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SECP1513 – TECHNOLOGY INFORMATION SYSTEM

SECTION 02

PROJECT – PHASE 2 (PROJECT PROPOSAL)

[SMART WARDROBE]

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INTRODUCTION

The purpose of this report is to document the detailed description related to our project including our journey of completing this project. For this project, we have proposed to create a smart wardrobe system. A smart wardrobe is a system that is able to analyze data at hand and to determine what has to be done to support the data. For example, a smart wardrobe allows users to manage owned garments, dry, refresh, and disinfect clothes, steam, and deodorize them before the next wear within the wardrobe to provide easy and convenient garment maintenance. Our smartphone application will be able to allow users to control the wardrobe's functions and also offer suggestions on how to plan outfits. Our system requires less human input and reduces waiting time as the process continues. These are possible because we have embedded intelligence into the resulting system. Users can customize various elements to meet their specific needs or choose an automatic combination of all functions using the given equipment.

The smart wardrobe's interactions with the user are comparable to those between the user and a manual wardrobe. The smart wardrobe and the user can communicate with one another. Manual wardrobes, on the other hand, are merely a piece of furniture that only delivers one service, which is storage space, and the interaction is one between the user and the wardrobe. It cannot respond to any type of user input, and the user cannot generate any inputs because no interface exists. With IoT, users can remotely monitor a variety of embedded sensors and control actuators.

PROBLEM STATEMENTS

The initiative of this proposed project is to address a range of issues that customers confront in their daily lives, such as difficulty completing regular tasks. This initiative aims to promote the adoption of 4th IR Technology among customers in order to improve their quality of life.

1. Users put a lot of thought into purchasing the smart wardrobe because the price is regarded as excessive due to the system being an all-in-one product that is also cost, time, and energy efficient in the long term. Despite the fact that the concept has been around for a few years, low-cost smart wardrobe solutions are hard to come by.

2. Males and females of all ages struggle with selecting appropriate attire to appear more presentable in order to impress their coworkers, superiors, clients, family, and friends. Choosing the right outfit for the right occasion, on the other hand, can be time-consuming and frustrating.

3. Users, particularly those on a tight schedule, are prone to neglecting their laundry management. Due to their hectic work schedules, they frequently find themselves recycling used clothing. Users rarely consider clothing care.

PROPOSED SOLUTIONS

Smart wardrobe saves time and helps customers live a healthier lifestyle by organizing and controlling their clothes. It also saves money because it is equipped with a variety of combined capabilities rather than requiring customers to purchase separate appliances for the same functions. By lowering the amount of work required from the user in terms of input, including smartness into a technologically enabled wardrobe increases user satisfaction.

1. By combining gadgets with laundry tasks such as steaming, deodorizing, keeping track, renewing, and sanitizing the clothes, the smart wardrobe aids in the organization and management of the stored garments.

2. With the development of the smart wardrobe system, its features can assist users in preparing their clothing in advance, especially when they are in a hurry, with just an app that allows the user to control or monitor their valuable garments from anywhere, at any time.

3. A function where the gadget removes viruses such as influenza and coronavirus, decreases allergies, and bacteria is incorporated to link this project to the pandemic. It quickly sanitizes textiles and objects that are difficult or impossible to wash without contaminating other clothing. Its built-in steam function keeps creases appearing crisp while also decreasing general wrinkling with minimal effort. When consumers adopt the smart wardrobe into their everyday habits, they may save time and money.

TEAM WORKING

My teammates and I each have a designated role. Before starting our report, we have assigned tasks according to our skills. We focused on team working skills such as organizing and planning skills, decision skills, problem-solving skills, and communication skills. The person that was in charge of creating the low-fidelity mock-ups has completed her tasks by using a software named Justinmind. The software is useful for designing user interfaces such as our smart wardrobe mobile application. For creating the business flowchart, the person in charge has come out with a detailed flow diagram to allow the service desk to check the income of the company and the customer's data. This must be done by someone that has skills in organizing and planning. We have also decided to assign one member to edit the videos for the project video. Her creativity enabled her to use her imagination to generate new ideas as well as to provide an interesting video for us to watch. As for me, I have decided to make a contribution on coming out with the problem statements and solutions to our project. With each of us assigned to our respective roles, we have successfully managed to develop a proposal of a smart wardrobe system.
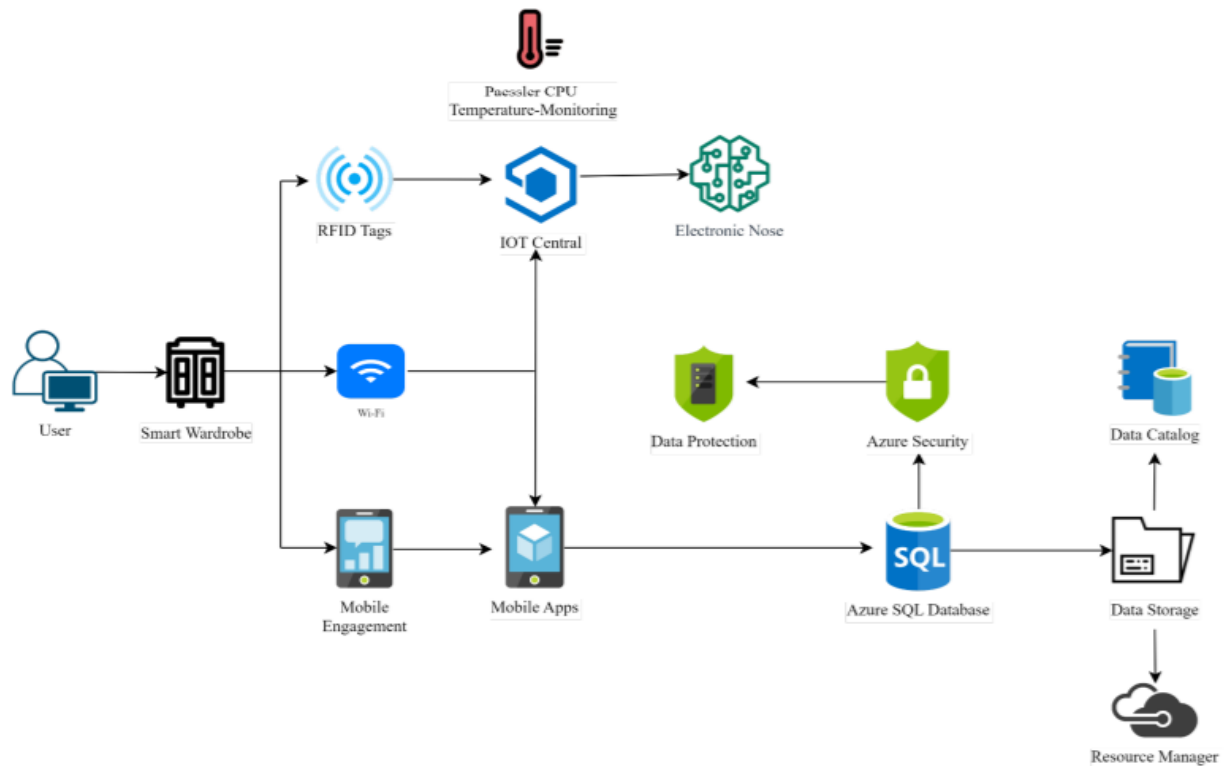
AWS ARCHITECTURE DESIGN

Figure 5.1 Cloud Computing Architecture for Smart Wardrobe

The project will be made up of four basic parts: a user terminal (phone, computer, or tablet), an RFID reader, Paessler CPU Temperature-Monitoring, electronic nose, and Microsoft Azure. It consists of front-end and back-end development. When registering for the first time, the user must allow the RFID reader to read the tag, after which a push notification will appear on the user's mobile phone application. The user will need to enter further information about the clothing, including the type and name. Users also needed to snap the photo of the clothes during the registration. The system will detect information on the colour. An RFID tag is connected to every item of clothing in the closet. The RFID reader will monitor the clothing as they are put in and taken out of the closet. Thus, the information will be sent to the phone application. The data will be sent to an Azure SQL database when it has been processed. Once the wardrobe data is

synced with the universal app, the app will show users which clothes they wear the most and least worn clothes. The temperature will be detected using Paessler CPU Thermal software. This will be used to choose a proper outfit for the day.

Other than that, with AI, when a user returns clothes to the wardrobe, the electronic nose is activated. It must be positioned in a position that will allow it full access to the freshly returned fabric since it is dependent on scents/aromas that originate from the clothes. The hanger with the returned cloth must be placed at a certain spot on the rail above which the eNose is fitted and it's pump is in excellent working order. When the eNose detects the presence of cloth, it will sniff for any scents or aromas to deodorize and clean it. It will keep clothes fresh by deodorizing inside the cabinet. It will filter and remove odour-causing and stop them from creating an unpleasant smell. It also helps with drying and sanitizing the clothes. After all, this smart wardrobe stops users from spending hours finding their clothes and outfits, a library is provided in the application through the smartphone, so the user can pick the outfits that they prefer from the library and it will automatically be steamed and ready to use.

1. Front-end development - The mobile application will consist of visual elements that users will be able to interact with such as the 'Setup', 'Erase', 'Out', and 'In' buttons. It also provides images of clothing items that the user has registered in the application.

2. Back-end development - For the server side of the smart wardrobe mobile application, this project will use an Azure SQL database to store the data regarding the clothing items registered. The type, name, and picture of the clothing item will be stored here.

3. RFID (Radio Frequency Identification) System - This system will identify individual clothes. RFID tags can only be read from a certain distance. The reader and tags must be installed in such a way that all the clothes within the closet are within reading range. Clothing that isn't in the wardrobe must also be out of the reading range.

4. Middleware application - This application has multiple roles. It performs data processing, receives the unique RFID tag number from the RFID system, and extracts data related to the tag ID from the database. It also receives data and performs the necessary processing.

Finally, it controls the overall working of the system

5. Azure Functions - This cloud is an on-demand cloud solution that offers all the constantly updated infrastructure and resources required to execute your apps. It manages to store data about every single detail of the clothes.

6. Paessler CPU Temperature-Monitoring - This device will be used for detecting the temperature for the smart wardrobe to choose a proper outfit for you.

7. Electronic nose - This will be used for sniffing and recognizing aromas and odours emerging from the indicated clothes with an electronic nose. Its setup must provide it with complete access to the fabric that has just been returned. Once the system has detected the presence of cloth, the eNose then sniffs it for any smells or odours.

Users will buy new clothes over time, or there will be clothes they do not want to wear because they are damaged or do not fit. We must plan for the capture of the contaminated clothing. A user picks the 'Setup' option from the main menu on the screen to add a new clothing item. This displays two further choices, one of which allows the user to add a new garment and the other of which allows the user to delete a garment that is no longer accessible. The system then searches the database for RFID tags that do not have the required information and shows the fields that are lacking on the screen. When removing a cloth, the user scrolls to the desired clothing to verify whether it should be erased.
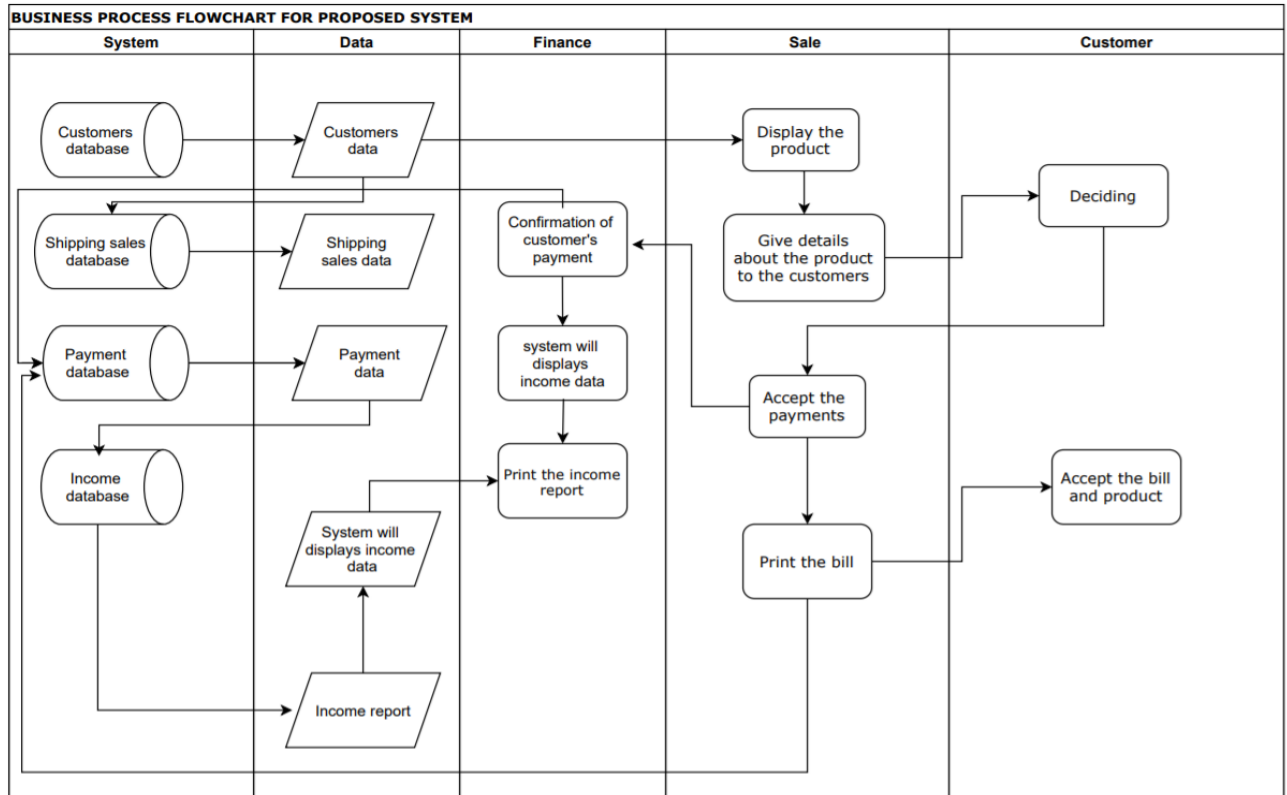
BUSINESS PROCESS FLOW DIAGRAM AND DESCRIPTION

Figure 6.1 Business Flow Diagram

This business process flow diagram consists of system,data finance,sales and customer.This procedure allows the service desk to check the income of the company and the customer's data.

In the initial we talked about the system which its include customers database,shipping sales database,payment database and income database.Customers database will stored customers data.The system will provide the details about the product to the customers.After promoting the product to the customers,they will decide either they want to proceed or not.If the customer proceed with the product the system will accept the payments from the customer and the system will print the bill.

Thus this will automatically be stored in the payment database.The payment data will directly store in income database and it will display in term of finance as income report.After accepting the payment the system will confirm the payments of the customer's payment,the system will select the customer data and determine the shipping information.The shipping information was stored in shipping sales database.The product will be ship to the customer's per request.
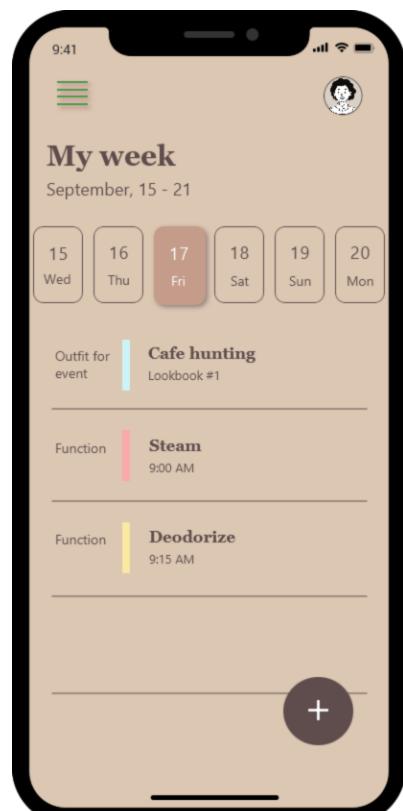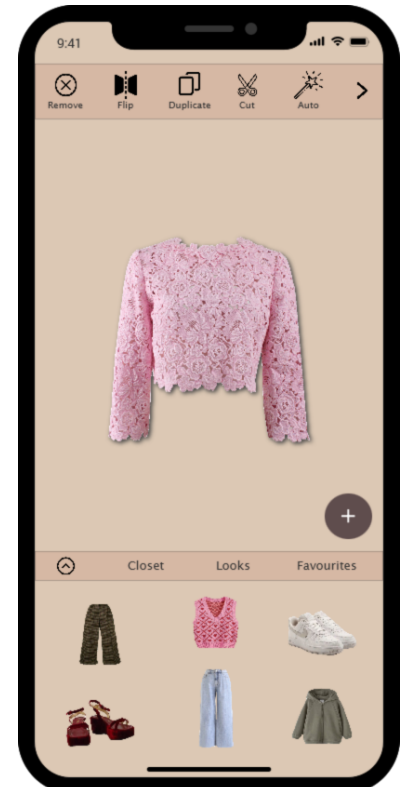
LOW-FIDELITY MOCK-UPS

Figure 7.1 Mock-ups for Smart Wardrobe

Wardrobetastic is the mobile application of our smart wardrobe system which provides various sets and combinations of functionalities of users' selection. Users are required to sign up or log in their very own account for data privacy and security. Users are then provided with a list of options in the page's menu with each option directing the user to the page of functions according to their needs.

Starting off with the clothes setup section, users are able to upload and remove their choice of garments into or out of the system in order for the clothes to be updated in the cloud. They are able to edit and personalize uploaded clothes up to their preferences. The clothes uploaded will be showcased according to their types and materials input by the user in the closet section. Users are also allowed to select their favourite or most worn garments to be put into the 'favourites' section in order to make an effortless outfit planning.

Apart from separate clothes being showcased one-by-one, wardrobetastic provides options for the users to create lookbooks where users can test out creative outfit combinations according to specific occasions without actually having to put them on physically. The lookbooks can be saved and shared to the cloud for the system to store the data enabling users to select the lookbooks created for future uses. We also provide the 'favourites' sections which have the same functions in the closet section. Users are capable of searching their named clothes and lookbooks in the search bar provided, enabling easy access to select them.

As for the functions section of the mobile application, a variety of options are provided to the users. The functions provided include steaming, drying, refresh and deodorizing, sanitizing or even customizing combined functions.

Next, for the schedule section, users are capable of setting up their own outfits to wear on days of the occasion and also be able to set up the functions to be worked on the garments according to their needs following the provided functions in the functions section. Users are also capable of viewing their planned outfits for the whole month in the form of a calendar. Suggestions are provided for the users that takes into account the weather, season, and events that may occur in the near future.

Lastly, the statistics section showcases the overview of recorded data regarding the garments uploaded which include their details such as item counts, price, sorting by category, look counts, most and least worn items and much more. This way, users are able to keep track of their clothing habits and management.

REFLECTION

NAME : ALYA BALQISS BINTI AZAHAR

Personally, I find that I am capable of utilising the knowledge and experience gained especially the topics covering Industrial Revolution 4.0 such as the application of cloud computing, Internet of Things, Artificial Intelligence and other elements. Upon completing this project, the research done has opened my eyes towards the importance of IR4.0 as it is a major factor in contributing to the world's advancements. I believe I am able to apply all the knowledge gained for future use when facing upcoming problems and coming up with efficient solutions especially in my future career in the IT field. I had discovered other significant elements and further strengthened my basics by tackling our project's objective in improvising existing advanced technologies where my group and I take inspiration from a smart wardrobe. My motivation to keep me going was my pure eagerness and curiosity in wanting to know more about our targeted topics. I find it fascinating how each unique component has its very own functions and how it is involved in evolving technologies. Not only that, I tend to prefer completing the given tasks as soon as possible so that I could make time for myself or slip in other activities to fully benefit my time. With said intention, I am able to feel motivated in doing my part of the project.

The issues that were implemented in efforts of making this project a success is firstly understanding the instructions and the rubric itself. The instructions given were confusing and my groupmates, including me, had a hard time figuring out the objectives of the project. At that point, we were reaching out for help towards students in other groups and sections in efforts of understanding the given task. Luckily, they were kind enough to help and share their insights on the project. Dr. Izyan Izzati also cleared out the fog by giving explanations regarding the project. Once the path was open, we were able to work on our project smoothly. Another issue that we tackled was the lack of time on our hands. During the period the project was given, our schedule was tight and filled with assignments and upcoming tests. We were unable to solely focus on the project and barely had time for ourselves. In the end, we managed to slip in meetings and discussions in between classes and other tasks.

My direction after completing this project is to indulge deeper in my chosen course where IT plays a significant role. I intend to further develop my interpersonal and technical skills upon approaching my dream career. By strengthening my basis, I believe that I am able to have better insights on upcoming challenges and provide improvised solutions. I will fully utilise the knowledge and experience gained in completing future tasks in order to personally profit from it and bring out my full potential. I spend more time and would love to explore further regarding related topics in the IT field.

The improvement that I find necessary for me to improve my potential in the industry is by enhancing and sharpening my interpersonal, technical and thinking skills. I believe that it is a must for me to take various approaches in order to improve myself such as doing research, communicating with my group members, attending talks and accomplishing tasks given. These said activities would further train and give me a taste of the outside world for me to be involved in the industry in the near future. So far, I managed to enhance my problem-solving skills, critical thinking, teamwork and data collecting skills. In terms of being technical, I discovered abilities that were hidden and managed to improve my editing skills, designing skills, and creative thinking. I do believe that I am still lacking in certain aspects. However, I will try my best to take steps in further improving and sharpening my existing skills.

NAME : ALIEYA ZAWANIE BINTI A ZAINI

I believed Informatics was only about acquiring knowledge in general at the start of the course, but these lectures have taught me various other perspectives on Informatics, as well as several fundamental computer skills and the use of web resources throughout the tutorials. Information is all around us, the only question is how we use and analyze it. It was interesting to try to develop thinking in a lecture rather than merely learn facts and abilities. From what I have learned during this project it was helpful to help me with my hard skills. Before doing the business flow diagrams I did not know about the process flow diagram. I did some research about what the process flow diagram was. Thus it helps me to increase my knowledge after doing some research and learning about it. I searched all over the internet about the diagram, its uses, and its function. Luckily I discovered another thing which is the software to make the diagram which is draw.io. Draw.io is a flowchart solution that allows developers, network admins, IT analysts, and designers to build and distribute diagrams using drag-and-drop features. Besides, my motivation to finish this project is I was amazed by the logical thinking of my teammates to do this project, so I would love to finish this project as soon as possible to see the outcomes of this technology.

The issues that were implemented while discussing this project is our very first time doing a project relatable to the technology and invention of something. We did some research regarding this project and asked our classmates about this project to make sure we are on the right path. Luckily our lecturer helps us with explaining this project. During our meeting, we tried our best to come up with the ideas which we wanted to invent a new product which still does not exist. So we are having a hard time thinking about the product. Finally, we got the ideas for the smart wardrobe with fully equipped technology implemented on it.The other issue that arises is the deadline was so close to the other subject's. We are in a rush to finish this project but once again, luckily our lecturer extended the due date.

My direction after completing this project is I would love to invent a new project when I become an employee to invent something new and learn something while developing a new project.Therefore, i really love to do projects related to technologies since I have passion for this kind of thing.Now, technological progress has progressed to the point where it can assist us in

overcoming or at the very least avoiding our cognitive shortcomings. Where the human mind lacks the attributes necessary for driving change and creative thinking, technology can provide a boost to our ability to innovate. I'd like to create a breakthrough that benefits humans while also allowing me to create forms and interactions that would have been impossible a decade ago.

The improvement necessary for me to improve my potential in the industry is that I want to improve myself in technical skills. Technical skills are important because nearly every job relies on different tools, programs, and processes. Technical knowledge and skills will help me to become a competitive candidate for the companies to employ me. As I learn technical skills I can increase my knowledge since I have a passion for this kind of thing. Therefore I can use this knowledge whenever I need to instead of applying via working.

NAME : YASMEEN NATASHA BINTI HAFIZ SHAHREL

       As I sit down to reflect on this project, I find that the process of making this project has provided me with a valuable opportunity for me to learn more about IoT and also improve my team working skills. During the completion of this project, I have learned how to implement IoT into our daily lives and how it is implemented to make life more easy. For this project, our group has come out with an idea to create a smart wardrobe. We believe that the all-in-one function of this smart wardrobe can help save a lot of time and energy especially for people with busy schedules. I learned that there is so much work and effort that we need to put in order to make this a success. First, we had to list down what the problems that people nowadays might face related to clothing care. Then, we need to propose a solution and that is when we got the idea to create this smart wardrobe. I also got to learn more about the cloud that we chose to store our data, which is Microsoft Azure. I got to know in detail the functions of it and how it works. The main motivation for me to complete this project is that I know my work and perseverance can help me make this project a success. All of the time we spent and the work we put into this project will pay off.

       The issue that I faced during the completion of this project is mainly how my teammates and I could not work face to face as we were having online classes and we also live far away from each other. However, the solution to this problem is that we would have online discussions from time to time. Even though we completed this project online, we still managed to have done it successfully. The other issue that I faced is the difficulty of trying to understand the concept and the technologies that were implemented in the smart wardrobe as I did not have in-depth knowledge of them. Fortunately, with the help of the Internet and also my friends and lecturer, Dr. Izyan Izzati, I had a more clearer view of how this system works. They had provided me with so much information that helped me better my understanding. I am so thankful for them because otherwise, I know I would still have less clarity on this project.

       My direction after completing this project is that I am hoping to have myself doing more projects related to Artificial Intelligence (AI) because it is indeed an interesting subject. I believe that we can really change the world for the better with AI being implemented around us.

I want to get myself involved in many programs and classes that will help me increase my knowledge in this particular topic. I really hope by doing these, I could make the lives of the people around me easier.

For me, I believe that there are many things that need to be done by me to improve my potential in the industry and I know I have a long way to go. First and foremost, I have to participate in more programs that are held by the University and attend more seminars that discuss different topics related to the industry. I think that just attending classes might not be enough. Plus, the seminars that I have attended during this first semester have been really helpful in providing me with a better understanding of the industry. The talks were also given by professional people that have been working in the industry for a long time. Another improvement necessary for me to improve my potential in the industry is doing more reading. This might sound simple but it is actually crucial for me to keep up to date with the latest skills and trends in tech-industry. I will strive to move forward and I hope I can be successful in this industry.

NAME: ALYA DAMIA BINTI HUZAIMY

For me, the most important thing I've learned from this project is how to start from scratch. It is beneficial for us as students to have the opportunity to brainstorm ideas and write a project report that will be presented. Aside from that, we have access to a variety of applications, such as draw.io and Just in Mind, to assist us in successfully completing the project. I would not have known about this type of programme that makes our job easier if it hadn't been for this project. I was able to form bonds with other kids, particularly with my groupmate. My communication and critical thinking skills both improved. Exploration through IoT, which is necessary to be implemented in this project, is one of the most significant things I learned in this project. It's incredible how one type of technology can make such a difference in people's lives. With all of the technology available, we can now even make the world more convenient. The satisfaction of overcoming an obstacle is my motivation to finish this project. I want to be able to be good at everything I do, so being able to expose myself to this type of work allows me to improve my abilities. It wasn't a simple undertaking, and I spent many late nights studying to complete it on time.The sense of accomplishment that comes from achieving difficult tasks is what drew me to work on myself.

The issues we discovered during the course of this project revolved around reaching a consensus on a single decision. We know there are a lot of things that can be applied in this project because it is an Internet of Things (IoT) implementation project, therefore we know there are a lot of things that can be applied in this project as if IoT requires detailing in each step we must choose. As you may be aware, we as teenagers have a plethora of thoughts running through our heads, and convincing everyone to agree on just one term would necessitate a great deal of debate and discussion. It took us days to talk about each phase so we could come up with the best ideas.The best solution we can think of is to write down all of our ideas in order to sort out the most logical ones that can be used to create the best project.

After completing this project, my direction is that I would like to be part of more of these kinds of projects in the future. This type of project would assist my portfolio because it could be one of my experiences, and I could improve my abilities in every area because it is a fun project to complete. I also feel that by implementing AI in our environment, we can truly alter the world for the better. I'd like to get engaged in a variety of programmes and workshops that will assist me expand my knowledge on this topic. I sincerely hope that by doing so, I will be able to make the lives of those around me simpler. In order to personally benefit from and maximize my potential, I will fully utilize the knowledge and experience gained in completing future tasks. I have more time on my hands and would like to learn more about related IT topics.

In order to develop my industry potential, I would like to take advantage of every opportunity to do all possible in each project I work on during my university years. Being able to do it on my own will familiarize and comfort me with the ability to complete any task on my own, especially if it is assigned to me. I'd love to attend any structured workshop that will be held because we wouldn't be able to investigate everything if we only went to all of the classes. We learn not only in official classes like universities, but also in informal classes that help us grow as students.