UTM UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
Faculty of Engineering

Industrial Visit 1 (Group)

SECP1513 TECHNOLOGY AND INFORMATION SYSTEM

SEMESTER I, SESSION 2019/2020

Title: Media and Game Innovation Centre of Excellence (MaGICX) UTM

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PROGRAMME: BACHELOR OF COMPUTER SCIENCE (SOFTWARE ENGINEERING)

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1.0 INTRODUCTION

Established in 2013, Media and Game Innovation Centre of Excellence (MaGICX) is a strategic cooperation between Universiti Teknologi Malaysia (UTM) and Iskandar Regional Development Authority (IRDA) to support and promote the development and ecosystem of creative industry that focuses on gamification and enrichment of digital content. MaGICX will play an integral part as the anchor for the Iskandar Malaysia Innovation Valley envisioned to offer industry players/SMEs/clients technical expertise/consultation, research/product development, business development, publishing, marketing and/or training in producing commercially.

Aspires to build an environment that contributes toward talent development, industry promotion, knowledge-sharing, and international collaboration, MaGICX's credits include projects related to augmented reality, mixed and virtual environment, image processing, computer vision, multimedia software engineering, medical computing, computer interaction, human interface, usability, animation and technology, speech and signal processing, visualization, multimedia and software innovation, and emerging technology.

MaGICX provides consultation and content development that focuses on Incubator programme, AR/VR solutions, Kinect enhancements, game & gamification, mobile & web app development, as well as our training & learning programme.

MaGICX's ecosystem has divided into 4 parts which ARE MaGICXcel, MaGICXpert, MaGICXplore, MaGICXpose respectively. MaGICXcel is focused on developing and cultivating young and budding start-ups and SMEs by creating a nurture ecosystem that provides expert mentorship and top-notch facilities. Expert mentorship that is provided are ideation consultation, pitching sessions, productization & IP protection advice. MaGICXcel facilities include ample working space, new workstations & licensed software, stable internet connections, meeting rooms & testing facilities, voice recording studio and 3D printing. This will create the perfect environment for any start-up company to focus on its product & service development. MaGICXpert catering to all levels of participants ranging from junior to professional. We also offer seminars form notable speakers, workshops & hackathons and competitions to the public. MaGICXplore brings an avenue to inventors such as visiting professors, postdoctoral graduates and PHD & Master students to share their research and knowledge by publishing their journals, theses, proceedings and books to the public. MaGICXpose is to help incubate and start-up by aiding them to understand the marketing & commercialization aspect in developing their IP or product from business and legal perspective. Consultation is provided to them from productization (packaging & monetization), marketing (market access & publishing) and IP Protection (copyrights, trademarks & patents).

2.0 WORK PLAN

The Industrial Visit 1 was on 7th October 2019 at 2.30pm. We reach Block T03 which is the location of MaGICX at 2.00pm. Five of the organization structure, services, achievements, projects that have been developed or maintained by MAGICX were chosen to be included in this report. Below are the lists of five of them:

a. Demonstration on Augmented Reality
b. Exhibition on 3D printer
c. Driving Car Simulation
d. Explanation on Kinect Interactive Wall
e. Demonstration on Virtual Reality of Oculus Quest

After gathering enough information and listening explanations of the research from MaGICX, we dismissed around 4.45 pm. after we have taken a group photo.

3.0 DETAILED DESCRIPTIONS

3.1 DEMONSTRATION ON AUGMENTED REALITY (AR)

Augmented Reality (AR) has become one of the biggest technology trends nowadays as smartphones and other gadgets such as tablets become more accessible around the world. Augmented Reality (AR) is an enlarge modification of reality where live indirect or direct views of physical actual-world environments are augmented with cover computer-generated images over a user's view of the real world to enhance current reality experience of people. Generally, the applications of AR can be categorized into several types which are marker-based augmented reality, markerless augmented reality, projection-based augmented reality, and superimposition based augmented reality.

In this booth, the exhibitor used his tablet installed with AR application to scan a rabbit which draws on a piece of paper. The image that displays in the tablet is a 3D and animated rabbit with audio effects which superimposed with reality in order to enhance vividness and user experience. The action of the image is needed to be predefined in the system by developing an algorithm for the image. Besides that, he also showed us that the ability of text-recognition of AR where the words in the book are read by the application vividly.

Diagram 3.1: 3D and animated rabbit displayed by AR application

Diagram 3.2: Rabbit drawing on the paper

In short, VR technology has large commercial and growth potential to fulfil the needs of the public and industry. Currently. AR technology is used to cater to the demands of the market for educational purposes such as in designing learning material of kids based on audio-visual to make learning more interesting and effective. Besides that, AR technology is also served for commercial and industrial purposes such as global well-known furniture company, IKEA, uses superimposition based augmented reality technology in its augmented reality furniture catalogue to increase its sales record. Customers can obtain more accurate impression of their desirable furniture by placing IKEA's furniture virtually in their own home through scanning IKEA's digital or printed catalogue with IKEA place application.

3.2 EXHIBITION ON 3D PRINTER

3D printing is a method whereby the 3D model can be produced from a digital file through 3D printer. A software called as Flash print is used for 3D printing. Before the object is printed, it will help to rotate and resize the sample. The model produced is not filled up, but it has the hole inside the model. There are only 25-30% of the product are filled up with the filament due to minimize the usage of filament. If the excessive filament is consumed, then it will be wasted. There are two types of filament, which are APS filament and PLA filament. The APS filament is steadier, which is stronger and harder than PLA filament, but PLA filament will show more details about the product. PLA filament is easier to break compared to APS filament. Both filaments have own strength and weakness. The existence of 3D printing will help the students to save the cost when they need to produce prototype.

Diagram 3.3: ABS Filament

Diagram 3.4: 3D printer

The 3D printer will become the hottest trend as it is able to use in most of the field. For example, 3D printing has been used in manufacturing industry such as creating car parts. Besides, it also contributes to the medical industry as it can used for building medical equipment, pills and artificial organ as well. The most important is the 3D printing also provide convenience to the human life especially entertainment side because it also used in smartphone cases, fashion accessories, art and jewellery. This is due to 3D printer are fast, reducing cost and mostly it will show all the requirements of the users to make sure the errors of the product will be reduced. Lat but not least, it also stays ahead in the competitive environment as it also helps in the construction field and most important in Information Technology such as computer gadgets and robots. 3D printer will be the one of the greatest products in the world to make the works become more accurate and precisely.

3.3 DRIVING CAR SIMULATION

A virtual driving simulator is a device that allows the user to feel a life-like experience of driving an actual vehicle within virtual reality. It is definitely used for studying the interaction of a driver and vehicle and for developing new vehicle systems, human factor study, and vehicle safety research by enabling the imitation of the actual driving situation a safe and tightly controlled environment. Most of the vehicle simulators consist of physical mock-ups as the examples steering wheel, pedals and gearshift. These are essential in trying to simulate real conditions, then it's become as a drawback for system becomes more expensive, more huge (non-mobile), and then limited to reflect changes on the vehicle type, dimensions, or interior design. For MaGICX car simulator is using UNITY software for graphic output, Adreno for hardware input. The maximum speed of a car is 130km/h.

Why Simulation?

Simulation implements a method for checking your understanding of the world around you and helps you produce better results rapidly. The overall purpose of a driving simulator is to study driver behaviour.

Diagram 3.5: Hardware of Car Simulator

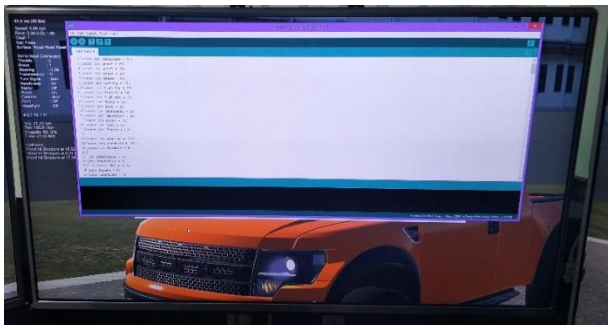

Diagram 3.6: Coding of Driving Car Simulator

In conclusion, Driving Car Simulator still has many areas which need improvement. Such as, we can add Virtual Reality to this Driving Car Simulator System and overcome the delay of output monitor to improve the experience of users. Because of the rising potential of computer technology, we presage increasing use of driving simulation in areas such as driver assessment, driver training, research, and entertainment. Low-cost virtual-reality (VR) applications will come within the reach of many institutions. However, some of the exploration questions may need to be answered before omnipresent driving simulation become practical, particularly questions related to simulator loyalty, the predictive potency of driving simulators, simulator-to-reality deportation of learning, and simulator discomfort.

3.4 KINECT INTERACTIVE WALL

The Kinect Interactive Wall basically it is just a form of prototype and the main function of the wall is only to share more information about the MaGICX. The device that connected to the screen will detect the motion of the user because there will have a camera inside the device. After the user being detected, the user can start control the arrow to move to the button for proceeding the next step. According to the instructor, the interactive wall can be displayed into laptop and computer as long as we need to equip the device.

Diagram 3.7: Kinect Interactive Wall

The Kinect Interactive wall has a lot of potential as it can used in different field especially education system. Instead of display information, it can create as the tool to finish assignment or report ang solve some mathematical equation. Besides, it can become the entertainment tool as the game can be installed into it and the user can enjoy the game in different postures instead of sitting on the floor and just control with the buttons and pads. The Kinect Interactive Wall is a good invention especially for the disable users and the old folks because it can recognize the user at the long distance. The users would not have to stand too near with wall to function it. It is better if the camera can recognize the user with different features such as temperature, eye lens besides than skin colour. It will bring a lot of benefits to the users to do their work efficiently with any postures.

3.5 DEMONSTRATION ON VIRTUAL REALITY (VR) OF OCULUS QUEST

Currently, Virtual Reality (VR) has become one of the most famous technologies around the world. Virtual Reality (VR) is a computer-generated simulation in which a person can interact within an artificial three-dimensional environment using special electronic devices, such as headset fitted with a screen, lenses and sensors, and controllers. Currently, VR technology can be used in various fields such as in the military field, health care, business, sport, programming languages, education, entertainment, telecommunication and so on.

In this project, VR technology is introduced to us through Oculus Quest. Oculus Quest is a completely wireless virtual reality headset created by Oculus VR which is a division of Facebook Inc. The features of Oculus Quest are as the table below,

Table 3.1 The features of Oculus Quest

FEATURES OF OCULUS QUEST	**DETAIL**
Processor	Qualcomn Snapdragon 835
CPU	4 Kryo 280 Gold (ARM Cortex-A73 based) & 2.45 GHz + 4 Kryo 280 Silver (ARM Cortex-A73 based) & 1.9 GHz
RAM Memory	4 GB
Storage	64 GB or 128 GB
Display	2 PenTile OLED
Display resolution	1440 x 1600
Refresh rate	72 Hz
Graphics	Adreno 540
Input	6 degree of freedom inside-out tracking through 4 built-in cameras
Controller Input	2nd generation Oculus Touch motion tracked controllers
Camera	4 cameras
Mass	571g
Sound	Integrated speakers
Connectivity	◆ USB Type-C ◆ Bluetooth ◆ Wi-Fi ◆ 3.5mm headphone jack (x 2)
Battery	Lithium-ion battery (2-3 hours playtime depending on what you are playing)
Compatibility	More than 50 titles of the game

Diagram 3.8: A student is using with Oculus Quest

During the visit, we were given a chance to experience the VR by using Oculus Quest. Oculus Quest can be set up easily in any place as it is completely standalone headset. No wires and PC are required to be connected with Oculus Quest. The visual experience in VR was very close to reality and every moment and action that we perform through insight tracking and touch controllers are immediately transferred into VR which gives us a sense of reality. Besides that, through our conversation with the exhibitors, we also knew that they are currently developing a VR game which is not completed yet and Oculus Quest will be used to test their game.

In short, we believe that VR technology has large growth potential in future as it can be highly integrated into human daily activities by providing reality-like experience to the user. Most importantly, VR technology can be applied in many different fields for example in education field especially for medical purpose which allows surgeons or students to perform medical operation exercises such as surgery virtually.

4.0 REFLECTIONS

4.1 SEE WEN XIANG

1. Since creating Education Gaming System is one of my dream in my life, so through the visit MaGICX I believe that through game can let everyone learning progress more effectively.
2. I should become more creative and improve my critical thinking to make my dream become true in future and contribute to my friend, family and social.
3. From this visit, I should do more concern about what this society really need to improve my potential in the industry.

4.2 KONG HAO YANG

1. Being a software engineer can achieve my dream which is able to develop applications even software that can make our life easier and thus improve our life quality. At the same time, being a software engineer is the first step for me to guide and form a more progressive and liveable society.
2. Through the visit, I gained a lot of knowledge and experience which can be useful for me in achieving my goal in future. Besides that, I also understood the importance of life-long learning and inspired to be innovative and creative especially in studies and developing applications in future.
3. I will learn extra knowledge and always update myself to latest information related to IT, so that I can fulfil demands of industry. Furthermore, I will always equip myself with practical experience and problem-solving skills related to IT and this can ensure that I will be able to encounter any kind of challenges and solve it.
4. During the visit, I believe that the applications of virtual reality and augmented reality can brought us closer to virtual world together with the artificial intelligence technology and thus greatly change the structure of current society, building a smart world in future.

4.3 LOO ZHI XUEN

1. Since we are taking software engineering course, we wish that the e-wallet services will be done completely around the world. I'm so admire to the Sweden when they are the first country that been cashless. For me, I would feel that it is convenient to do all the trade without the cash but with just a device and mobile application. Besides, the existence of e-wallet would help in reduce the corruption as the cash produced will be lesser.
2. This visit makes me feel that the world is changing constantly especially the community will have different ideas to create some software to make the life easier. From the visit to MagicX, I would feel that Software Engineering is a right course for me as it needs a lot of demands in the job field. Besides, this course is easy to be expandable as its fits to any field.
3. I should approach more to the latest information about IT so I would not be left behind. Besides, I must upgrade my skills such as programming constantly to make sure I'm prepared to face the rapid change of the world. Lastly, I wish I can have the interaction with the professionals from different nation to share their experience about their thought to the Information Technology nowadays and future.

5.0 THE TASK FOR EACH MEMBER

Name	SEE WEN XIANG	KONG HAO YANG	LOO ZHI XUEN
Tasks	INTRODUCTION	DEMONSTRATION ON AUGMENTED REALITY (AR)	EXHIBITION ON 3D PRINTER
	TAKING PICTURE	DEMONSTRATION ON VIRTUAL REALITY (VR) OF OCULUS QUEST	KINECT INTERACTIVE WALL
	DRIVING CAR SIMULATION & REFLECTION	REFLECTIONS	REFLECTIONS
	MERGE ALL THE REPORT PART & REVIEW	RECORD THE AUDIO FROM EXHIBITOR	LIST DOWN THE NOTES FROM THE EXHIBITOR

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