Aurdino based Advanced irrigation System using GSM and Solar Energy

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Abstract—Greenhouses mostly use for Production of vegetables and flowers. The greenhouses having various equipment and may be automatically controlled by a computer or cell phone. Proposed design useful for monitoring water irrigation system and also it monitor water level of tank. When soil sensor senses moister of soil it will turn on valve for irrigation . If water level of tank reduces below set level then it will send alert message to owner by GSM and owner can send back SMS to Turn on bore which fill the tank again .The water level of tank is monitored and if tank is full then aurdino based automated system will send SMS to user that tank is full and after that system will turn off bore. When Soil sensor detect that water not needed, then automated system send back SMS to owner & owner can Turn off water irrigation system through SMS. Proposed automated system also contain LM35 which use to maintain inner temperature of Green house which maintain constant temperature, it can turn on / off Fan when temperature increase/ decreases from particular level . It is useful for remote location. It is difficult to monitor the tank water level all the time when it has reached below set level we can turn on & off   bore   by GSM. Main advantage of whole system is that it depends on solar panel generated power.

Keywords—Aurdino Board, GSM, SMS , Irrigation

1. INTRODUCTION

In last few years labor problem is the major problem in farming. Some irrigation systems are used to implement efficient irrigation method for the field having different crops. It is difficult to handle irrigation system always in big Farm or in Green House all the time. In nursery it is necessary to apply the right amount of water at the right time, independent of labor. In addition, if farmers using automated system then it is not required to monitor irrigation every time & also internal temperature which should be constant. By using proposed Method, the soil wetness and temperature required for plants are precisely controlled. Because of changeable atmospheric conditions sometimes depend on place, it is very difficult to maintain constant condition. The green house dependent agriculture is the today's requirement. The main reason is the lack of rains & scarcity of land reservoir water. For this GSM is used to report the detailed about irrigation. The report from the GSM is send through the android mobile.

Figure 1: Green House

II. HARDWARE ARCHITECTURE

Proposed design of System is shown in Figure 2.System Contains Aurdino, Water sensor, LCD Display, LED and GSM Modem. All Devices Controlled By Aurdino. Proposed design is fully automated. No need of monitoring always. soil sensor is for moisture sensing, it will send signal to aurdino . aurdino based device will turn on irrigation system.   Water sensor senses the tank water and it sends information to aurdino and aurdino initiate GSM for transmitting message to owner and give the current status of tank. After receiving message user can send back message to turn on motor. If tank is full then water sensor gives signal to aurdino and it turn off motor. It also sends message using GSM to user that tank is full. System also contain LM35 for temperature control inside green house. When LM35 sends signal to aurdino board then Exhaust fan on/off by aurdino board. Whole system based on solar energy. It will save power. It is environment friendly and require less man power.
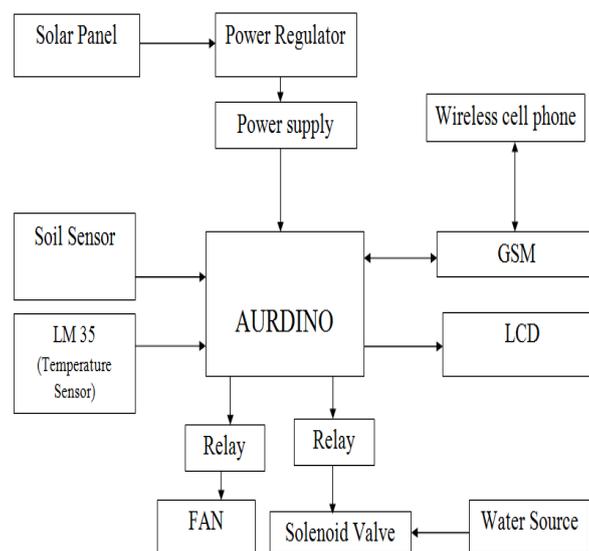

Figure 2: System architecture

2.1. Arduino

Arduino is an open-source platform and easy-to-use hardware and software. Arduino boards are completely open-source. It is simple and easy accessible. Arduino used by thousands of different projects and applications. The Arduino software is easy-to-use for beginners, It is flexible. Arduino boards are relatively Cheap compared to other microcontroller platforms.

Figure 3: Arduino

2.2. Relay

Relays are used in a wide variety of applications. The advantage of relays is that it takes a relatively small amount of power to operate. Relays are simple switches which are operated both electrically and mechanically. Relays consist of an electromagnet. it also contain a set of contacts. The switching mechanism is based on electromagnet.Most of the devices have the application of relays.Relay system showing in figure 4.
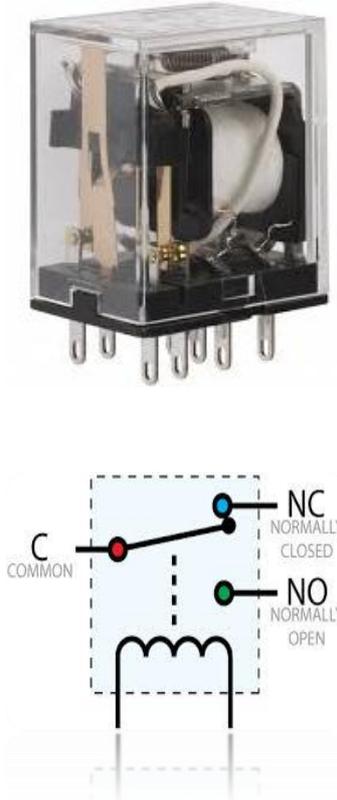

Figure 4: Relay system

2.3. Liquid-crystal display (LCD)

The LCD used on the transmitting side is a 16 character and 2 lines LCD, which is normally referred as 16 X 2 LCD. This LCD is an alphanumeric LCD that means it can be used to display the characters of both alphabets and numerals apart from special symbols. The value to be displayed on the LCD"s panel is sent in the form of ASCII code format. The data and the commands to be send to the LCD are sent on the data bus by using a port of the microcontroller, which is connected to the data pins of the LCD. The same data bus is used to carry the control signals in both the directions and also the data to be displayed on the LCD.

Figure 5: liquid crystals display

2.4. Solenoid valve

Solenoid valves are the mostly used for control of fluid. A solenoid electromechanically operated system.. Solenoids provide fast swithching time . It is reliable & low power consuming. They are found in many application areas.
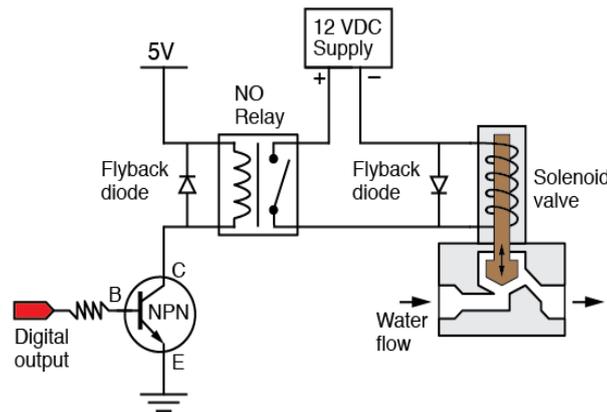
Figure 6: Solenoid valve System

2.5. GSM

GSM is a standard developed by the European Telecommunications Standards Institute. SIM300 is used to integrate with a wide range of applications. SIM300 is a GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz . SIM300 can fit for all application. SIM300 is used in many projects and hence many variants of projects for this have been developed.

Figure 7.: SIM300

2.6. Water Sensor

The series of liquid level sensor measure liquid level in water tanks and reservoirs.The sensing element consists of a wire cable it can able to   sensing the surface level of nearly any fluid. The sensor element which is inserted into liquid is electrically insulated and isolated from the liquid. Measurement range we can adjust from a few centimeters to several meters.

2.7. Solar panel

The solar panel is used to trap the incident sunlight and charge the battery to be stored for future use. A solar panel module contains solar cells. Each module is rated by its DC output power under test conditions, and typically ranges from 100 to 320 watts. The panel is adjusted at specific inclination to enable maximum power tracking. This provides increased efficiency and most of the sunlight that falls on the panel is stored. The panel that we are using of has a rated capacity of 12 volts and 5 Watts power.

Figure 8: Solar Panel

III. TEST & RESULT

Proposed design is completely advanced irrigation system. The complete hardware system consumes very less power. System is Efficient irrigation for different kind of crops. This paper provides a system that could monitor the tank water level and report by SMS notification using GSM.

IV. CONCLUSION

The system is simple and reliable. It is portable and real-time effective system . The main use of this system is to save time, manpower & energy. Main Advantage of this design to provide automated detection and alerting system. System is managing the water use because it provides irrigation as per the requirement of the crop. System also monitor the tank water level and report by SMS using GSM. It has fast response time and easy in use. Solar based system is able to save energy and it is also environment friendly.

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