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Link to group website: <https://hci-group-website-f470f.web.app>

Assignment 2: Plan and Collect Requirements

PROJECT IDEA

This system will be used by farmers or anyone wanting to grow a garden to help decrease the amount of manual work needed to grow crops. It will be using an android application to control and monitor a hydroponics system. The hydroponics system will have sensors such as temperature, humidity, PH, EC, and water level. The hydroponics system will also have certain modules that will allow the system to be turned on and off automatically. These modules and the sensors will be connected to a raspberry pi. The raspberry pi will be connected to the user's wifi using a network card. It will constantly collect data from the sensors and use the wifi connection to send the data to a database stored on a remote server. The android application will retrieve the data from the remote server and display all the information in a clear format to the user. The user can use this information to know if anything is wrong with the system or any action needs to be taken like refilling the water tank. The android application's interface can also be used to program the hydroponics system to turn on or off automatically at a certain time. Once the user submits a time to turn on the system that data will be sent to the database and the raspberry pi will receive that information from the database and turn the specific modules on or off.

STAKEHOLDERS AND USERS

Farmers: Farmers may not have much experience using applications of this nature and might need tutorials to learn how to use the application at first.

Home gardener's: They may have more experience using applications of this nature however they may still need a short tutorial at first to show them how the application works.

Both farmers and home garden's will be taking part in evaluations.

RESEARCH METHODS

Survey: a survey was used to verify the types of users that would be interested in using technology to monitor a hydroponics system, this method was appropriate as it allows for the collection of unbiased data from a wide range of potential users of the system. The

total number of surveys handed out and completed is ten. The survey questions were read out by me to anyone who was willing to do the survey. In conducting the survey not many people wanted to participate. The findings of the research show that all participants knew what hydroponics is but when asked what they knew about it none of them knew anything besides growing plants with water and not soil. The findings show out of the ten participants only two use hydroponics but the rest of the participants all said they would be interested in using hydroponics. Both of the two participants that are currently using hydroponics are not using technology to monitor their system. All the participants said they would be interested in using technology to monitor a hydroponics system. The overall finding is that using technology to monitor a hydroponics system is an idea that would be successful when materialized.

This research method will allow for gathering a vast amount of data from many users quickly. In carrying out this method surveys were handed out in one area so not many people wanted to take the survey. Next time the survey should be handed out in different areas in order to obtain more data.

The survey questions used can be found in the link below.

[Hydroponics survey](#)

Secondary research: To verify the validity of hydroponic systems for the cultivation of plants secondary research was used. Online articles were very helpful because they helped clarify what a hydroponics system is as well as the several advantages and disadvantages associated with them. They provide detailed explanations on how they work as well as why people will choose to use a system of such nature instead of traditional agricultural techniques. Through the combination of knowledge gathered from those articles and computer science we can now provide a new interface which users will enjoy.

For example, a hydroponic system to function properly, it needs to be heavily monitored.

As a result only well trained professionals will be able to use it properly.

However, with the introduction of the raspberry pi, sensors and a mobile app that process becomes significantly easier so even part time gardeners will be able to use it well. We have also gathered information on the raspberry pi on how it can be applied to this project.

One of the disadvantages with the secondary is research is not taken first hand. One can only assume that the information which is given is accurate. To help remedy this problem only trusted sources were used.

Links to those articles are provided below:

<https://www.thespruce.com/beginners-guide-to-hydroponics-1939215#:~:text=Hydroponic%20is%20a%20form%20of,and%20conserve%20soil%20and%20water.>

<https://www.raspberrypi.org/blog/what-can-you-do-with-a-raspberry-pi/>

Research Method: Interviews

Interviews were conducted to get a better understanding from a user perspective on how managing a hydroponic system works. The user will give their opinions and experiences

on the topic, explaining different situations they faced and what can be done to solve it. Using this method, the developer will have better insight of the user from conversing with them to make a better product that can suit their target audience.

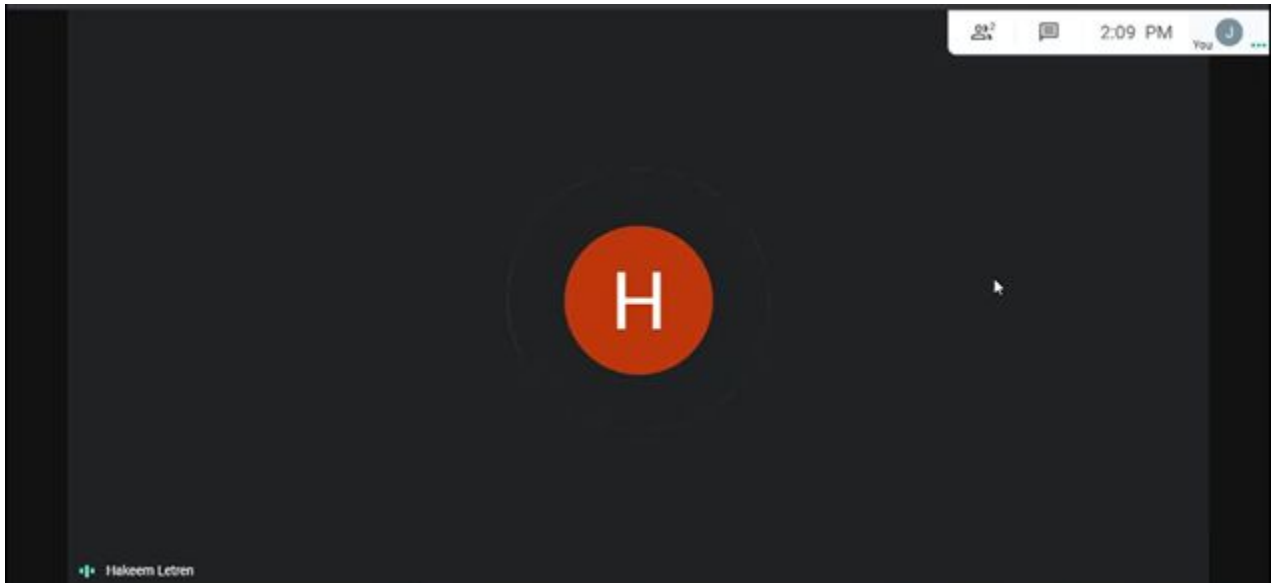
Interviews were scheduled with three individuals virtually via google meets. Some interviews were recorded with permission of the interviewee and 5-7 questions were asked while the interview was being conducted. The interviewee will give a brief introduction of themselves and then give their opinions on hydroponics and what technologies can be implemented.

From conducting the interviews, each interviewee had different explanations as to how hydroponic systems work but it all led to the same conclusion that it is all dependent on the quality of the water to provide nutrients for the plants to survive. Due to hydroponics being a soilless based form of agriculture, a major finding from the interviews is that quality control and management of the water is the most important factor in maintaining a hydroponic system. From this, another finding discovered is that a key feature is a centralized monitoring system where data such as ph (alkalinity) levels, ammonia levels, temperatures, chlorate can be sent to the user. The user will also want a very simplistic user interface where they can easily navigate and understand how their hydroponic system is running as some may not know what the level numbers may be but instead information like low, medium and high.

Conducting this research method is very viable considering the pandemic as well as it gave informative insight as to what the user will expect for the app. Unfortunately, a major disadvantage is scheduling meeting times as individuals are busy with their own personal lives. This caused some interviews to be rescheduled and even cancelled due this factor. What can be done better is to make a proper schedule day where both parties have to commit to as well as have other interviewees just in case



Interview with Nathaniel Davis year 2 UTT student studying Maritime



Interview with Hakeem Letren year 3 UWI student studying BSc in Agricultural Science

TASK DESCRIPTIONS

1. Activate hydroponic system:

Goal- The farmer or the home gardener wants to turn on the hydroponic system.

Exceptions:the system is already on

2. Deactivate hydroponic system

Goal- The farmer or the home gardener wants to turn off the hydroponic system.

Exceptions:the system is already off

3. Schedule system to turn off

Goal- The farmer or the home gardener wants to set a time for the hydroponic system to automatically turn off.

The system must be on to set a time to turn off the system

Exceptions:the system is currently off

4. Schedule system to turn on

Goal- The farmer or the home gardener want to set a time for the hydroponic system to automatically turn on.

The system must be off to set a time to turn on the system

Exceptions:the system is currently on

5. View tank water level

Goal- The farmer or the home gardener wants to view the water level in the tank of the hydroponic system.

6. View the pH of the water in the tank

Goal- The farmer or the home gardener wants to view the pH of the water in the tank of the hydroponic system.

Exceptions:there is no water in the tank

7. View the temperature of the water

Goal- The farmer or the home gardener wants to view the temperature of the water in the tank of the hydroponic system.

Exceptions:there is no water in the tank