trillion only hold the numbers of 137,000 employees. This shows the reduction in numbers of employments. Most of the industry used machine for operating task and required more intelligence employees.

**Skills requirement that relevant in Industry 4.0**

As the technology moving fast in industry revolution 4.0, most of the company required the skills that are relevant with the world modernization.

Here are the top 10 skills to be relevant in Industry 4.0 in 2020 :-

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgement and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

The Emotional Intelligence which is new skills available in the 2020 list, the ability to recognize, understand and manage our own emotions and influences the emotions of others. In term of team performance, it can help improve in it and increase the leadership ability. Other than that, it also helps decreased occupational stress which leads to increase personal well-being and also reduced staff turnover.

Other than that, the skills that required in the era of 2020 is Cognitive Flexibility. It is an ability to change course when the work doing is not working which we say as the ability to adapt to change easily. Other than that, it has the ability to take advantage and seize opportunities when they arise, even if it means changing course as mentioned above.

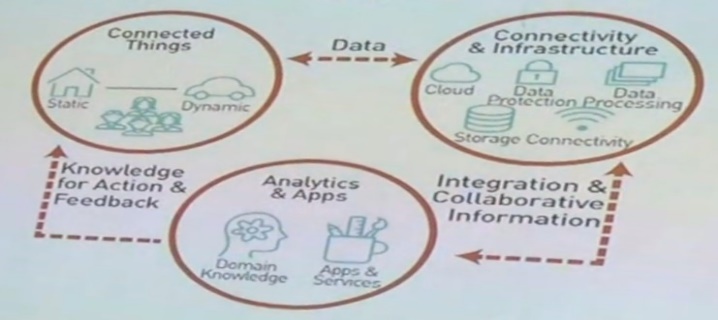
These two are the updated skill required in the 2020 which difference from 2015.

**Robots Taking over Human Jobs?**

The increasement of intelligent agents and robots could eliminate about 30% of the world human labour by 2030. This is basically a major challenge of jobs after being replaced by automation or robot. President Kennedy once said that “the major of the sixties is to maintain full employment at a time when automation is replacing men” in 1961. There was also an advent in the late 1980s known as “Computerphobia” caused by fearing of computers would replace the people.

There was a time where workers operated machine such as in clothing industry which required human to tend multiple machines to keep them running smoothly. The demand increased by time and also for the jobs. The technology gradually changed the nature of the weaver’s job and the skills required to do it. It happened in that way rather than replacing it altogether. So people need to align themselves with the revolution with the skills required for it.

**Smart Manufacturing laboratory @ CAIRO**



**Theme:** Promoting and Advancing Intelligent Manufacturing Capability for Malaysia

* IoT integrated system
* Robotic Assembly Module
* CNC Machining Module
* 3D printing and Handling
* Drone Delivery

**Industry Revolution 4.0 in Manufacturing**

* AI and its sub field Machine learning (ML) is a pre conditioned
* All manufacturing process can be tracked online
* Allows for predictive maintenance (reduce cost of maintenance)
* AI used as a tools for data analytics for decision making
* Robots to be made more intelligent and easily programmable
* Intelligent vision inspection is of a primary importance
* Learning algorithm such as NN or deep learning NN

**SOCIETY 5.0**

Instead of focusing in Industry Revolution 4.0, Japan also tend to be focus in Society 5.0. It is a human-centered society that nalances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space. It can be said that the techonology also can useful for the society other than industry uses.

**Artificial Intelligence ( AI )**

A tool that has been developed to imitate human intelligence and decision-making functions, providing basic reasoning and other human characteristics. Human intelligence has their own capability on:

|  |  |
| --- | --- |
| Adapt | Generalize |
| Make decisions | Reasoning |
| Recognize | Relate |
| Recall | Perceive |
| Learn | Acquire |

Most of the capability above are not far with the AI capability itself. Artificial Intelligence is growing all around the world by now. Us has the most companies of AI followed by China. US also has the most number of talent in AI.

**What AI can do?**

The use of Precision Medicine. It is an emerging approach for disease prevention and treatment that takes into account people’s individual variations in genes, environment and lifestyle. This is a significant advances that was made but still not be used as a standard practice for many diseases. Precision medicine refers to tailoring or medical treatment to the individual characteristics of each patient.

The personalization spotlight ability can be seen in most application such as Netflix. It can analyse data for the annual budget. They also provides personalized recommendation to the customers to retain the customer and saves $1B annually.

Impact of AI in a healthcare has halved by the time it has taken to bring a cancer-combatting drug to market. Today, it takes 12-14 years and $2.6 billion to develop one drug. With AI technology, it could reduce to half of the price.

AI also very useful in agriculture such as carbage harvester which make the process easier for the industry.

But there is also some problem for some people in term of agriculture and food to be consumed by them especially for the Muslims. Muslims needs to used the halal method in most agriculture industry such as animal slaughtering farm and factory. Machine cut does not provide a proper cut that follows the Syariah way of cutting. Now, there is a Sycut which has the system to verify the Halalness of animal slaughtered. The machine will scan and detect the aesophagus of the animal which indicate the halalness of the animal. The technology known as Syariah-Compliant Automated Chicken Processing system is one of the AI technology used in agriculture in Malaysia that provides halal quality food.

There are more AI technology in our world and it also might increased in number by time.

**REFLECTIONS**

Artificial Intelligence and Machine Learning are products of both science and myth. The idea that machines could think and perform tasks just as humans do is thousands of years old. The cognitive truths expressed in AI and Machine Learning systems are not new either. It may be better to view these technologies as the implementation of powerful and long-established cognitive principles through engineering.

We should accept that there is a tendency to approach all important innovations as a test upon which we impose anxieties and hopes about what constitutes a good or happy world. But the potential of AI and machine intelligence for good does not lie exclusively, or even primarily, within its technologies. It lies mainly in its users. If we trust how our societies are currently being run then we have no reason not to trust ourselves to do good with these technologies.