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IMPLEMENTATION OF HI-TECH VERTICAL FARMING & SOLAR FENCE SECURITY WITH VOICE FEEDBACK SYSTEM

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***Abstract*—**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. 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 BCM2836 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. 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 BCM2836, Moisture sensors, AC submersible pump, relay driver. A submersible motor will get switched ON /OFF depending on the soil moisture condition and status of motor can be displayed on 16X2 LCD. This motor will be operated using RF communication.

***Keywords*—Drowsiness, GSM Module, ECG, EEG, Fatigue.**

I. 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. 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 Arduino 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. 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 Arduino, Moisture sensors, AC submersible pump, relay driver. A submersible motor will get switched ON /OFF depending on the soil moisture condition and status of motor can be displayed on 16X2 LCD. This motor will be operated using RF communication.

II. Existing System

The existing method in agriculture is the manual method of checking the parameters, in which farmer uses their manpower to identify their growth level of their crop .The farmers themselves check the parameters in their crop field. They uses only the sensor not the advanced level of notification it may consume more time and huge number of manpower. Continuous monitoring of the crops and maintenance is very difficult. Accurate results cannot be obtained. It is impossible to be there in the crop field and analyzing the temperature, humidity, and safety for the crops may not be accurate and satisfied. This may lead to the decrease in crop yield due to insufficient manpower and monitoring.

III. Proposed System

The proposed system which contains two functional components. They are the moisture sensors and the motor/water pump. Thus the Arduino Board is programmed using the Arduino IDE software. The function of the moisture sensor is to sense the level of

moisture in the soil. The sensors sent the data to the database for storing the values in it. Again the values, sent to the android phone through WIFI port. This method is used to avoid the data lost while sending the sensor values from device to device. Also, the motor/water pump supplies water to the plants. The Arduino Board is programmed using the Arduino IDE software. The moisture sensor measures the level of moisture in the soil and sends the signal to the Arduino if watering is required. The motor/water pump supplies water to the plants until the desired moisture level is reached.

IV. Block Diagram

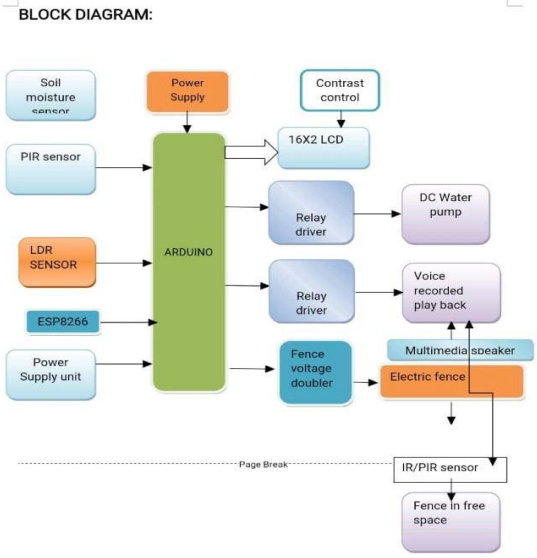

Fig.1. Block Diagram of the Proposed System

V. Block Diagram Description

The project irrigation control using Raspberry pi 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. The expenses in establishing many of these crops and their relative intolerance to drought make an effective irrigation system a necessity for profitable enterprises.

VI. Working Principle

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs – light on a sensor, a finger on a button, or a Twitter message – and turn it into an output – activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing. Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments.

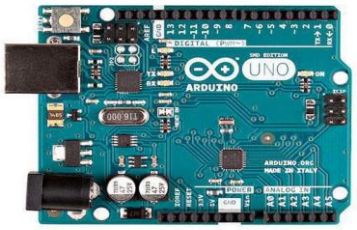

Fig.2.ARDIUNO BOARD

A worldwide community of makers – students, hobbyists, artists, programmers, and professionals – has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike. Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments. All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it is growing through the contributions of users worldwide.

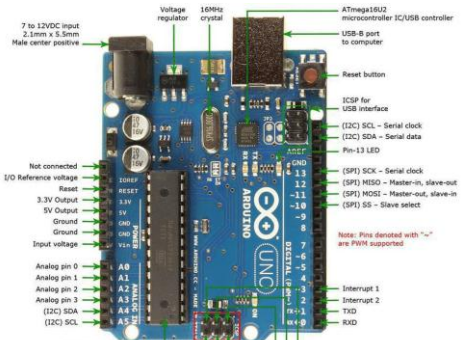

Fig .3. structure of Ardiuno board

A typical example of the Arduino board is Arduino Uno. It includes an ATmega328 microcontroller and it has 28-pins. The pin configuration of the Arduino Uno board is shown in the above. It consists of 14-digital I/O pins. Wherein 6 pins are used as pulse width modulation outputs and 6 analog inputs, a USB connection, a power jack, a 16MHz crystal oscillator, a reset button, and an ICSP header.Arduino board can be powered either from the personal computer through a USB or external source like a battery or an adaptor. This board can operate with an external supply of 7-12V by giving voltage reference through the IORef pin or through the pin Vin.

PIN DESCRIPTION:

The power pins are as follows:

• **Vin:** The input voltage to the Arduino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
• **5V**: The regulated power supply used to power the microcontroller and other components on the board. This can come either from VIN via an on-board regulator or be supplied by USB or another regulated 5V supply.
• **3.3V:** A 3.3volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
• **GND:** Ground pins.
Each of the 14 digital pins on the Arduino Uno can be used as an input or output, using pin Mode(), digital Write(), and digital Read() functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50kOhms.
• **Serial**: Pins 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip
• **External Interrupts**: Pins 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the attach Interrupt() function for details.
• **PWM:** 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analog Write () function.
• **SPI:** 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.
• **LED**: 13. There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it is off. The UNO has 6 analog inputs, labelled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the AREF pin and the analog Reference() function. Additionally, some pins have specialized functionality:

• **TWI:** A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.
There are a couple of other pins on the board:
• **AREF:** Reference voltage for the analog inputs. Used with analog Reference().

A. PASSIVE INFRARED (PIR):

The most frequent use of the PIR sensor is as an 'area' sensor. Whether it is to detect 'someone moving in the front yard', or 'someone moving in the bathroom', or 'someone moving through a doorway', or even 'someone opened the beer cooler', it is all technically the same sensor and logic. There is a simple electronic device which is sensitive to 'heat', or rather the infrared light that is emitted by warm or hot objects (like humans). In its simplest form, it looks like an old metal transistor with a black plastic 'window' on the top. The 'logic' of the PIR sensor is that it must detect 'significant change' of the normal level of heat within the 'field' of its view. The circuits that control it must be able to determine what 'normal' is, and then close a switch when the normal field changes, as when a human walks in front of it. It must also be able to 'tolerate' slow changes within the field, and remember that as the new 'normal'.

You'll notice in all three pictures of PIR type sensors on this page, that they all have some sort of plastic 'lens' that covers the circuit board and the PIR sensor device. This is a 'Fresnel' lens. It 'pinches' light that passes thru it. If you hold it to your eye, you can see that there are apparent distinct 'bars' of light as you move it across a scene. Some of these bars may be vertical, and some may be horizontally oriented.

VII. Conclusion

This project presents a high sensitive sensor based automotive device control. The tracking controller based on the closed loop algorithm is designed and implemented with Raspberry pi in embedded system domain. The proposed system can control devices automatically. Thus, the power can be saved. Experimental work has been carried out carefully. The proposed method is verified to be highly beneficial for all the electrical appliances.

VIII. Future Work

The project irrigation control using Raspberry pi 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. The expenses in establishing many of these crops and their relative intolerance to drought make an effective irrigation system a necessity for profitable enterprises. 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.

IX. Results and Discussion

The project irrigation control using BCM2836 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. 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 BCM2836, Moisture sensors, AC submersible pump, relay driver. A submersible motor will get switched ON /OFF depending on the soil moisture condition and status of motor can be displayed on 16X2 LCD. This motor will be operated using RF communication. Whenever the dry condition is detected then the motor goes to on condition. Level Sensor is used to indicate the level of water. If water level is LOW or HIGH it will give the buzzer indication. Here we are utilizing solar energy to charge the battery.

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