SECP 1513 - Sec 07
TECHNOLOGY AND INFORMATION SYSTEM

ASSIGNMENT:

Low Fidelity Prototype (Part 1)

GROUP 6

LECTURER: Hairudin Bin Abdul Majid

DUE DATE: 27/12/2021

Group leaders contact number: 016-5653191

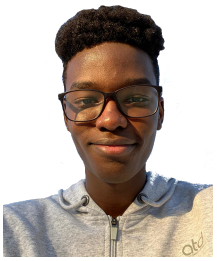
GROUP MEMBERS					
	Muhammad Taufiq bin Jurimi (Group Leader)	Tan Chun Ming	Azhan Haniff Bin Azni	Muhammad Najwan Hazim Bin Khairi	Ayman Hesham Eldaw Mohamed
MATRIC NUMBERS	A21EC0095	A21EC0229	A21EC0017	A21EC0087	A21EC4026

TABLE OF CONTENT

INTRODUCTION

Klaus Schwab, the World Economic Forum's Founder and Executive Chairman, invented the phrase "Fourth Industrial Revolution" (4IR) in 2016 (Lavopa at el, 2021). Nanotechnology, biotechnology, novel materials, and advanced digital production (ADP) technologies are among the developing technology disciplines that have converged and complementaries (Lavopa at el, 2021). The Fourth Industrial Revolution is a term used to describe how the physical, digital, and biological worlds are becoming increasingly intertwined. Artificial intelligence (AI) and machine learning, robots, the Internet of Things (IoT), genetic engineering, quantum computing, and other technologies have all come together to create it. It is the driving force behind a plethora of products and services that are quickly becoming vital in today's world.

From our perspective, there are several problems that we observed before creating this project. Before this, other restaurant reservation methods looked tedious and required a lot of processes. This will make consumers use a lot of energy and feel annoyed by the traditional method of calling the restaurant. Also, other restaurant reservation apps do not have 4th IR technology implementation. They just put a couple of pictures to describe how the restaurant will look while we are planning to implement a virtual reality view of the restaurant.

A restaurant reservation is a reservation made ahead of time to ensure that a table is available at a restaurant. While most restaurants in the great majority of the globe do not require reservations, and some do not have a policy or even a way to make one, so-called "higher-end" restaurants, particularly in congested cities, sometimes do, and some may have tables booked for weeks in advance. It may be hard to make a reservation on the same day as the intended visit to some of the most exclusive places. So, our group will propose a restaurant reservation system with advanced technology based on the 4th industrial revolution. We applied a lot of elements in the system such as Big Data Analytics (customer feedback), Internet of Thing (order alert tags, sensors for food reservation availability), AI or Machine Learning (Restaurant ranking, restaurant recommendation), and Virtual reality and augmented reality (3D picture of the restaurant look like, size of certain food in real life).

CONTENT

Several 4th IR technologies will be implemented for this restaurant reservation project, such as big data analytics, Internet of Things (IoT), VR/AR and AI/Machine Learning.

Big Data Analytics

Big Data Analytics in restaurant reservations is focusing on the customers' feedback of the restaurant. This feedback can describe how the restaurant works to the customer and also will give benefits to the restaurant owner.

Big Data Analytics is related to restaurant reservations because it can deliver valuable feedback from all customers that have been there. It shows which restaurants are most frequently used by customers and which ones need better improvement. From that, customers and consumers will know which restaurant has a better environment, food, and service from the waiter. Customer or company connections may be facilitated and transformed by big data. Organizations that use it to examine the world from the perspective of their customers gain a much better understanding of their customers, enabling them to close gaps and disconnects in their marketing strategy, resulting in improved engagement through more tailored campaigns and communication.

Due to consumers being typically linked to companies across several channels, it is critical to gather, analyze, and process all data to provide workers with the knowledge they need to offer excellent customer service. Companies can handle issues more quickly and precisely by knowing customer behavior since big data allows employees to give solutions fast and accurately without having to ask a lot of questions. Also, big data analytics gives businesses a deeper understanding of client behavior, which may lead to more sales, better customer service, and a better customer experience.

IoT (Internet of Things)

The Internet of Things (IoT) solution related to restaurant reservation systems is mainly focusing on customers' experiences and for the restaurants' management and notification.

There are several IoT solutions related to the restaurant reservation system. One of the IoT solutions is smart occupancy sensors. These sensors will be used to track and accurately measure the flow of people in the restaurant. The occupancy sensor normally will send high-frequency sound waves which are inaudible to humans or also known as ultrasonic technology into an area and it will measure the reflection patterns. For example, the wireless motion sensors will track the selected restaurant whether it is still available to reserve or full house and monitor the flow of the people to the end-user page where they can know whether it is still available to reserve a place in the selected restaurant.

On the other hand, order alert tags are also the IoT solution that relates to restaurant reservation systems. This IoT solution is made for the restaurant when customers reserve to dine in that restaurant. When an order is made, the alert tags will auto-tag the selected restaurant with that location. Restaurants will be able to manage places for the reservation order and the food reservation. Customers are also able to add, remove, extend and backdate the order and the notification will be sent to the restaurant. For example, when the restaurant receives an order, the staff of the restaurant will be able to notice the specific machines or tags. They will also receive messages and notifications if customers make changes to the reservation order.

Lastly, the IoT solution related to restaurant reservation systems is smart sensors for food. Food sensors are used to ensure and monitor food quality and contaminant detection to improve food management. In fact, the sensors should be designed with careful consideration of chemicals of the quality marker which they will detect and the challenges of analyte recognition in a complex serving. At the same time, customers are able to determine the availability of the serving and ensure that the food is in a good condition.

AI/Machine learning

The Artificial Intelligence (AI) and Machine learning (ML) for our application is related to the application's restaurant recommendation system and fake restaurant reviews system.

There will be a restaurant recommendation system that will list out recommended restaurants. This is where the AI and ML of our application come in, when the user registers, they will be required to enter their data for our application's use, for example, what type of food that they prefer and like. The AI and ML will calculate and analyse the user's data to make up a list of restaurants to recommend to the user.

Furthermore, Our AI and ML will also browse through the restaurant reviews to detect if it is a fake review or not, such as spam and automated reviews. It will find a keyword or a phrase that is used often and does not seem humanlike. After that, it will flag that review and delete it. This is done so that restaurant owners can not make their restaurants look good even though it is not.

Virtual Reality & Augmented Reality

The VR/AR feature is mainly targeted at customers. We incorporate the idea of VR in a unique way that shows our customers how the restaurants feel and look through VR technology so the customers can reserve the table with a suitable view for them. One of the main reasons I don't try to discover new restaurants is how the menus don't show the actual portion of the food, sometimes the food is too little and sometimes it's too much, that's why we incorporate the AR technology so our customers can see the exact portion of the food on their tables.

Accessing the VR feature in our application is going to require the VR headgear while accessing the AR feature only requires a camera.

Possible Client

The restaurant reservation system is mainly targeted towards two possible clients, which are customers and restaurant owners. Customers can reserve a restaurant using the application while restaurant owners can set up and advertise their restaurant page by signing in and partnering with us. Our system can be considered as a business-to-consumer (B2C) e-commerce because it requires transactions between restaurant business owners and end customers. We provide an easy platform for the business between restaurateurs and customers to happen.

There are several types of customers that we expect will be our clients, which are normal customers, loyal customers, food reviewers, and tourists. Examples of normal customers are people who reserve a restaurant for regular dine-in or birthday parties or any special occasions. Loyal customers are normal customers that use our service frequently. This will happen if a normal customer finds our application is easy and beneficial to use for dine-in, then they will keep using it frequently. Next, food reviewers are customers that went to restaurants to review the food, such as television show food reviewers, and professional food inspectors. Lastly, tourists, which covers a large portion of the customers. This is because most people who travel will use an application to make their reservation process much easier.

The next possible client is restaurant owners. Restaurant owners or restaurateurs are people who manage a restaurant. In order to grow their business, restaurateurs will try to advertise their restaurant as much as they can. Therefore, by partnering with us, we will generate our revenue and provide an opportunity for them to advertise and grow their restaurant through this application. The application will make the reservation process much easier since the process is done online and a lot of 4th IR technology is implemented.

ARCHITECTURE PLANNING AND DESIGN

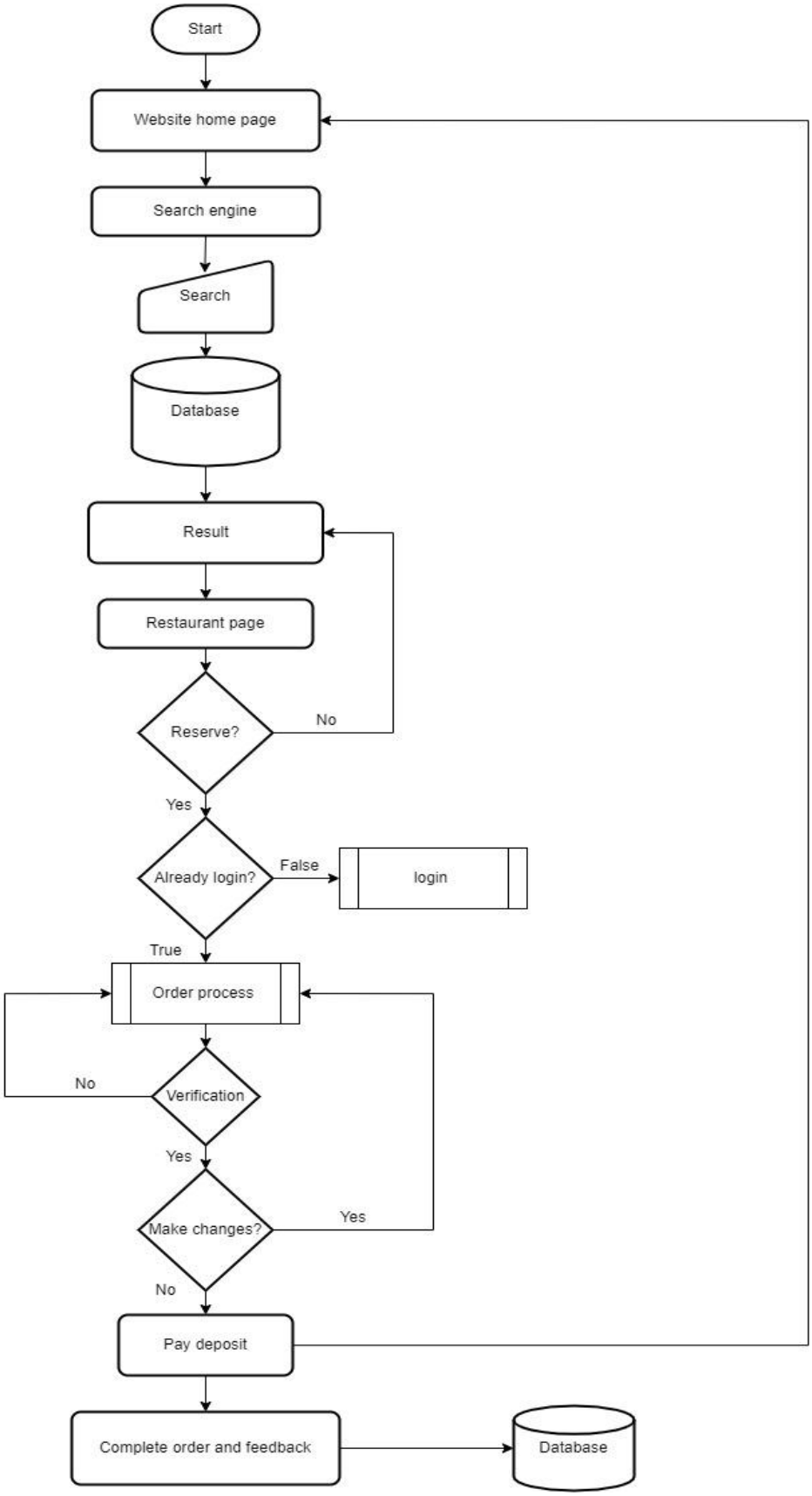
Our plan for this application is to make a user-friendly application where everyone can use it for an easy and quick restaurant reservation. The application consists of several parts, which are the home page, login page, user page, search result page, and restaurant page. First of all, the home page shows the “front page” of the application which has buttons that can direct the user to the other sub-pages of the application. Here is also where a search bar to search for restaurants is present and also some general information of a few trending restaurants is shown. As for the login page, this is where the user and restaurant owner can enter their data to sign up and log in to their accounts on our application. After completing the signup, the user must wait for the admission office to verify their account. When it is verified, they can now start using our application to do reservations for restaurants. The user page mainly consists of the user's personal information and every user can edit their information. This information will be stored in our database and is used for future restaurant recommendations and reservations. Furthermore, the user will be directed to the search result page after searching for restaurants on the search bar on the home page. Here the application will search through our database and then the user will be given a list of restaurants based on what you search, if the user clicks on a certain restaurant page, then they will be directed to that specific restaurant page. Lastly, the restaurant page. This is where the main important part in our software as a service model. Restaurant page can be customly designed and edited to advertise their restaurant. There are several main artifacts on this page such as restaurant information, contact, location, menus, user reviews, restaurant pictures, scenery, virtual reality view of the restaurant, and augmented reality view of the food provided. This page is also the page where users reserve a restaurant, based on their interest and the information provided.

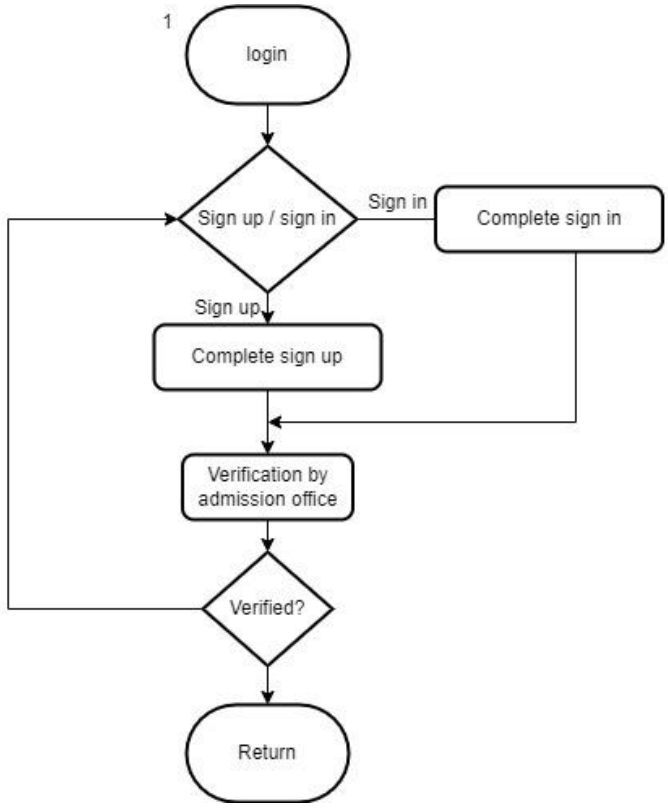
Cloud computing model

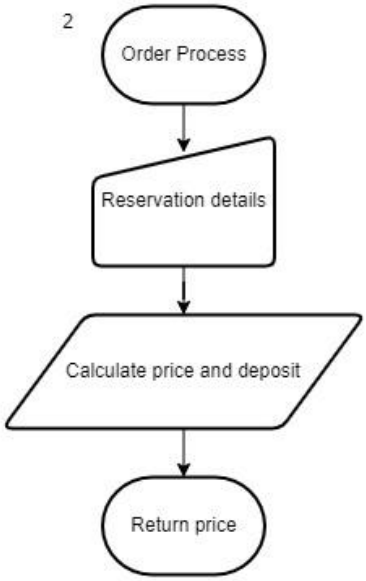
We use SaaS (software as a service) as our cloud model because it's much more cost-efficient compared to other models, it's also time-efficient since we're spending less time on installation and configuration and we'll have the flexibility to scale our saas on specific needs. SaaS products are really easy to manage and can be used from any device. SaaS software cloud models are popular in the ecommerce and banking field because of the reliability of the service provided. This service can be subscribed through any cloud computing service provider. For example, Amazon Web Services (AWS) provides an opportunity for business owners to launch their application to the internet as a SaaS product. The service can be chosen as either a normal SaaS pay-as-you-go subscription, SaaS contracts or SaaS contracts with pay-as-you-go.

Deployment method

Hybrid cloud is the combination of private and public clouds. Private clouds handle our customer's confidential info and can only be accessed by our private networks while the public clouds handle scalable and cost effective infrastructure and non critical applications where no sensitive data are involved. For example, AWS provides some hybrid cloud services in compute, containers, storage, networking, management and VMWare. Some of the services are AWS outposts, AWS Snow and many others. This will accelerate the digital transformation and improve our IT productivity. All of the service can be subscribed as a pay-as-you-go model, to maximize efficiency and costs. One of the services that we would like to use is AWS Storage Gateway, which simplifies storage management and lower expenses, by allowing on premises workloads to access AWS storage.


Start
Website home page
Search engine
Search
Database
Result
Restaurant page
Reserve?
No
Yes
Already login?
False
login
True
Order process
No
Verification
Yes
Make changes?
Yes
No
Pay deposit
Complete order and feedback
Database


1
login
Sign up / sign in
Sign in
Complete sign in
Sign up
Complete sign up
Verification by admission office
Verified?
Return


2
Order Process
Reservation details
Calculate price and deposit
Return price

CONCLUSION

In conclusion, our project will make sure that consumers can manage a comfortable environment more consistent and less stressful. This is helped by the automatic modifications given by advanced restaurant reservation tools. For instance, when there is no food, sold out, or when the food is being cooked, the system will update and adjust accordingly. The solution then creates the most recent version of the food list based on the tables and other important indicators that are accessible. The reservation and waitlist management processes should decrease customer work, increase communications with customers, and provide a frictionless experience. All of this equates to increased comfort for everyone, especially to customers.

Unfortunately, applying 4th IR technologies in this app has limitations and disadvantages. Not all restaurants in this world will be partnered with us because some restaurants prefer to use old or traditional dialing methods for reservations. This can cause a bad review to our consumers as they can not make a reservation at the restaurant that they wanted. Also, as you know, this app requires information from consumers to make a reservation. When everything is linked, the potential of data being hacked, tampered with or used for bad purposes increases. Not to mention that it calls into question the entire concept of identification and privacy, especially as data analytics and machine learning become more prevalent.

With the 4th Industrial Revolution technologies, we believe that as a result of these technologies, the number of full-time employees will decrease as robots take over human jobs. Employees will also be able to do new, more productive professions as a result of these technologies. With that, we can make sure that our staff is disciplined and good at their work. We also can reduce energy to consumers and make it safer as the technologies are capable to do what humans can not do. We can guide contact between clients and organizations even through the internet, allowing us to have a deeper understanding of what consumers require.

REFERENCES

AWS Hybrid Cloud | On Premises & Edge | Amazon Web Services. (n.d.). Amazon Web Services, Inc. https://aws.amazon.com/hybrid/

Industry 4.0: which technologies will mark the Fourth Industrial Revolution? (n.d.). Retrieved from https://www.iberdrola.com/innovation/fourth-industrial-revolution

Lackermair, G. (2011). Hybrid cloud architectures for the online commerce. ScienceDirect. Retrieved from https://www.sciencedirect.com/science/article/pii/S1877050910004667

Lavopa, A., & Derela, M. (2021, January). What is the Fourth Industrial Revolution? Retrieved from https://iap.unido.org/articles/what-fourth-industrial-revolution

MacDonald, J. (2021, August 19). 7 Types of Customers and How to Convert Each of Them. Retrieved from https://thegood.com/insights/types-of-customers/

Patton, N. (n.d.). What are occupancy sensors and how can they help building re-entry? BuildingsIOT. Retrieved from https://www.buildingsiot.com/blog/what-are-occupancy-sensors-and-how-can-they-help-building-re-entry-strategies

Sharma, R. (n.d.). Top 10 Ways Internet of Things Can Be Used By Restaurants. Retrieved from https://www.finoit.com/blog/top-10-ways-internet-of-things-can-be-used-by-restaurants/?sfw=pass1640589721

Software as a service (SaaS)–based products - AWS Marketplace. (n.d.). Amazon Web Services, Inc. https://docs.aws.amazon.com/marketplace/latest/userguide/saas-products.html

Verevka, T. V. (2019, June 28). Development of Industry 4.0 in the Hotel and Restaurant Business. IBIMA Publishing. https://ibimapublishing.com/articles/IBIMABR/2019/324071/324071.pdf

Weston, M. (2021, March 14). Food Sensors: Challenges and Opportunities. Wiley Online Library. Retrieved from https://onlinelibrary.wiley.com/doi/10.1002/admt.202001242