UNIVERSITI TEKNOLOGI MALAYSIA

SECP1513 - SECTION 04

REPORT PART 2

ASSIGNMENT: LOW FIDELITY PROTOTYPE PART 2

LECTURER: Mr. Hairudin Bin Abdul Majid

DUE DATE: 31/12/2021

Group leader's contact number: :012-704 1955

Group Member	 PRAVIN SIVANATHAN ****(GROUP LEADER)**	 AFIF BIN GENARI@ AZHARI	 MUHAMMAD FAIZ BIN ABDUL MUTALIB	 RASIDIN BIN HATTA	 MUHAMMAD QAYYIM BIN KHAMRUDIN
MATRIC NUMBER	A21EC0123	A21EC0003	A21EC0059	A21EC0126	A21EC0090

TABLE OF CONTENT

INTRODUCTION

In the modern economy, society is always looking towards technological advances that can provide benefits and convenience.On this occasion,we as a group have decided to run a project that connects digital technologies such as the internet of things(IoT) that is driving change in agriculture.

Basically in this project,we try to develop an application named “Autofarm” to connect these physical devices like sensors,timers and front end service that can send and receive information via the internet.

The main target of this project is to the group of farmers or anyone who has a farm in order to make their everyday task become easier.A few examples such as a farmer can easily control the use of fertilizers by simply monitoring remotely over the smartphone that is connected to an IoT device via the internet connections.

We also always keep our project in line with progress of the 4.0 revolution industry nowadays.We believe that with the advancement of internet connectivity can increase the rate of IoT usage in modern agriculture nowadays.We strongly believe that this project can help millions of farmers in increasing the production rate of their farms and be able to give efficiency to the agricultural space,and create a virtuous cycle that makes food products more accessible to consumers.

PROJECT DESCRIPTION

Problem

There are many farms and gardens nowadays that grow a variety of types of fruit and vegetables because of the growth of humanity's population. In other words, the quality of fruit and vegetables produced today must have a higher probability of good-quality.This problem will lead us to invent an idea.

Problem we always faced:

1.Quality of products that market sells

2. Incorrect watering time that can cause plant to dehydrate

3. Inconsistent amount of fertilizer consumption

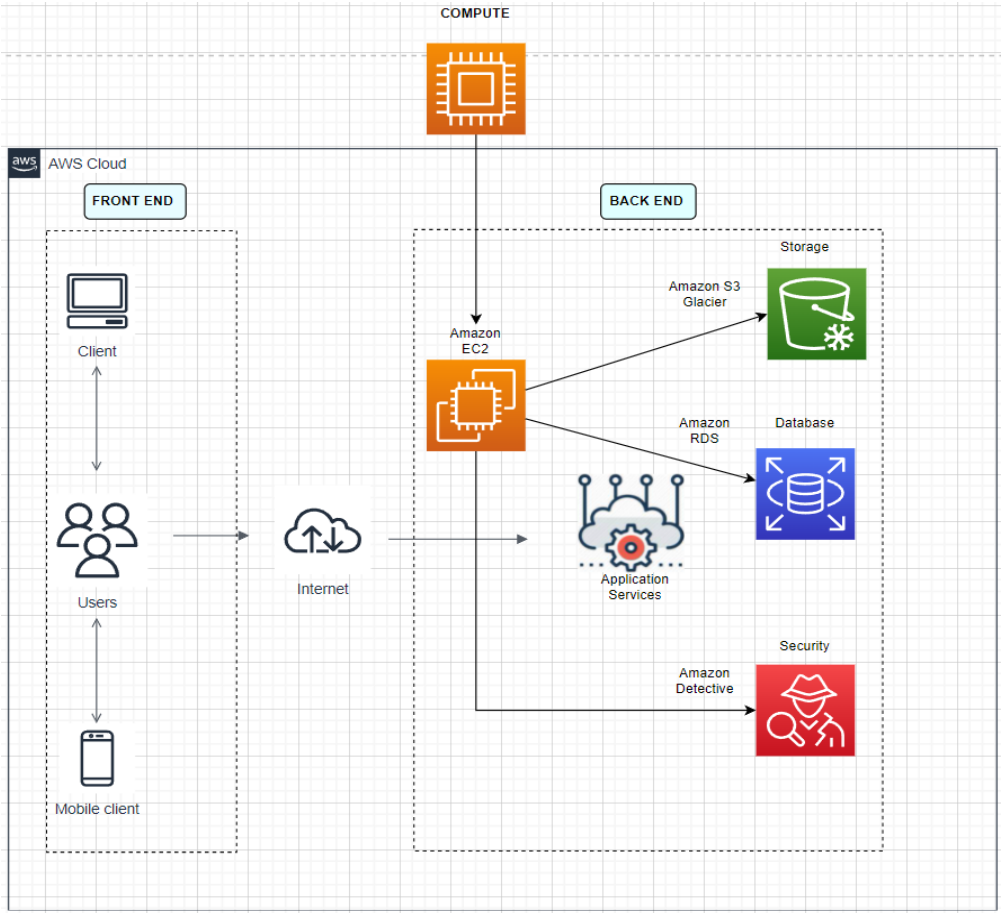
Solution

After spending a lot of time researching, we came up with an idea on how to solve the problem. In order to solve this problem, we came up with our solution to ensure that the qualities of the plants did not greatly differ. We developed an application and sensor that helps us manage the growth rate of the plants.

Our project advantage

1. To make farming easier and guarantee a profitable future, farmers are using equipment such as sensors, automatic self-watering devices, signal generators, etc.
2. The IoT devices are connected to our application via the internet so that the person in charge of the farming fields can more easily monitor the condition of crops or plantations.
3. Even if no one is physically present at the site, information such as pests, water, and fertilizers needs can be detected and notified to the farmer through an application connected to the IoT devices installed in the farming area.
4. Because those devices work via the Internet, they work day and night regardless of whether it is day or night.

AWS ARCHITECTURE PLANNING AND DESIGN



Front end

- In order to access the apps, users must provide their email and password.
- It is possible to use these apps on a computer or smartphone.
- The Internet is also required to use these apps.

Users will receive a notification from the apps if :-

1. **The time has come to water the tree**

   ➢ Using the apps,users may programme the autonomous self-watering equipment to water their trees at a specific time.

2. **Fertilization time**

   ➢ Users can specify a fertilization time for their plants, and when that time comes, the apps will send a signal

3. **Fruit or vegetable produce from plants**

   ➢ When the plant bears fruit and it is mature, the user will receive a message that the fruit is ready to be plucked.

4. **Plant-damaging insects.**

   ➢ A notification will be sent to the user if pests are present on the plant. As a result, consumers will be aware of the presence of pests.

Back end

- Back end is the service platform to manage the resource and data and to make sure all the application services are moving fluidly.

- Our application uses amazon web services as our main cloud service provider.

- There are several categories of the back end services used in the application.

    1. **Compute**

        ❖ Amazon Elastic Compute Cloud (Amazon EC2) enables us to gain computing capacity in the AWS cloud.This is because through Amazon EC2 we do not need to invest in hardware like storage and computing power that we do not even know how much that we needed.Therefore, with EC2 we can launch as many server that we need so that we can manage all the user resources.

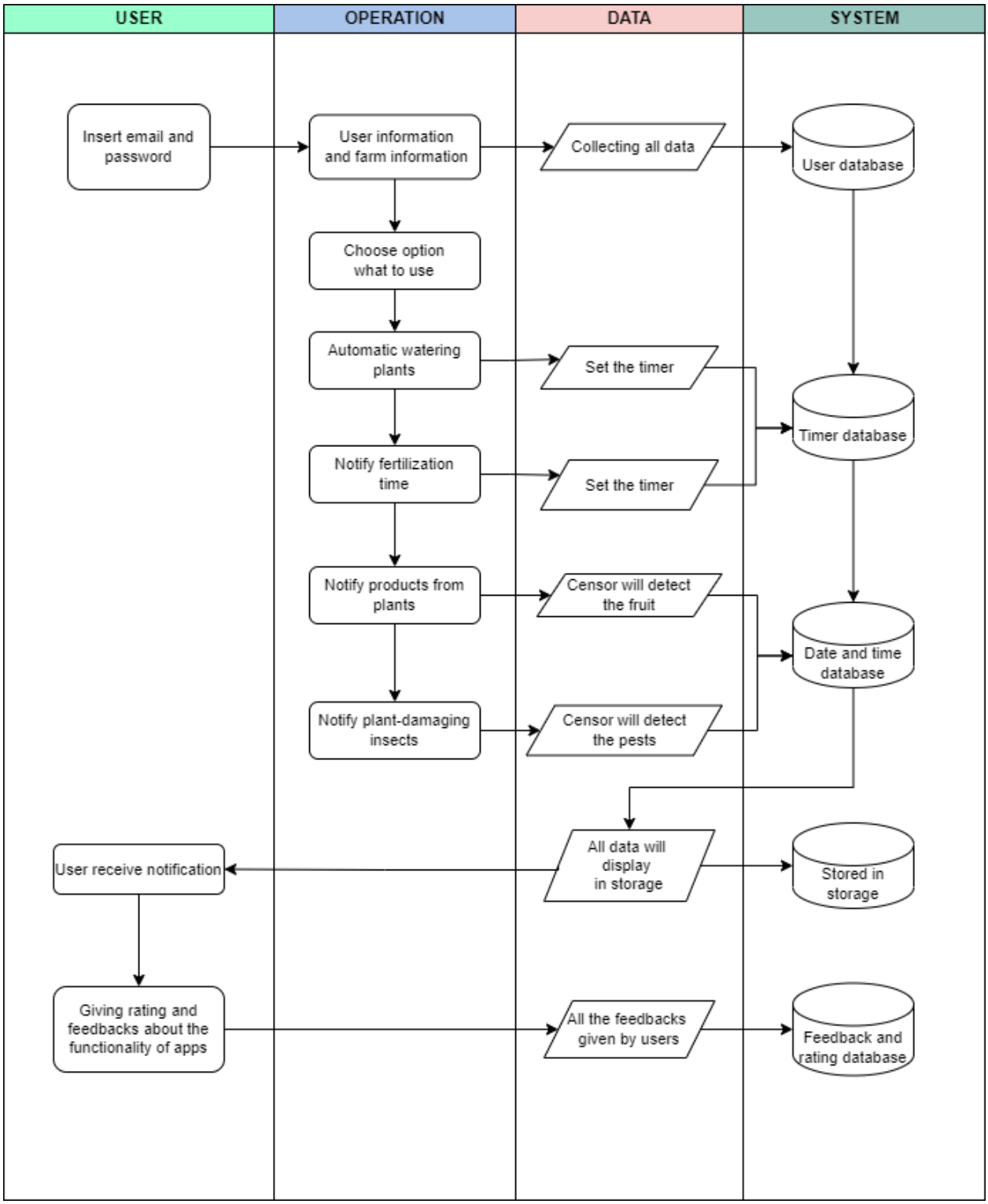
    2. **Storage -** used for store client's information and client's farm information

        ❖ Amazon S3 Glacier allows the application to store and protect enormous amounts of data for our use case which is for web-based applications and mobile applications.And it also allow us to archive old data or unused new data when a user deletes the application, so that whenever any clients wants to reused back the application , they can reuse back their email to login, and get back all the data that they used before this.
        ❖ Amazon Relational Database Service(RDS) allows us to set up and system databases in the cloud so that client information is stored in a structured database and it is easy to access the Information when needed.This services also provide scalable databases so that we just use the database within our capacity only.

3. **Security -** used to protect the application from vulnerabilities

    - ❖ Amazon detective allows us to identify the root cause of the suspicious or any security issue , like malware attack and denial of service(DOS). This service automatically collects log data from our application aws resources and uses technolo like machine learning to make sure we can find the root cause of the problem faster and in an efficient manner.

BUSINESS PROCESS FLOW DIAGRAM



To begin, users must input an email address and a password to gain access to these apps. Because many apps may only be used online, users must have access to the internet. After that, the user must fill in personal and farm information in order for the data to be saved in the database. Following that, the user must decide which option to use. If the user chooses automatic plant watering and fertilization, the user must schedule when to water the trees and apply fertilizer. As a result, the data from the timer will be recorded in a database. The sensor will detect the fruit and pests if the user decides to notify things made from plants as well as plant-damaging insects.The sensor will automatically recognise the day and time that the fruit and bugs were present. As a result, the information will be recorded in the database as well. A notification will then be sent to the user when it is time to water the tree, fertilize it, and check for fruit and pests. After receiving the notification, the user must return to his farm and complete the task they selected earlier. All information stored in the database is utilized to assist users in determining when it is appropriate to install a timer for each of the apps' options. Finally, users must provide ratings and feedback so that we can improve the shortcomings in these apps.

LOW FIDELITY MOCK-UPS

We decided to use the online software 'Figma' to create the low fidelity prototype. 'Figma' is a vector graphics editor and prototyping tool which is primarily web-based, with additional offline features enabled by desktop applications for mac OS and Windows.We named our application "Auto Farm". We intended to create an app where details about plantations, soil, and crops can be detected through Iot equipment fixed on the plantation site and visualized through the application. We created our low fidelity prototype in such a way where it works on desktops. In our application users have to login in order to use his/her profile to surveillance their plantation site. In order to login the user has to type in his user ID and password for security purposes.

The application then displays the homepage where the user can view his plantation details such as type of plantation, area size, and the last time their plantations get watered, fertilized and pesticide. These features added because make the site owner or farmer to get updated about his crops. On the other hand, there are two main functions that can be done by the user of this application.

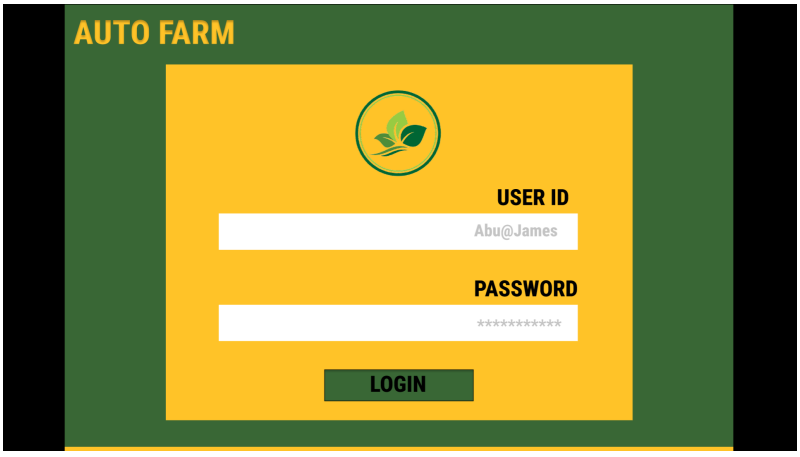
Firstly the sensor function. After clicking the sensor button, the homepage will direct to the sensor page. Here, users get more detailed information about his plantation. In detail, our application will detect the presence of pests in a particular piece of land. Depending on the size of the plantation land gets divided into several plots so that presence of pests can be easily detected. Apart from that, users also get notified about the crops. Through the application, harvesting time will be displayed. Next, the percentage of active crops will be displayed as well. Followed by, how frequent crops get watered, fertilized and pesticide. The frequencies will be shown in percentage. As a last part of the sensor, soil conditions also can be detected by the application. Information such as acidity of soil, temperature of soil, and dryness of soil will be displayed. Along with that, the type of minerals which are lacking in the soil will be notified to the user in this app.

Secondly, the action function. After clicking the action button, the user can either spray water or pesticide or fertilizer on his plantation. For watering, the user can either select water or pesticide or mix both. For fertilizer there are 3 types. Bone meal, blood meal, fish emulsion. Users can mix up the fertilizer before launching to the plantation depending on the plantation type. When the launch button is pressed a signal will be received through the Iot devices and processes will be carried out.

Thirdly, the guide page. Upon clicking the button “APP GUIDE " the homepage will direct to the guide page. Here where users can learn more on how the app works. In detail, colour codes will be exposed to the user at the guide page. For instance, if the wordings appear red in colour, that indicates an immediate action is required. If it's green, it means that it's in a good condition.

Lastly, the “About us” page. Users can get directed to this page upon clicking the “help” button in the login page. At this page, contact details about our company will be displayed. Also there is a feedback section where users can comment about this application for us to enhance. Followed by ratings for us to make further more improvement about our application.

There is also a “Logout” button. Users can go to the login page upon clicking it. At every page (sensor page, action page, guide page, contact page) there is our application logo. If a user clicks that it will direct them to the homepage. This will ease the user rather than scrolling up all the time to get to the homepage



LINK: https://www.figma.com/file/6iHWFZH9ApRjrvlQJazsjP/Untitled?node-id=0%3A1

REFLECTIONS

a. What have we learned and our motivation to complete this project?

We have learned so much in the journey doing this project. First and foremost, we were exposed to low fidelity prototypes. Here, we were experienced making a software which is on the low fidelity stage. Apart from that, we learned about Iot devices that are capable of being fixed in the plantation sites. For example automatic water spraying devices. Our motivation to complete this project is to make a revolution in agriculture. This means, implanting modern technology devices on the plantation sites making the farmers carry out their harvesting process more easily.

b. What issues and solutions are implemented to make the project a success?

One issue we faced was the quality of fruit and vegetables. We found that not every market or shop had a consistent quality product. Therefore, we expected to have to come up with a method that would make their products more consistent and better. First of all, we researched what determined the quality of the plant. After doing research, we learned that some farmers use an incorrect timing to fertilize and water the plant. Some people water their plants according to the last time they watered the plants. In this case, the humidity and weather need to be checked first before we proceed to that process. We invented an irrigation system that checks the humidity and weather to automatically water the plants. We also included a sensor to determine the right time to water. All of this can be controlled remotely via an internet-connected mobile app.

c. What is our direction after completing this project?

With all that, we can see our direction toward becoming a software engineer that will create a lot of apps that can help to make everyday life become much easier. Moreover, with the course that we were taking which is security network, it will really help to learn how the technology system works.

d. What is the improvement necessary for us to improve your potential in the industry?

We need to increase our skill in Information Systems especially in the 4th ir revolution skills so that we can be better in handling technologies and because technology is always revolving therefore we need to upskill ourself everyday as a lifelong learner in this industry.