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Implementation of Hi-Tech Agricultural Solar Fence Security with Soil Humidity Based Automatic Irrigation System and Voice Alert on PIR Live Human Detection

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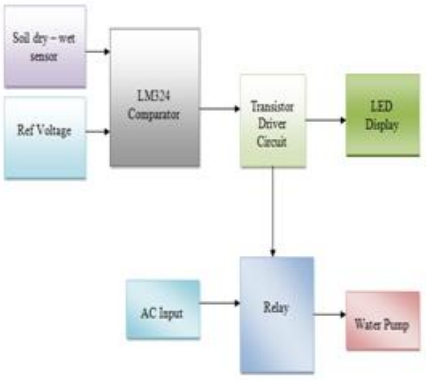
Introduction:

Irrigation system in India has given a high priority in economic development. Many new concepts are being developed to allow agricultural automation to flourish and deliver its full potential. To take full advantage of these technologies, we should not just consider the implication of developing a new single technology but should look at the wider issues for complete development of a system.

Existing Method:

The Project presented here waters your plants regularly when you are out for vocation. The circuit comprises sensor parts built using op-amp IC LM324. Op-amp is configured here as a comparator. Two stiff copper wires are inserted in the soil to sense the whether the Soil is wet or dry. The comparator monitors the sensors and when sensors sense the dry condition then the project will switch on the motor and it will switch off the motor when the sensors are in wet. The comparator does the above job it receives the signals from the sensors.

A transistor is used to drive the relay during the soil wet condition. 5V double pole – double through relay is used to control the water pump. LED indication is provided for visual identification of the relay / load status. A switching diode is connected across the relay to neutralize the reverse EMF.



Draw Backs:

No PIR sensor to identify the living being.
There is no fence to protect the field

Proposed Method:

Implementation of Hi-tech Agricultural Solar Fence Security with soil Humidity Based Automatic irrigation system and voice alert on PIR live Human Detection is been implemented in this project for safe and secure agriculture irrigation. The project irrigation control using LPC2148 is designed to tackle the problems of agricultural sector regarding irrigation system with available water resources. Prolonged periods of dry climatic conditions due to fluctuation in annual precipitation, may appreciably reduce the yield of the cultivation.

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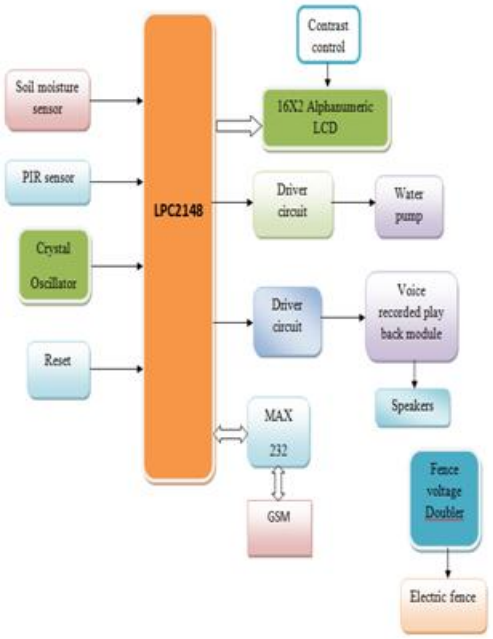
The expenses in establishing many of these crops and their relative intolerance to drought make an effective irrigation system a necessity for profitable enterprises. In this project we are using ARM7, Moisture sensors, submersible pump. A submersible motor will get switched ON /OFF depending on the soil moisture condition and status of motor can be displayed on 16X2 LCD. GSM modem is interfaced to the controller to send SMS. A PIR sensor is arranged near the fence to warn the people to stay away from fence. Since an electric fence is arranged, living being when they touch that, they will experience a shock. So to avoid that voice alert will be given when someone approaches near fence. Here we are making use of solar energy.



Modules used in this project

ARM7TDMI Processor Core

- Current low-end ARM core for applications like digital mobile phones
- TDMI
  - T: Thumb, 16-bit compressed instruction set
  - D: on-chip Debug support, enabling the processor to halt in response to a debug request
  - M: enhanced Multiplier, yield a full 64-bit result, high performance
  - I: Embedded ICE hardware
- Von Neumann architecture

GSM:

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz. It is estimated that many countries outside of Europe will join the GSM partnership.

PIR SENSOR:

In a PIR-based motion detector (usually called a PID, for Passive Infrared Detector), the PIR sensor is typically mounted on a printed circuit board containing the necessary electronics required to interpret the signals from the pyroelectric sensor chip. The complete assembly is contained within a housing mounted in a location where the sensor can view the area to be monitored. Infrared energy is able to reach the pyroelectric sensor through the window because the plastic used is transparent to infrared radiation (but only translucent to visible light). This plastic sheet also prevents the intrusion of dust and/or insects from obscuring the sensor's field of view, and in the case of insects, from generating false alarms.

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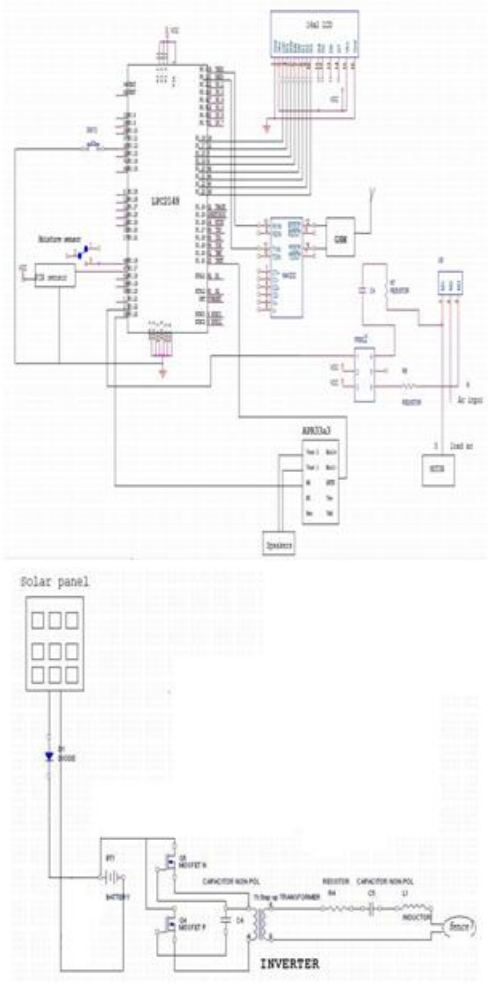
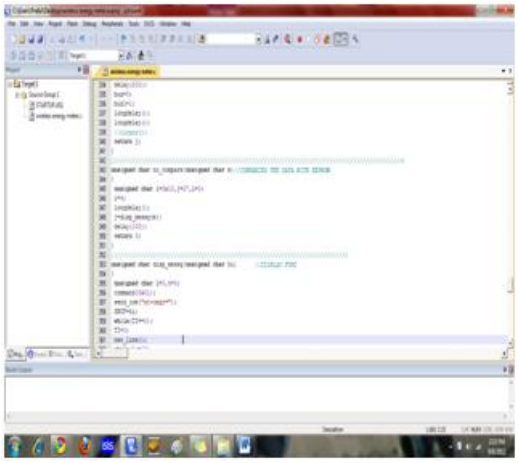
Circuit Diagram



Software Tools:

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.



Flash Magic:

Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. It only supports the micro-controller of Philips and NXP. It can burn a hex code into that controller which supports ISP (in system programming) feature. Flash magic supports several chips like **ARM Cortex M0, M3, M4, ARM7 and 8051.**

Advantages:

- Ease of operation
- Low maintenance cost
- Fit and forget system
- Durability
- Accuracy

Applications:

- Agricultural fields
- Industries

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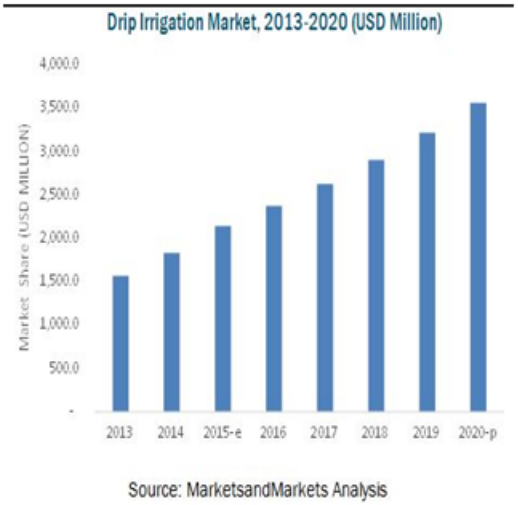

Future Scope:

Video monitoring could be used for monitoring the field

Conclusion:

This project presents an electronic system which is designed to control and operate a water pump automatically based on the soil moisture (water) content. The proposed system eliminates the manual switching mechanism used by farmers or users to ON/OFF an irrigation or similar watering system. Moreover, the system achieves proper water management, saves human power and enhances crop or plant productivity from automating. The overall design methodology can be used for designing and developing an advanced system capable of providing several levels of water pumping according to the state of the soil moisture content.

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