

MODERN INDIAN AGRICULTURAL SYSTEM USING GSM

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Abstract

Project is used to find exact field information and to provide instant across the field. This involves some sensors, LCD display, GSM and ARM processor. All the sensors will give analog output but our processor will accept only the digital data. So we have to connect all the sensors to the ADC channel pins which are in-built to the processor. LCD will be on field display purpose. GSM module will contains a Subscriber Identity Module (SIM) user can communicate with this SIM-Number. When the particular command activated or given by the user, immediately the corresponding sensor will activates and reads the present reading and immediately sends results to the same user mobile and displays in the LCD panel in the field. Immediately user will take the necessary action if required. Here we are using total seven sensors to monitor the field condition. Those are Temperature, Humidity, Soil moisture, Leaf sensor, PH sensor, Level sensor, Phase sensor. All these devices are connected to the ARM processor. GSM is used for communication purpose, with the help of AT (attention)-Commands we can communicate with the components. For soil module and level sensing applications we are using motors. One motor is used to store water and another is for releasing the stored water into the soil.

Keywords – Arm LPC 2148 Microcontroller, GSM, Sensor, User Mobile.

1. INTRODUCTION

Modern agriculture offers a range of benefits, including greater production and higher incomes for farmers including small producers in both developed and developing countries. Technical advances also have sharply reduced environmental impacts, enabling reduced pesticide, herbicide and fertilizer use, less tillage, and less land and water use per unit of output all decreasing pressure on fragile global ecosystems. It is clear that we have a productivity gap going forward, a gap that we must begin now to close. If we are to double agricultural output by 2050 and do so with basically the same amount of land and water as we have today while also reducing the environmental footprint then clearly we must become more productive than we have been in the past. That is the productivity gap, which is our challenge. Recently, potentiometric sensors have appeared that take profit of the electric field generated by the membrane potential caused by presence of specific ions; the electric field modulates current in a field effect transistor, in this way these sensors are known as Ion Selective Field Effect Transistors (ISFETs). ISFET sensors have a great future in continuous monitoring, given that they are able to determine ions at very low concentrations and they can be massively produced using VLSI technology. In agricultural farms where operation and environmental conditions are quite aggressive the robust and cheap ionic sensors that provide exact information of the ionic composition of the nutrient solution are very useful, although accuracy is not excessively high.

The technique is also suitable for expensive crops like strawberry and mushrooms in closed soilless systems. The closed soilless systems is a techniques implemented in modern horticulture in order to improve the efficiency in the use of water and fertilizers and to preserve the environment. In few words, in this technique, plants grow on artificial substrates which substitute natural soil. A fertilizer supply unit provides nutrients and the solution not used by the plants is collected and regenerated to be reused several cycles. The addition of new fertilizer ions (ammonium, potassium, nitrate, phosphate) and tap water is controlled by the value of electrical conductivity (EC) and pH signals. However, this protocol can only give a qualitative control over these species given ions uptake by the plants may vary. In the closed soilless systems non-essential ions such as sodium and chloride accumulate in nutrient solution causing an increase in the overall EC and consequently a decrease of the concentration of the nutrient ions if the conductivity is maintained at a fixed value. Therefore, the measurement of the concentration of each individual ion in the nutrient solution in continuous mode, and in real-time can be a clear improvement to normal use in this area, and can lead to fine control of fertilizer dosage adapted to each plant stage.

This is my simple concept and approach, to bring our agricultural system into the world class recognition.

2. BLOCK DIAGRAM

The following figure shows the block diagram of modern agricultural system.

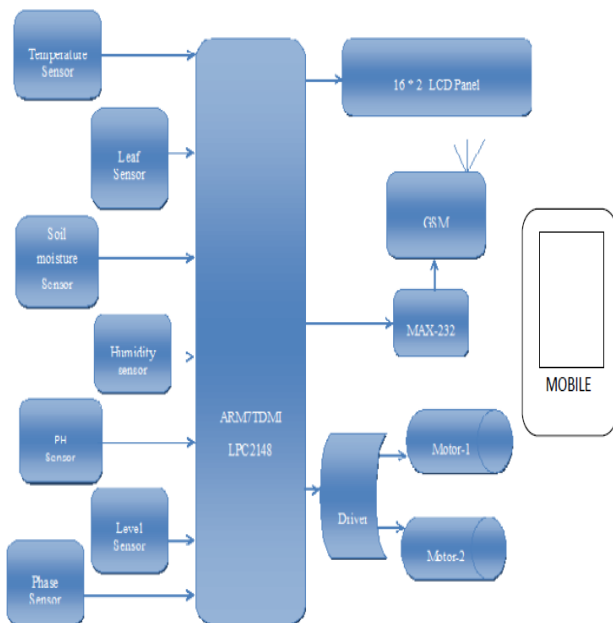


Fig:1 Block diagram

The above parameters as discussed in the block diagram will monitor the field and gives the accurate results to the user. Here the new and important things like, Leaf sensor, PH, Soil, Level sensors. To monitor weather leaves are healthy or not.

The PH sensor is to monitor the soil condition, weather the soil having harmful acidic nature or normal base nature. If acidic nature is present means we have to dilute the content and neutralize it or we will provide the necessary fertilizer.



Fig 2: PH Sensor

In case of soil moisture, we will check weather soil is dry or wet. If it is dry means, this condition is very harmful to plants. So immediately release the water into the soil and make it wet. For this we will use the level sensor and phase sensor will be

very useful. Temperature and humidity are useful in the case of monitoring the weather conditions. And we are using the two ac motors, one is for the bringing the water into the storage from ground. Whereas another one is helpful in case of sending water into field from the storage. The LPC2148 microcontrollers are based on a 32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support that combine microcontroller with embedded high speed flash memory upto 512 kB.

A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty.

Due to their tiny size and low power consumption, LPC2148 are ideal for applications where miniaturization is a key requirement, such as access control and point-of- sale.

3. GSM MODEM

3.1 Definition

The words, “Mobile Station” (MS) or “Mobile Equipment” (ME) are used for mobile terminals Supporting GSM services.

A call from a GSM mobile station to the PSTN is called a “mobile originated call” (MOC) or “Outgoing call”, and a call from a fixed network to a GSM mobile station is called a “mobile Terminated call” (MTC) or “incoming call”.



Fig:3 GSM Modem

3.2 Soil Moisture sensor

The oven-drying technique is probably the most widely used of all gravimetric methods for measuring soil moisture and is the standard for the calibration of all other soil moisture determination techniques. This method involves removing a soil sample from the field and determining the mass of water content in relation to the mass of dry soil. Although the use of this technique ensures accurate measurements, it also has a number of disadvantages: laboratory equipment, sampling tools, and 24 hours of drying time are required.. Eventually, measurements will become inaccurate because of field variability from one site to another.

Procedure

When installing the probe, it is best to maximize contact between the probe and the soil. There are two methods to accomplish this.



Fig :4 Soil moisture.

3.3 Advantages

- Real-time response, monitoring and controlling.
- Checking the weather conditions and intimating to user.
- It will protect each and every issue regarding plant growth.
- Controlling and managing whole system through GSM.

3.4 APPLICATIONS

- Industrial automation system
- Weather Station
- Home automation system

CONCLUSION

The project is thus carried out using ARM7TDMI core with the help of GSM technologies. This project finds application in domestic agricultural field. In civilian domain, this can be used to ensure faithful irrigation of farm field, since we have the option of finding out moisture level of soil in a particular area.

FUTURE SCOPE

The project scope involves ARM-controller with a video capturing and sending it to user as MMS about the total crop position or to know the total crop condition. We can connect to the nearer weather station to know the up-coming weather changes.

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BIOGRAPHIES

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