Android Based Organic Agriculture

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Abstract. *Organic farming system in India is not new and is being followed from ancient time. It is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (bio fertilizers) to release nutrients to crops for increased sustainable production in an ecofriendly pollution free environment.This intent will be fully automated with the help of embedded system using PIC 18677 Microcontroller. The entire system is connected with wireless sensor network we may receive the entire parameter based on the value it will balance the system to compensate the variation inSoil, Pigment, temperature, weather, Moisture and Minerals can be analyzed with quick and reliable automated system.Pigment, temp, weather, moisture etc.*

Keywords: Sensors, Pic microcontroller 16f877, Solar panel, Android application, Motor driver circuit.

1. Introduction

Organic agriculture has grown out of the conscious efforts by inspired people tocreate the best possible relationship between the earth and men. Since its beginning the sphere surrounding organic agriculture has become considerably more complex. A major challenge today is certainly its entry into the policy making arena, its entry into anonymous global market and the transformation of organic products into commodities. During the last two decades, there has also been a significant sensitization of the global community towards environmental preservation and assuring of food quality. Ardent promoters of organic farming consider that it can meet both these demands and become the mean for complete development of rural areas. After almost a century of development organic agriculture is now being embraced by the mainstream and shows great promise commercially, socially and environmentally. While there is continuum of thought from earlier days to the present, the modern organic movement is radically different from its original form. It now has environmental sustainability at

Its core in addition to the founders concerns for healthy soil, healthy food and healthy people.

Need of organic farming

With the increase in population our compulsion would be not only to stabilize agricultural production but to increase it further in sustainable manner. The scientists have realized that the 'Green Revolution' with high input use has reached a plateau and is now sustained with diminishing return of falling dividends. Thus, a natural balance needs to be maintained at all cost for existence of life and property. The obvious choice for that would be more relevant in the present era, when these agrochemicals which are produced from fossil fuel and are not renewable and are diminishing in availability. It may also cost heavily on our foreign exchange in future.

1

The key characteristics of organic farming include

- Protecting the long term fertility of soils by maintaining organic matter levels, encouraging soil biological activity, and careful mechanical intervention
- Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms
- Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures
- Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention
- The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing.

2. Block Diagram

This block diagram shows automatic organic based smart agriculture system. It consist of GSM module with sim 900 to send the entire parameter values to user with exact location using GPS receiver. With the help of PH, TDS, Temperature, Moisture modules corresponding values can be absorbed it will be processed by PIC microcontroller and DC motor, solenoid valve can controlled automatically.
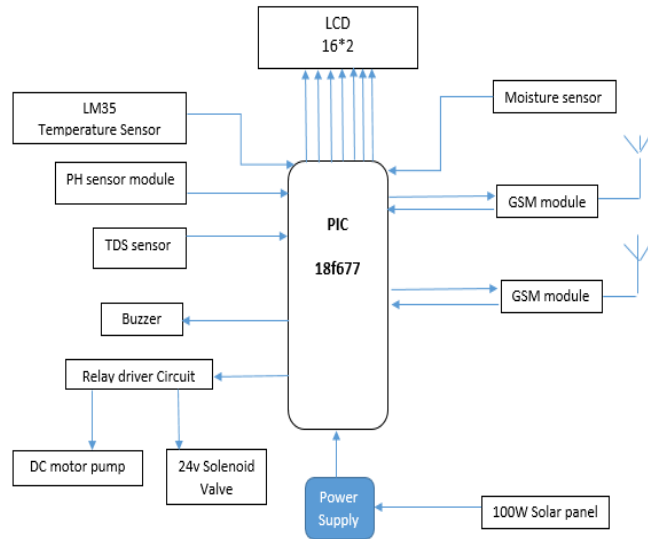

3. Moisture sensor

This Moisture Sensor can be used to detect the moisture of soil or judge if there is water around the sensor, let the plants in your garden reach out for human help. They can be very easy to use, just insert it into the soil and then read it. With the help of this sensor, it will be realizable to make the plant remind you please give me some water.

4. Temperature sensor

LM35 is a precision IC **temperature sensor** with its output proportional to the temperature (in ^{0}C). The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. With **LM35**, temperature can be measured more accurately than with a thermistor. It also possess low self-heating and does not cause more than 0.1^0C temperature rise in still air. The operating temperature range is from -55°C to 150°C. The

2

output voltage varies by 10mV in response to every ^{o}C rise/fall in ambient temperature, *i.e.,* its scale factor is 0.01V/^{o}C.
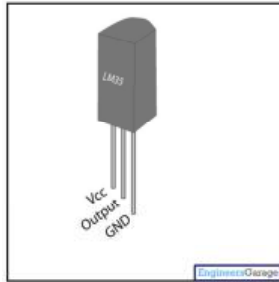
5. PH Sensor

A pH measurement loop is made up of three components, the pHsensor, which includes a measuring electrode, a reference electrode,and a temperature sensor; a preamplifier; and an analyzer or transmitter.

A pH measurement loop is essentially a battery where the positiveterminal is the measuring electrode and the negative terminal is thereference electrode. The measuring electrode, which is sensitive tothe hydrogen ion, develops a potential (voltage) directly related tothe hydrogen ion concentration of the solution. The referenceelectrode provides a stable potential against which the measuringelectrode can be compared.

6. GSM Module

GSM/GPRS module is used to establish communication between a computer and a **GSM-GPRS system**. **Global System for Mobile communication (GSM)** is an architecture used for mobile communication in most of the countries. **Global Packet Radio Service (GPRS)** is an extension of GSM that enables higher data transmission rate. **GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces** (like RS-232, USB, etc) for computer.

7. TDS Sensor

TDS is the measuring of the amount of salts in a solution. For a lot of applications the amount of salt is indicative of the levels of other stuff in a solution. TDS meters sold for gardening and aquariums figure the amount of salt in Parts per Million by measuring the Electrical Conductivity of the solution **under test.**

8. Buzzer

3

Piezo buzzers are used for making beeps, tones and alerts. This one is petite but loud! Drive it with 3-30V peak-to-peak square wave. To use, connect one pin to ground (either one) and the other pin to a square wave out from a timer or microcontroller. For the loudest tones, stay around 4 KHz, but works quite well from 2 KHz to 10 KHz. For extra loudness, you can connect both pins to a microcontroller and swap which pin is high or low ('differential drive') for double the volume.

9. GPS Module

New improved GPS Module with external high-gain patch antenna and memory back-up for OEM and hobbyists projects. This unit features low power consumption, high sensitivity. The unit is ideal for navigation systems, distance measurements, vehicle monitoring and recording, boating direction and location, together with hiking and cross country exploring.


10. Solar Panel

A solar panel is a set of solar photovoltaic modules electrically connected and mounted on a supporting structure. A photovoltaic module is a packaged, connected assembly of solar cells. The solar panel can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 320 watts.

11. Relay Driver Circuit

Generally, we think on the high side because we usually place the power switch in the power lead as in Fig. When controlling relays via logic etc. it is far easier to interface to the low-side driver.
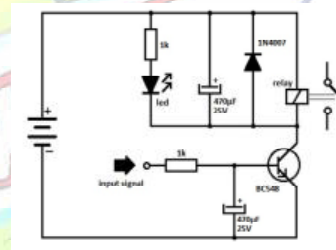
12. LCD

LCD (liquid crystal display) is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube (CRT) technology. LCDs consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it.
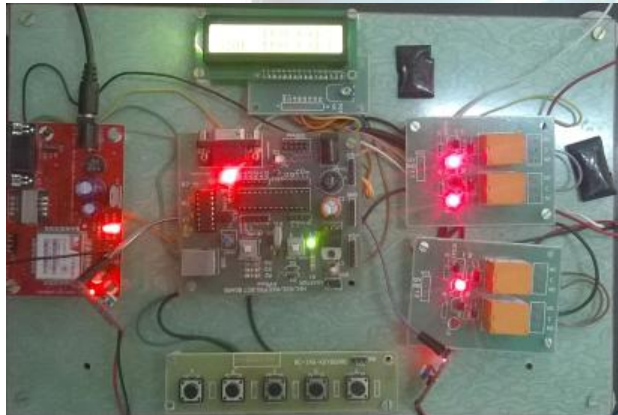

4

13. Solenoid Valve

Solenoid valves are used to close, dose, distribute or mix the flow of gas or liquid in a pipe. The specific purpose of a solenoid valve is expressed by its circuit function. A 2/2 way valve has two ports (inlet and outlet) and two positions (open or closed).

14. Output

The project output data's are send to android application and all the modules are controlled by smart phone.
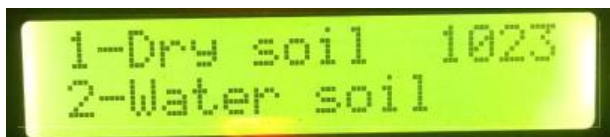
15. Conclusion

In this way we have to use lot of synthetic fertilizer, pesticides, in agriculture. Inorganic method will create the biological problems in human and animals. This is right time to change our synthetic method and establish organic method for safe guarding with our future generation.

16. Reference

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5