

IOT Powered Farmers Buddy

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Abstract— Agriculture has been the livelihood of almost two thirds of the people in the country. Agriculture has always been most important economic sector of India. The increase in agricultural production has brought extra areas under cultivation, new irrigation facilities, better use of seeds, better use of techniques, management of water, and protection of plants. In particular, the project is mainly on both hardware and software. The project deals with the implementation work of Marketing/selling the crops at right price with average profit is the major problem faced by the farmers as lack of pricing and demand information in the markets. Our project consists of the following SMS-enabled applications for farmers to know the exact price, demand and future predictions in the market before he decides to sell his crops. When farmer decide to sell his crops, He can know the demand, current price and the future trend the crop can take. This data is maintained in central server by experts and updated daily as market trends.

I. INTRODUCTION

The production of food is decreasing where as demand for food is continuously increasing. The reason is most of the farmers are selling their land because of which there is no production. The main reason is there is no consistent rains every year as well as there is no proper water supply. The water level is reducing because of the continuous extraction of water from earth due to which lot of land is coming slowly in the un-irrigated zones. Another reason is due to unplanned use of water most of the water is getting wasted. The significant advantage of drip irrigation system is that water is supplied near the root zone drip by drip due to which large amount of water is saved. At present farmers are using irrigation technique manually which needs to be irrigated at regular intervals. This process may lead to crops getting dried if there is no proper supply of water at right time. Water deficiency may affect the growth of the plant and wilting occurs. Water deficiency may also result in slowed growth rate and light weight fruit. By using automated drip irrigation system the problem can be easily solved in which the process takes place only when there is intense requirement of water.

To turn motor on or off the irrigation system makes use of valves. By using controllers and solenoids these valves can be easily automated. The valves can be turned on or off even if the labors are not there by using this automation. This automation provides right amount of water required at the right time for that particular land. By using this automation equipment farmers are able to reduce over watering saturated soils, avoid irrigation at the wrong time of the day, which will improve crop performance by providing adequate amount of water and nutrients when needed. It is one of the most valuable tool for accurate control of soil moisture in specialized greenhouse vegetable production and it is pretty simple and accurate method for irrigation. It also helps in saving of time, human error can be removed by adjusting soil moisture and the net profits can be maximized.

This project is useful for agricultural students and farmers and it is a IOT CLOUD based project. It helps in providing solutions to farmers and agricultural students as it has a open discussion portal and problems can be discussed in the portal and appropriate solutions will be given to the farmers. It also provides information about which fertilizers should be used and how much? It also tells about which crop or which

vegetable to be grown as the market trends and provides profit to the farmer. So based on the market prices the farmer can make decision about which crop he can grow so that he will get the profit of growing that crop and does not become a loss. Daily information is maintained in the central server regarding the crop prices in the market and this will be published to the farmers so that they can make decisions according to that. Agricultural officers also provide training to the requested agricultural students, farmers and general public. Students and general public can also post queries through mails. Queries can also be sent to a particular officer if required and suitable solutions will be provided by the agricultural officers. The agricultural officers and administrator can change the information pages as the information provided is dynamic.

II. DESCRIPTION OF COMPONENTS

2.1 Microcontroller

The SST89E516RD is a 8-bit microcontroller product manufactured by cmos semiconductor technology. It offers significant cost and reliability for sst customers by using split gate cell design and thick-oxide tunneling injector. The instruction set used is 8051 and it has more random access memory and read only memory capacity. It also has 3 timers.



Fig. 1. Microcontroller.

2.2 Humidity Sensor

Humidity sensor has been used in various applications for measuring and monitoring humidity such as consumer, electrical, biomedical and environmental applications. The water content in air is important factor to mankind. For ex if the humidity is less we will feel quite comfortable that the air is dry such as 00C and if the humidity is more then we will feel quiet uncomfortable such as 100C. Humidity also plays major role in operating sensitive equipments like industrial equipment, high voltage devices, electrostatic sensitive devices, electronics etc. These devices must be operated with

humidity environment which is suitable for that particular device.

2.3 Temperature Sensor

Temperature sensor is mainly used to detect the temperature or heat. LM35 is used as the temperature sensor. This LM35 can be glued onto particular surface and its temperature is noted and this temperature will be less than 0.01C of the surface temperature. This tells that air temperature is almost same as the surface temperature.

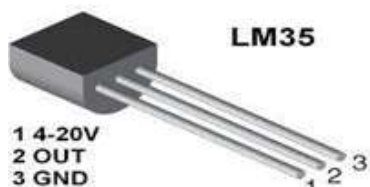


Fig. 2. Temperature sensor.

2.4 GSM

GSM mainly acts as a intermediate between the microcontroller and the user. The commands which come from other sensors are passed on to the GSM first and then GSM passes it to the microcontroller. In our project it is mainly used by the farmer for switching on and off the motor automatically even if he is anywhere in the world by passing characters to the GSM.

2.5 Relays

Relays mainly act as switches. It is used in places to control circuits by using low power signals. Many circuits can be controlled by using one low power signal. Relays were invented during telephone exchanges where it was used for long distance telegraphy. Logical and Boolean operations can be performed in various versions of computers by using relays. High power is needed by some of the high end applications of relays which can work by using electric motor.

2.6 ADC

ADC is mainly used as analog to digital converter. The readings coming from temperature and humidity are in analog as the microcontroller cannot understand readings in analog hence readings are converted into digital by using analog to digital converter. Successive approximation is the technique used to convert analog to digital.

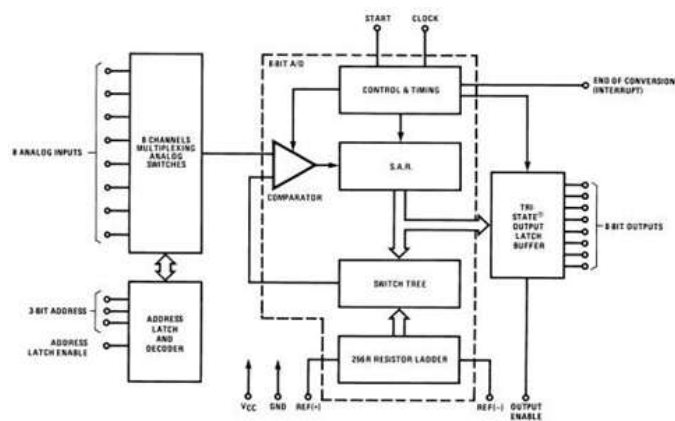


Fig. 3. ADC.

This ADC are designed to perform repeatable, accurate and fast conversions over a wide range of temperature and humidity readings.

2.7 LCD Display

LCD Display is mainly used to display characters. It contains two rows each of which contains 16 bits. Hence totally two rows each of 16bits can be displayed. Bit 1 is ground, bits 7-14 are the data bits, bit 15 is the back light anode and bit 16 is the back light cathode. Bit3 is mainly used provide input voltage for LCD.

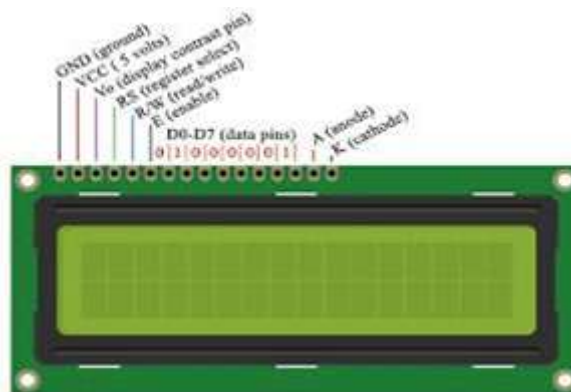
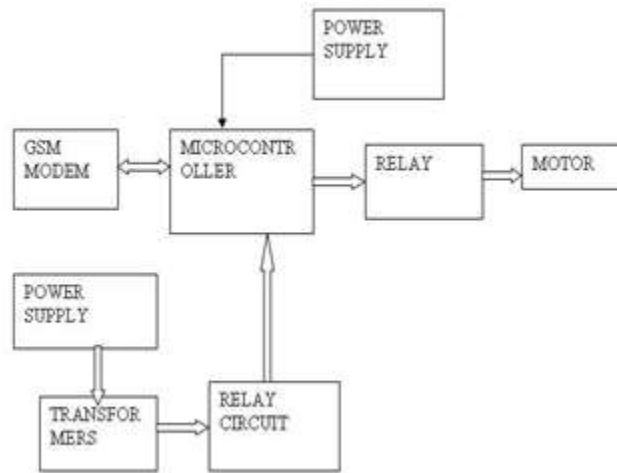


Fig. 4. LCD display.

III. METHODOLOGY

Transmitter Side



Receiver Side



Fig. 5. Block diagram.

This project mainly works on microcontroller and GSM. When there is a three phase power the GSM sends message to all the authenticated users. If there is a single phase power or two phase power GSM will not send message to the users. If the farmer wants the motor to be on he has to send message to the GSM with the registered number with a particular character. The GSM check the particular character if its matching then GSM sends it to the microcontroller and microcontroller automatically switches on the motor otherwise it assumes that message is coming from other user and ignores it and no action will be taken. This can be done even if the farmer is anywhere outside by sending a message with particular character to the GSM. Similarly if he wants to switch off the motor he has to follow the same procedure he has to send message to the GSM with a character if it matches the GSM sends it to the microcontroller and microcontroller automatically switches off the motor. After each and every state the information is passed on to the farmer. The entire process can also be done by calling to that particular number the motor gets on and similarly calling to the same number the motor gets off.

We have implemented one more feature called auto switch. If the switch is in ON STATE whenever there is three phase power the motor automatically gets on and if he wants to switch it off he needs to send message to particular GSM.

The advantage of using GSM module is farmer can switch on and switch off motor remotely even if he is anywhere in the world.

Saves time: No need of spending more hours of watering and the farmer need not have to worry about visiting the land at regular intervals. The GSM module does it automatically.

Saves water: It saves large amount of water by doing itself automatically at the right time even when the farmer is not present. So gallons of water can be saved by using automated irrigation system

Protects your financial investment: It can be done in very less cost and farmer will get to know which crop has higher demand in the market and this will help the farmer in his financial investment

IV. RESULTS

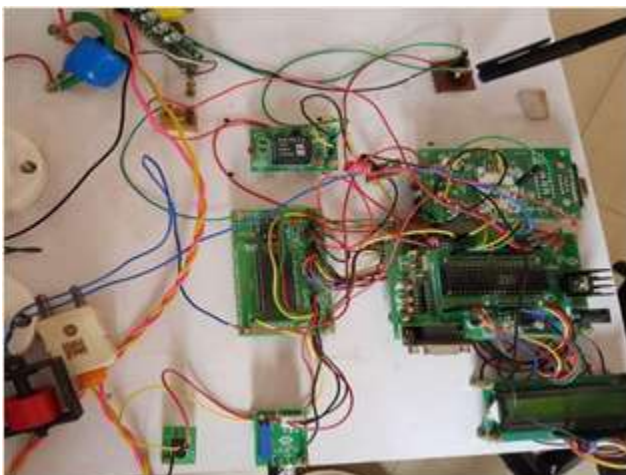


Fig. 6. Implementation.

The result obtained here is the implementation of the hardware when there is a three phase power the GSM sends message to all the authenticated users. If the farmer wants the motor to be on he has to send message to the GSM with the registered number with a particular character. The GSM check the particular character if its matching then GSM sends it to the microcontroller and microcontroller automatically switches on the motor otherwise it assumes that message is coming from other user and ignores it and no action will be taken. Similarly if he wants to switch off the motor he has to follow the same procedure he has to send message to the GSM with a character if it matches the GSM sends it to the microcontroller and microcontroller automatically switches off the motor.

V. CONCLUSION

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