UNIVERSITI TEKNOLOGI MALAYSIA

SECP1513 - SECTION 04

TECHNOLOGY AND INFORMATION SYSTEM

GROUP PROJECT: PART I

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DUE DATE: 19 DECEMBER 2021

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Introduction

Industrial Revolution 4.0 (IR 4.0.) is a revolutionary process in the industry sectors where digitalization, robotization, computerization, and automation will be involved in the future. However, the COVID-19 pandemic has impacted many industry sectors severely especially the restaurant industry in recent years. Thus, a restaurant must undergo a series of technological transformations and evolution in advance. The transformation and evolution of the restaurant are said to be crucial as it helps the owners to continue and improve their restaurant business during the COVID-19 pandemic. To reduce the transmission of COVID-19 between people, restaurant owners will have to revolutionize their restaurant business to ensure the safety of the employees as contact between employees and customers will be reduced significantly due to the increased digitalization in their restaurant. Therefore, there are several technologies from IR 4.0 such as Internet of Things (IoT), Autonomous Robot, Big Data and Analytic which are available for the restaurant industry in order for the owner to transform their restaurant business to solve their business problems and enhance the business performance during the pandemic.

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A. Potential Client

The potential client for our low-fidelity project will be suitable for the client who runs restaurant business.

Benjamin Chai is a restaurant staff from Restaurant Sweet Inn Seafood based in Petaling Jaya, Selangor. During the interview, he has provided 3 problems which the problems that he has experienced when working in a restaurant during COVID-19 pandemic.

1) The problem of staff might come contact with positive COVID-19 customers.
2) Understaff problem which may leads to order delays and miscommunications.
3) High spending on the unnecessary ingredients problem due to unpredictable orders.

Interview Video Link: https://youtu.be/AgjclGzVw5k

B. Selection of 4th IR Technology

1. Internet of Things (IoT)

Internet of Things (IoT) is a technology where sensors, smartphones, and other technological devices interconnect, collect and share information with each other over the Internet or a network (S. Gillis, 2021).

IoT is said to be one of the crucial elements for the restaurant industry to transform into a smart restaurant due to the fact the development of this technology will reduce the interaction between staff and clients, especially during the pandemic. This is because the IoT devices for smart restaurants will ensure the safety of the staff especially the receptionist during their duty as the clients will need to interact with IoT devices for their orders, requests, and question without interacting with the staff via verbal communication. For example, when a customer has reached the restaurant, motion sensors in the restaurant detect the movement of the customer that walking into the restaurant. The customer will be able to start ordering their food via the restaurant's application on the smartphone by scanning the QR code on their table. Additionally, customers can also input the request and questions through their smartphones whenever they encounter a problem during the dining process. From this, customers will not have to wait for staff to serve them and there will not have interaction between them as well.

2. Autonomous Robot

An autonomous robot is a robot where will be able to perform some specific tasks by itself with little to no interaction from the human as it will be engineered and designated to make a decision independently and according to some specific conditions (Fitzgerald, 2021).

Autonomous robot technology from the IR 4.0 will be involved in the transformation in the restaurant industry as it will reduce the workload of the staff to deliver the foods to the customers during the peak hours especially during the pandemic where understaffed is a problem for the restaurant industry. The reason for this is that staff might be confused and messed up the order from other customers which leads to delivering wrong orders to the wrong table.

For instance, staff will have to speed up their progress during peak hours in order to cope with the demand surge. During this process, the staff might actually mess up with the customer's order which may lead to unsatisfactory with the customers due to unavoidable human errors. In order to solve this issue, the autonomous robot should be implemented into the restaurant in order to support the staff to handle the demand surge accordingly and efficiently.

3. Big Data and Analytics

Big data and analytics are one of the key technologies that will be involved in IR4.0. These technologies will uncover the patterns and insights of a situation by analysing a large amount of data (SAS Institute, 2021).

The restaurant industry should apply big data and analytics into their business during the pandemic for the reason that these technologies will bring advantage to the business for the restaurant by reducing unnecessary spending during the business operation. The is due to the fact that the pandemic has caused the price of ingredients to skyrocket. Thus, restaurant owners can arrange their ingredient supply accordingly to the popularity of the food in the restaurant.

For example, if seafood is more popular than other delicacies in the restaurant, the restaurant owner will be notified by big data and analytics technology system as the system will collect the data from the IoT device during the business operation in the restaurant. This is because the system will be able to analyse and notice the high popularity in the seafood delicacy so that the owner can re-supply the seafood ingredients more than the other less popular ingredients to reduce unnecessary spending and food wastage.

Architecture Planning & Design

The architecture will be divided into two parts which are the front-end and the back-end.

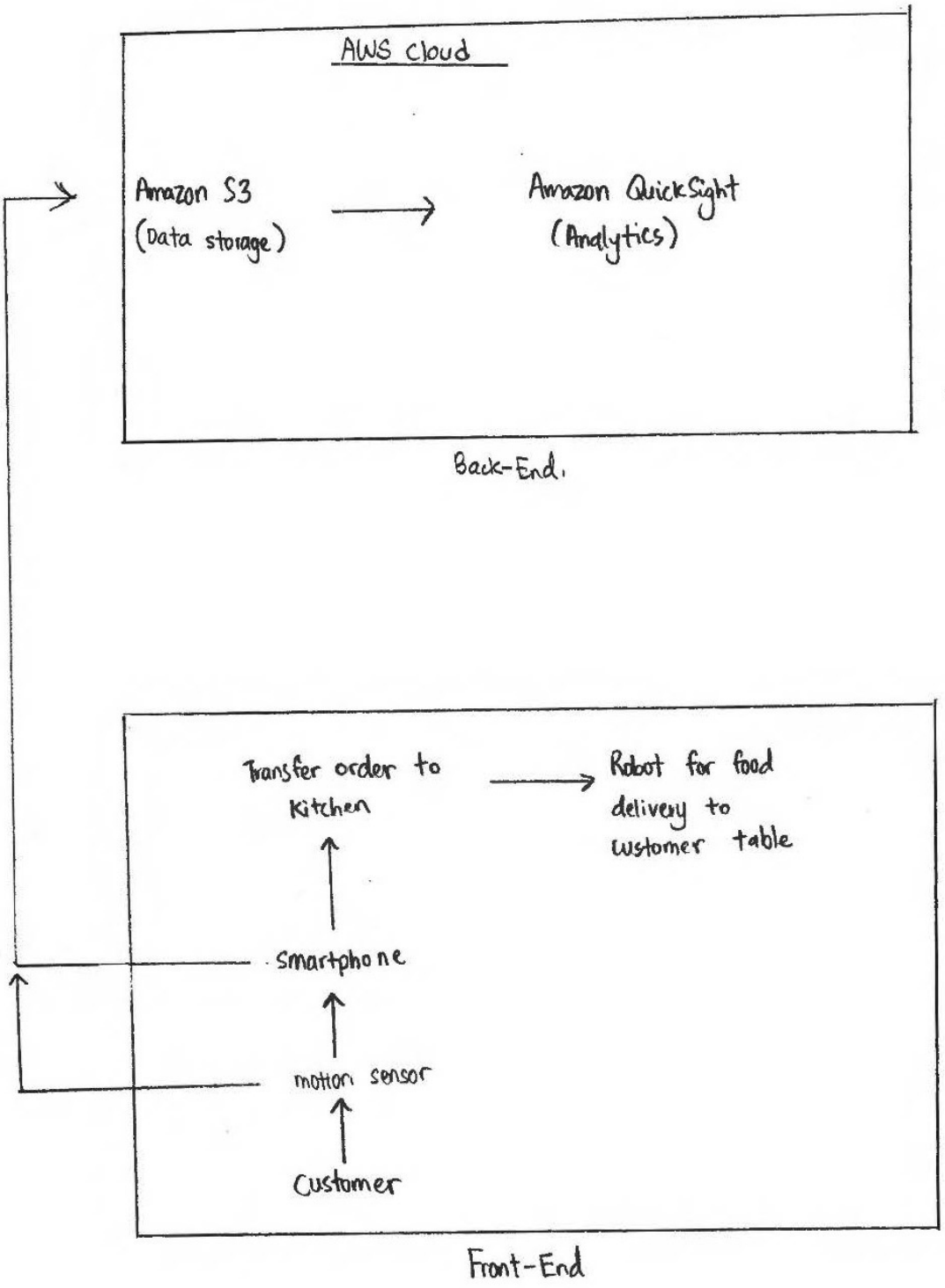
A front-end will require the customer's interaction with the system. As the brief description of how the front-end works, when a customer has entered the restaurant, the motion sensor will automatically detect the movement and send the record to the back-end architecture for recording purposes. The customer will be required to scan the QR code provided on their table by using the restaurant application on their smartphone in order to view the food menu. Then, the customer will require to input their desired food selection into the food menu on their smartphone. Once the order has been confirmed, the order will be transferred into the kitchen so that the chef could prepare the order accordingly. After that, the food will be delivered to the customer's table by using an autonomous robot.

The back-end architecture will be responsible for supporting the front-end architecture by completing the remaining required processes via cloud computing. The system mainly uses Amazon S3 storage and Amazon QuickSight for analysis.

For the data storing, the food menu from the restaurant will be stored and distributed from the Amazon S3 bucket to the customer's smartphone according to the table. Additionally, the data from the motion sensor will be also stored on the Amazon S3 in order for recording the number of customers who visited the restaurant. Customer's order information will also be stored in the Amazon S3 storage for future reference and analysis purposes.

For the data analysis, Amazon QuickSight analytics will be responsible for carrying out the analysis process on the data collected during the business operation in the restaurant. The data from the motion sensor and the order information from the customers which has been stored into the Amazon S3 storage will be used by Amazon QuickSight for further analysis. Amazon QuickSight will generate a summary for the restaurant owner to discover and identify the demand of the food ingredients accurately to avoid unnecessary spending and food wastage during the purchase of food ingredients.

Diagram of the Architecture Design



Conclusion

From the group project, we have successfully understood the importance of the 4th IR Technologies when it comes to implementing these technologies into solving the problem that has been provided by our potential client. Furthermore, we have also developed a Cloud Computing architecture that will be used by our potential client in order to solve the problem and run the restaurant business more efficiently.

Apart from that, there are some limitations that we found during the low-fidelity project. The first limitation is that there are only a small number of potential clients that are interested as some of the large-scale restaurant business has already implemented a similar technology into their management system. Therefore, this has limited us to focus our low-fidelity project on small-scale restaurants. The second limitation will be that some restaurant owners are not willing and ready to adapt to the sudden change in the ways of restaurant management.

We hope that our low-fidelity prototype project will definitely contribute to our potential client by solving the current problems in the business. Not only that, but the low-fidelity prototype will also help our potential client to generate more business opportunities so that our potential client will be able to run the restaurant business and reduce the impact of the COVID-19 pandemic on the restaurant business industry.

References

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