Smart Plant Monitoring System

Team - Athugalpura

Progress Review Report

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1. Problem Description

Plants are delicate things and sometimes taking care of them is as much as cumbersome and exhausting as the joy one can get from it. It is a continuous process that cannot be neglected even for a one day. This is a problem that we as a team also experienced, and pone inspection about this subject we found out that this problem was faced by most of the hobby plant growers online. And later we found out that this is a major problem for the busy farmers who have to take care after large number of crops. Although we are not sure to address this question in a larger scale, we decided to make a solution for this using the electronic knowledge. There are some of the products that can be sold in some countries, there is no such thing within Sri Lanka, and our country is not yet aware of possibility of such products too.

2. Motivation

Agriculture is becoming more and more crucial with the increase of hunt for food, and using technology to enhance the agriculture is becoming ever so popular. Everyone is getting busy and it is impossible for large farmers to keep track of every plant individually. Even the people who are growing for a hobby forgets to take care of their plants from time to time. Since having a cellphone phone is becoming a norm, we decided to use this for a remedy. Using the knowledge of electronics and IOT we decided to improve upon the idea of using distant farming to help the busy farmer to take care of his crops even when he is not able to attend them physically.

So out team Athugalpura decided to make a solution to this problem by making a device that can help anyone to take care of their plants remotely.

3. Justification for Selection

It is estimated that the amount of wheat destroyed due to negligence is at around 5%. It seems like a minor amount, but the amount of money, water, space, fertilizers and the effort that went into it is a total waste. So, this will be able to reduce by a significant amount using the effort.

On the other hand, we did a survey on the students from our university and from people around our age group. There we asked who wants to maintain a plant as a hobby but never get a chance because they are busy. Out of 82, 41 of them said yes for the above problem. So, it is safe to assume that this percentage will be larger when we consider the elderly population.

As a part of our research one of our members went to Bathalagoda Research and Development Institute. According to the data the information that we gathered from them it is quite evident that this negligence problem is worse with the people who grow plants as a hobby. And this is also a problem during the initial state of the people who grow large crops like coconut and jack.

So, from the above details we decided that these are enough information to justify that our selection is good.

4. Feasibility Study

This is a new product in Sri Lanka, so we did a 2-part feasibility study to check whether our product is viable. They are Technical feasibility and Market Inspection.

Technical Feasibility

Since this is an incorporation of technology to a very old concept, we did our technical inspection to clarify most of the problems that can be faced.

Easiness in Use

This device should be able to used by the most of the people who are into agriculture. So, the interface must be very simple. We are planning to make the device with the minimum possible interactions. Now as the mobile phones are with almost everyone, we decided to make the output of the device through a mobile app. And the app will also be very simple. The enclosure will be designed in a way that the complex electronic parts are all hidden, so giving a simple look.

Distance that can be Reached

We are using Bluetooth modules for the initial stage of the product. So, the notifications regarding the plant will only be reached about to 10-15 meters distance. This will be enough for a hobby plant grower who is keeping his plant in his room. Later if we were able to incorporate IOT and WIFI the reach can be made infinite.

Power Usage

Initial predicted product is to panned to use the AC power supply of a household. So, this product is limited only to the inside of a house. So later if we got a chance, we can improve this to utilize a power through a battery. Then we will be able to use it outside.

Weight and Size

The weight and size are not a crucial condition for the performance of this product. But the packaging will be made minimums as possible for the easy transport and the weight will be around 500g.

Usage of an LCD Panel

LCD panel is used in case the user is not familiar with the mobile app or if he does not have the access for a smart phone. This LCD panel will display all the necessary notifications about the plant.

Market Inspection

It is clear that this kind of a product is not available in Sri Lanka. With the problems of accessing a phone, farmers not being familiar with the technology and the problems that our product have in taking it outside (like power supply, WIFI reach and whether proofing) it is not feasible to market this product to the general farmers. But this will have a good market among the people who are growing ornamental plants for the aesthetics inside their houses. Since it is a niche market, we would be able to price this to a reasonable price.,

5. Components Used.

1. Soil moisture sensor, Relay Module, Solenoid valve, Pipe and hose

The moisture level is measured by the soil moisture sensor. When the moisture level went down, the solenoid valve is opened by the relay module and add water to the plants using pipe and hose.

2. Bluetooth module

To connect with mobile app to control the system and get the readings and notifications.

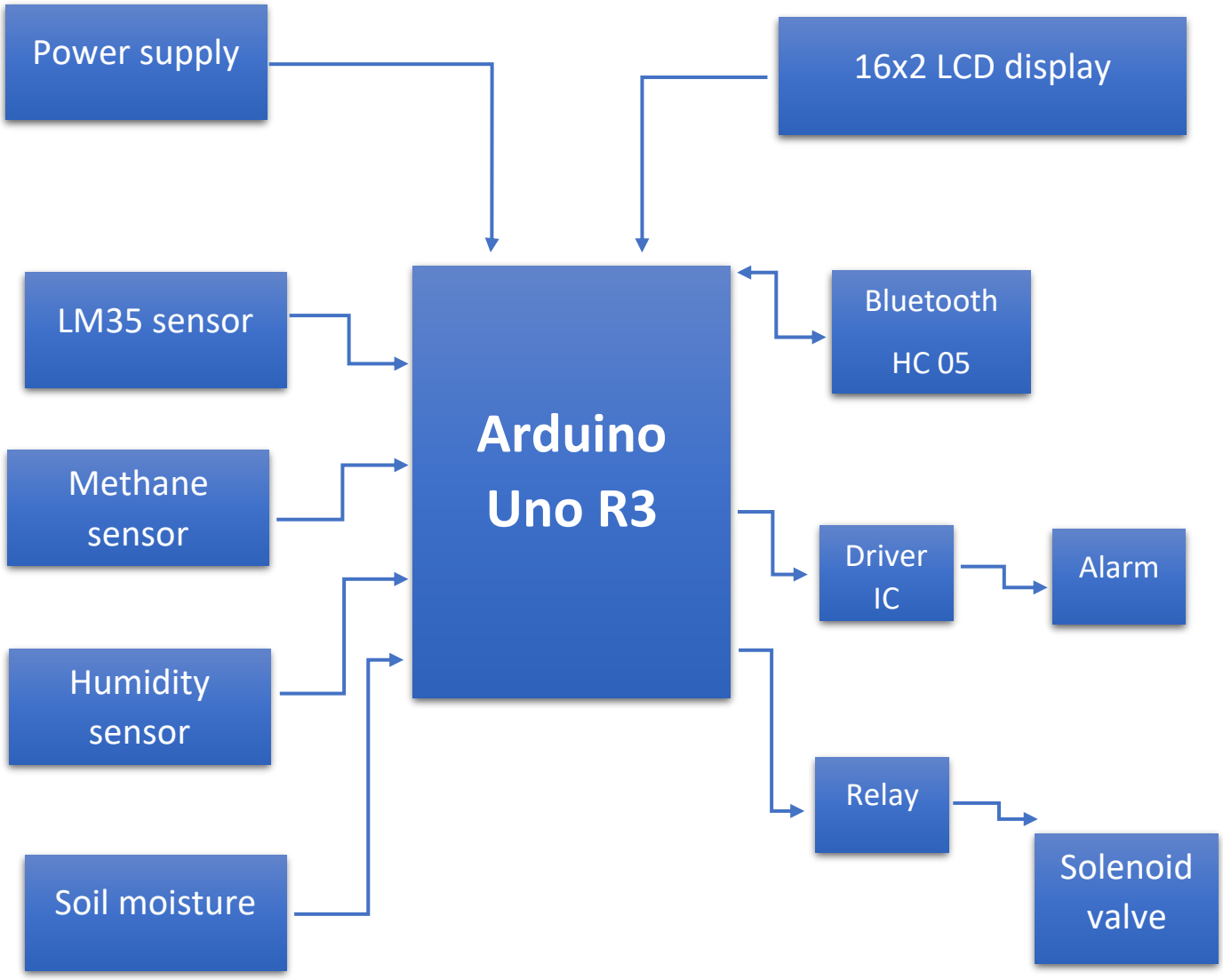
3. Lcd display, Keypad

When the system is not connected to the mobile this block is used to operate the system and get notifications.

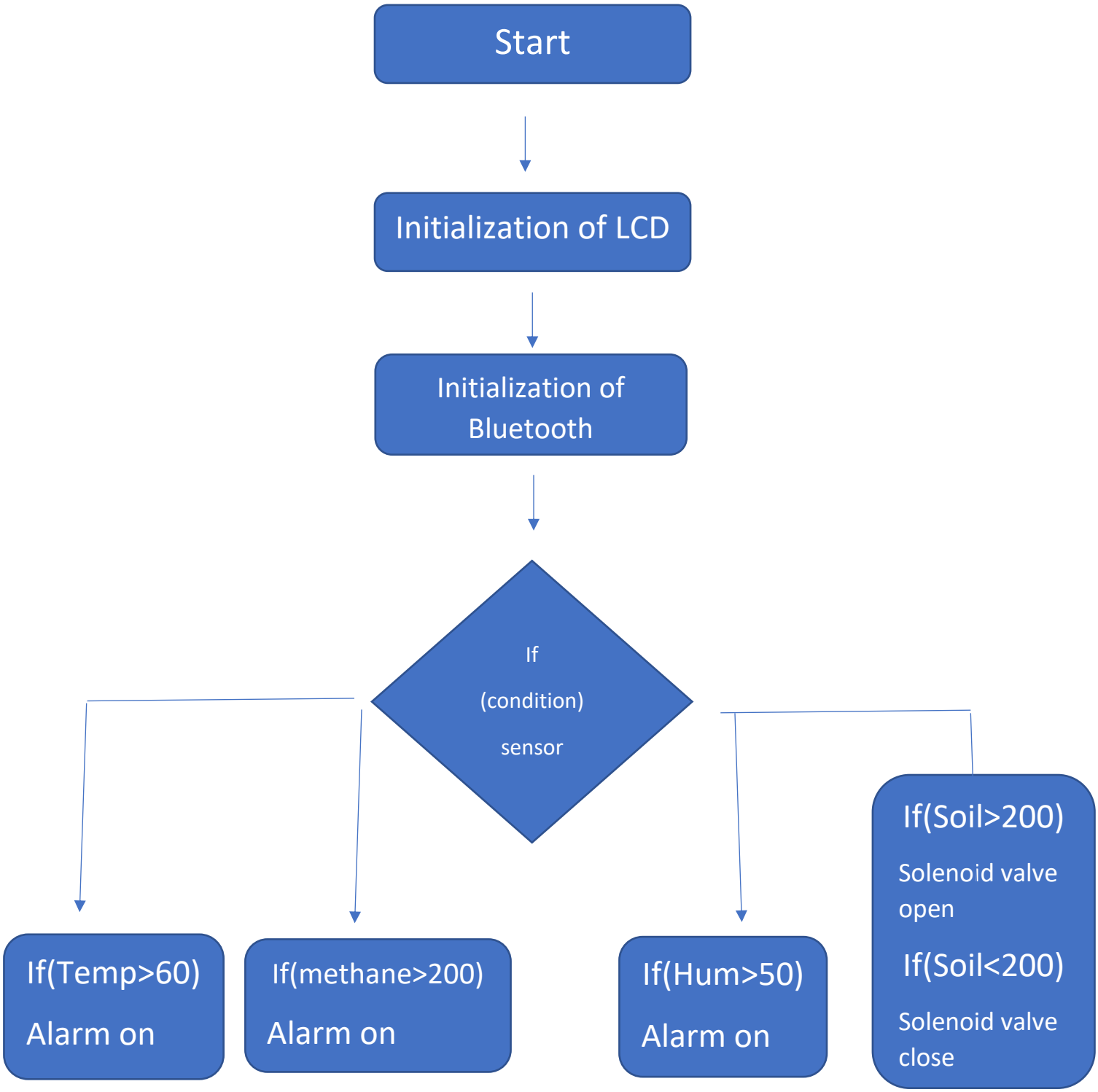
4. Temperature, methane and humidity sensors and alarm module

Measure temp, methane level, humidity and inform using an alarm when the parameters go off the limits that we already decided

6. A Smart Wireless Sensor Network for Monitoring Agricultural Environment-Block Diagram



7. Flow Chart


Start
Initialization of LCD
Initialization of Bluetooth
If (condition) sensor
If(Temp>60) Alarm on
If(methane>200) Alarm on
If(Hum>50) Alarm on
If(Soil>200) Solenoid valve open
If(Soil<200) Solenoid valve close

8. Expected Enclosure

9. Bill of Materials

Component Name	Quantity	Cost (SLR)
• Arduino uno	1	1 200
• Soil Moisture Sensor	1	450
• Bluetooth HC 05	1	850
• Relay Module	1	400
• Solenoid Valve	1	1 250
• Pipe and hose	sufficiently	1 200
• Wires	sufficiently	100
• Drip nozzle	sufficiently	50 x 5
• LCD Display	1	400
• Keypad	1	200
• Temperature and Humidity sensor	1	870
• Methane sensor	1	1 300
• Alarm	1	200
• Others		200
Total		8 870

10. Task Allocation

Abeysinghe W.A.M.S.Y 190014F	Rathnayake R.M.K.L 190520D	Wickrama W.M.T.B 190680P
• App building (Soil Moisture Sensor) • Enclosure Design • Report Creating	• App building (Temperature and Humidity sensor) • Assemble photo type • Budget planning	• App building (Methane sensor) • Finalized the code • gathering of data and information