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UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

PROJECT - DESIGN THINKING REPORT

SEMESTER 1 2023/2024

TITLE : INTERNET OF THINGS

GROUP : TIC TECH TOE

SECTION : SECTION - 04

SUBJECT : SECP1513 - TECHNOLOGY & INFORMATION SYSTEM

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1. Introduction:

What is IoT? According to Global Standard Initiative, Internet of Things (IoT) is a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.

The Internet of Things (IoT) is the current trend of automation and data exchange in manufacturing technologies. It includes cyber-physical systems, artificial intelligence systems, and cloud computing. IoT's direct impact, or rather its gift, to the industrial nations is the concept of Industry 4.0, which, though initiated as a vast vision, is now increasingly becoming a vast reality. It is better for us to know more about Industry 4.0 before trying to understand IoT, since a prior knowledge of the former would enable us to appreciate and understand the latter better.

Kevin Ashton of Procter & Gamble, later MIT's Auto-ID Center, is credited with having coined the term “the Internet of Things” in 1999, though its concept and practical applications came into effect after the popularisation of the term Industry 4.0 as initiated by Germany in 2012. The Global Standards Initiative, in 2013, analysed the possibility of integrating and information sharing among several functions and activities and came up with the concept of the IoT, with a clarification that “thing” is an object of either the physical world (physical things) or the information world (virtual things), which is capable of being identified and integrated into communication networks.(Kiran, 2019, #495-496)

2.Design Thinking

Have you ever faced the problem of arriving at a food court to eat, but there is no place to sit down? The food court is too big to find an empty space in the crowd. Why didn't we have a design that could show the empty space and guide us to it?

Based on this idea, we decided to design a food ordering application that includes a seat availability checker for the food court as our design thinking project. But how does it work?

Before answering this question, we know that the Internet of Things (IoT) consists of two main components, physical and virtual. To apply IoT in our design thinking project, we need to think about the physical component that we need to use in the design. After brainstorming with the group and consulting Dr Iqbal, we got the idea.

By having a few auto-tracking video analytics CCTV cameras in the food court. This idea comes from the security features of the LRT and the station, the Track Intrusion Detection System. The purpose of the system is to detect static and dynamic objects that invade the trackside environment to enable preventative action to be taken to avoid collisions with objects that are potentially hazardous to the train, or objects that it is desirable or necessary to minimise the threat posed to them by train operations.

So if we have the cameras, we can see the number of customers and the availability of seats in the food court. We get the data from the cameras and keep it updated in the application that we have developed.

In addition to the seat availability function, we are also designing a food ordering system. Using the application, customers can sit down first and order food from their table using our app. This allows customers to get the food very conveniently and eliminates the time the customer spends queuing at the counter to order food.

3.Problem faced, solution and team working

Actually, the first idea we think about IoT is to design a food ordering system that includes cleaning features. The cleaning feature means that a page will pop up to notify the customer to clean their table after they finished their meals. The implementation of IoT for this feature is by installing sensors at the tables of the food court and if the table is cleaned by the customer, the customer can collect some points. Then, the points can be redeemed by the customer to get a discount voucher for next time purchase.

But when we propose this idea, there are a few questions that our client asked us, which are :

1. Why do we think that the customer will be motivated to clean the table with just a little tiny award?
2. Is it worth it to have a lot of things including the sensor and the application, what about the cost?
3. Why don't the clients just hire more cleaners?

The same question was also asked by our lecturer, Dr Iqbal. Dr Iqbal said that the sensor system for the cleaning system is actually not suitable to appear in the food ordering system. It is not very related to the main point and combined with the question asked by the client, Dr Iqbal advised our group with a new idea which is why we don't have a system where we can know the situation of a food court like seats, crowdedness and so on. Thus, we get the core idea of our design.

4.Assessment Point

a. During the end of the project demonstration

At the end of the project demonstration, we found that although design thinking is a project that is a little difficult for us to do, if we work together with each other and are full of motivation and effort, the project can be done easily.

b. During the transition between design thinking phases

At first, our idea included cleaning features that needed sensors to be installed. But our lecturer's advice, Dr. Iqbal's, has reminded us of some problems that are related to the cost, how the sensors work, and other questions.

So, we decided to change our idea and rethink a new idea. Before this, we faced some difficulties thinking about the new idea. This is because all of us were busy with studies in other subjects. But, luckily, we have time to have a discussion and create a new idea. Once all of us agreed with the idea, we started designing our prototype by using Canva and doing handwritten prototypes.

5.Evidence

a. The sample work by students working to solve the design challenge



Figure 1: Interview our client

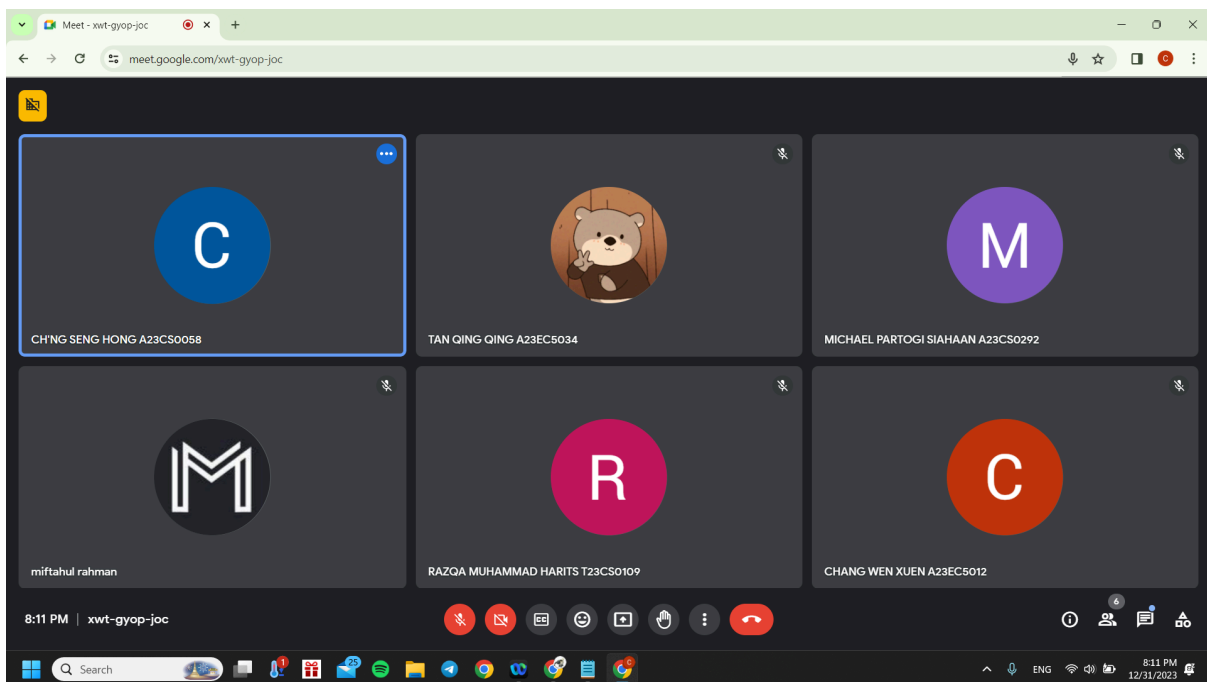


Figure 2: Online meeting with each others

RATING

FOOD

★ ★ ★ ★ ★

SERVICE

★ ★ ★ ★ ★

APP


★ ★ ★ ★ ★

Complete Your Food?


Clean The Table
To Collect Point

Figure 3: Our prototype of first idea which is cleaning features


Seat Availability




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2




3




4




5




6




7




8




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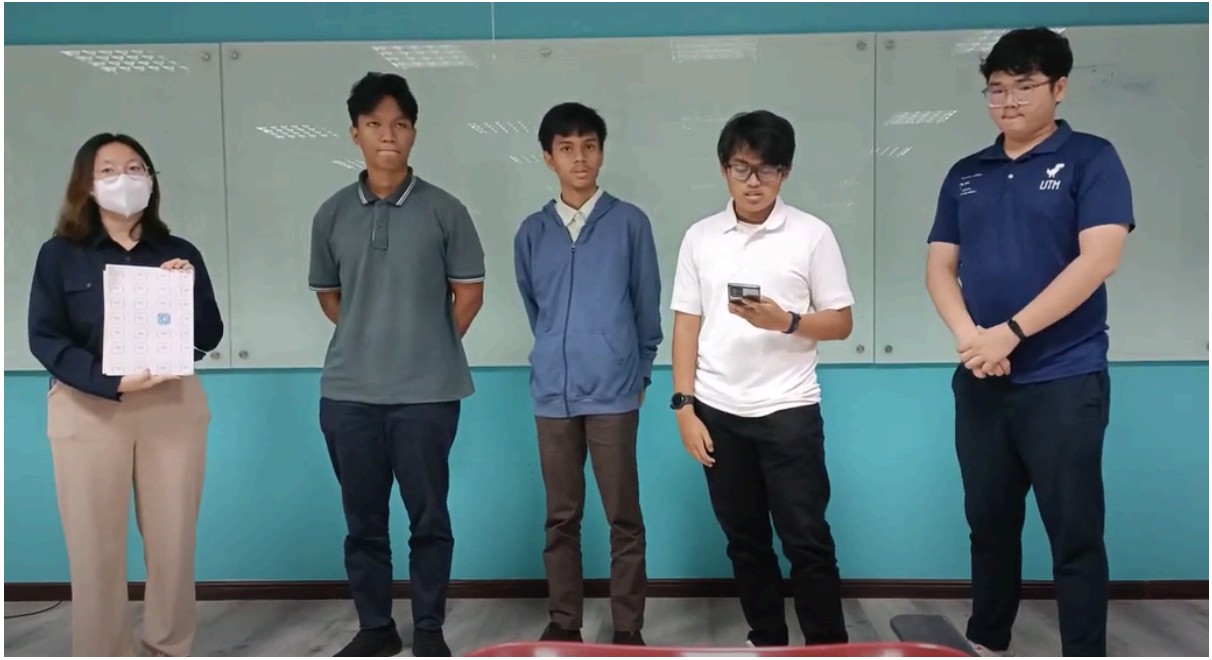


Figure 6: Group presentation

b. Record for each phase

I. Empathy:

Empathy is where we should understand the habit of our respondent in using the food ordering system. Our target was every age group of people who were using food ordering applications. At the beginning of the project, we created a survey form for our respondents. We asked our respondents about their personal information. But in this survey form, most of the respondents are between the ages of 18 and 25. The most appropriate reason is that we are all college students, so the respondents are all close to our age. After that, we asked about their experience and the types of food ordering applications that they used.

II. Define:

Define is used by us to identify ways to improve and create a new food ordering system. After collecting the data from our respondents, we identified the features of our design thinking by analysing their answers in the survey form.

III. Ideate:

Ideate is the process of brainstorming where we generate new features related to IoT. In this stage, all of us gave different ideas for the features and decided the most suitable idea in order to create our design thinking.

IV. Prototype:

Prototype is the stage where we turn our ideas into products. After deciding on the features that we wanted, we started producing our prototype. We have created our prototype using Canva and then turned it into a handwritten prototype. The materials used for the handwritten prototype were a ruler, A4 paper, coloured pencils, and pens.

V. Test:

Test is the phase in which users test our product; in order to enhance it, we need to hear from these users' feedback. After finishing the handwritten prototype, we demonstrated it, explained the features we made, and solicited feedback from our responses.

6.Reflection

Ch'ng Seng Hong:

From the process of doing Design Thinking, we learned that communication is the most important thing. Just like in our project, if we didn't communicate with the client, we wouldn't know what they need and what part we need to focus on in the design. We also need to get opinions from different people before we do anything. Different opinions allow us to have a broader vision and think from different perspectives. Just like after consulting Dr Iqbal, we realised that the ideas we were proposing were not mature enough and we could see our pros and cons.

Michael Partogi Siahaan:

1. What is your goal/dream with regard to your course/program?

My Goal regarding this program is to be able to work in a tech company and maybe build my own startup

2. How does this design thinking impact on your goal/dream with regard to your program?

With this Design Thinking Project, I was given a chance to improve my communication skills, learn how to manage my time despite other courses, and also empathise when working on this project with other team members.

3. What is the action/improvement/plan necessary for you to improve your potential in the industry?

Learning how to work in a team and also improving technical skills are few of many ways to improve my potential in this industry.

Chang Wen Xuen:

1. What is your goal/dream with regard to your course/program?

Being able to work in a tech company provides me many opportunities to grow and enhance my creativity.

2. How does this design thinking impact on your goal/dream with regard to your program?

It makes me think about creating problem solving apps that are able to interact with hardware and to make people's lives more convenient and

more comfortable. Moreover, it takes a lot of hard work and teamwork to make a single project run smoothly.

3. What is the action/improvement/plan necessary for you to improve your potential in the industry?

Boost my creativity, communicate with more people to get opinions from different perspectives, and coordinate with teammates.

Muhammad Nur Miftahul Rahman:

Comprehending the process of design thinking and being able to collaborate with others with the communication skill I get from this course are the most anticipating things I want to achieve in this course. In my opinion, as a person who wants to work as a software engineer in the future, learning the design thinking process is essential because it enables me to make an innovative solution while also satisfying the end user side. With that in mind, developing a skill which enables me to collaborate with others, such as communication skills, is a priority for me. To improve my potential as a software engineer in the industry, seeking an experience in this industry such as trying to contribute to open source technology in github or other platforms and enrich my knowledge regarding IT technology are my approaches are my plan in the future.

Razqa Muhammad Harits:

1. What is your goal/dream with regard to your course/program?

I enrolled in this program in hopes to be a computer scientist. The reason for that is because in the future, everything will be digitised, and in order to adapt to that change, I want to stay ahead in the front of the advances of technology

2. How does this design thinking impact on your goal/dream with regard to your program?

This design thinking project helped me in understanding the process of making an idea into reality. We were made to start from the very start, that is the idea, and we have to make changes based on the needs of others. It helps me in achieving my dream because from that I can learn that if you want to achieve something, you have to start from the beginning and you have to adapt to the situation that you were given

3. What is the action/improvement/plan necessary for you to improve your potential in the industry?

Definitely to study more about the materials and the intricacy of the computer world. As of now, I am just a beginner and I have so much to learn. Everything still looks unfamiliar and difficult to understand. That is why I need to learn more.

Tan Qing Qing:

1. What is your goal/dream with regard to your course/program?

My goal with regard to this course is to become more proficient at coding and learn more about information technology. I also want to get more opportunities that can improve my skills and help me decide my future career.

2. How does this design thinking impact on your goal/dream with regard to your program?

Through this project on design thinking, I improved my skills, such as communication skills, thinking skills, and so on. This design thinking helps me learn about the Internet of Things (IoT). It also helps me improve my creativity and helps me understand the importance of teamwork better.

3. What is the action/improvement/plan necessary for you to improve your potential in the industry?

The plan necessary for me to improve my potential in the industry is that I'll do more studies about information technology and do more research about software engineering, which is the program that I study at present. I'll keep improving my coding skills too, learning programming languages as much as I can.

7. Task of each member

Michael Partogi Siahaan:

- Designed prototype with canva
- Discussed project idea
- Presentation

Chang Wen Xuen:

- Produce handwritten prototype
- Discussed project idea
- Record the presentation

Muhammad Nur Miftahul Rahman:

- Designed prototype with canva
- Discussed project idea
- Presentation

Ch'ng Seng Hong:

- Designed prototype with canva
- Discussed project idea
- Interviewing the client
- Presentation

Tan Qing Qing:

- Produce handwritten prototype
- Discussed project idea
- Presentation

Razqa Muhammad Harits

- Designed prototype with canva
- Discussed project ide
- Presentation