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MONITORING AND CONTROLLING SYSTEM FOR SOIL IRRIAGATION USING IOT

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***Abstract* :** *The project aims at developing an intelligent system capable of monitoring different parameters in the irrigation system through IOT. The live parameters and status of devices can be monitored on the mobile screen available in the system. The monitoring of parameters can be done on a mobile application. The monitoring of the devices is done using Wi-Fi with the help of mobile phone application.*

This method uses Internet of Things (IoT) as the platform of communication. The proposed method also provides an option for monitoring and control even in remote location in addition to the control room. Internet of Things (IoT) will play a major role in the future concept of power plant integration. The proposed method will suit and provide a start-up initiation for this future concept.

The controlling device of the whole system is done using Arduino Microcontroller. Whenever the sensors unit gets the input from respected sensors like, soil moisture sensor, PH sensor, DHT11 (combination of temperature and humidity sensor), these inputs are fed to the Arduino microcontroller. The Microcontroller performs appropriate task, system from the mobile phone application through Wi-Fi. The live data is continuously uploaded to a mobile phone application using Wi-Fi module interfaced to microcontroller.

Keywords*: Internet of Things (IoT), Arduino Microcontroller, Soil Moisture Sensor, PH sensor, DHT11.*

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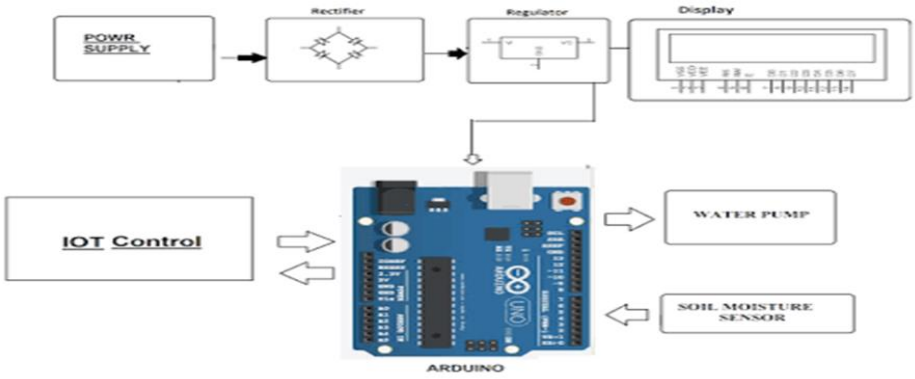
1. INTRODUCTION

An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers.
Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result.

This proposal is using ATMEGA 328 microcontrollers is an exclusive project which makes capable of detecting temperature, humidity, soil moisture, pH value and monitoring. This data is sent through Wi-Fi to a mobile application

2. HARDWARE DESCRIPTION

The block diagram of the proposal and design aspect of independent modules are considered. Block diagram is shown



3. SOFTWARE DESCRIPTION

It can be implemented using following software's:

- Express PCB – for designing circuit
- Arduino IDE Studio Compiler- for compilation part
- Proteus 7 (Embedded C) – for simulation part

3.1 Express PCB:

Breadboards are great for prototyping equipment as it allows great flexibility to modify a design when needed; however the final product of a project, ideally should have a neat PCB, few cables, and survive a shake test. Not only is a proper PCB neater but it is also more durable as there are no cables which can yank loose.

Express PCB is a software tool to design PCBs specifically for manufacture by the company Express PCB (no other PCB maker accepts Express PCB files). It is very easy to use, but it does have several limitations.

- It can be likened to more of a toy then a professional CAD program.
- It has a poor part library (which we can work around)
- It cannot import or export files in different formats
- It cannot be used to make prepare boards for DIY production

Express PCB has been used to design many PCBs (some layered and with surface-mount parts. Print out PCB patterns and use the toner transfer method with an Etch Resistant Pen to make boards. However, Express PCB does not have a nice print layout. Here is the procedure to design in Express PCB and clean up the patterns so they print nicely.

3.2 Arduino IDE Compiler:

This instructable adds to any of the Arduino on a Breadboard instructables.

1. We need a microcontroller with a pre-loaded Bootloader, or must load your own
2. Not all ATmega328's are equal
3. (A bootloader, very simply, is a programme that sits on the chip and manages the upload of your sketches onto the chip)

4. IMPLEMENTATION

We use the Arduino UNO to bootload the ATmega328 that is sitting on the Arduino-on-a-Breadboard. This is fairly straightforward having an ATmega328P-PU, but needs an extra step for an ATmega328-PU

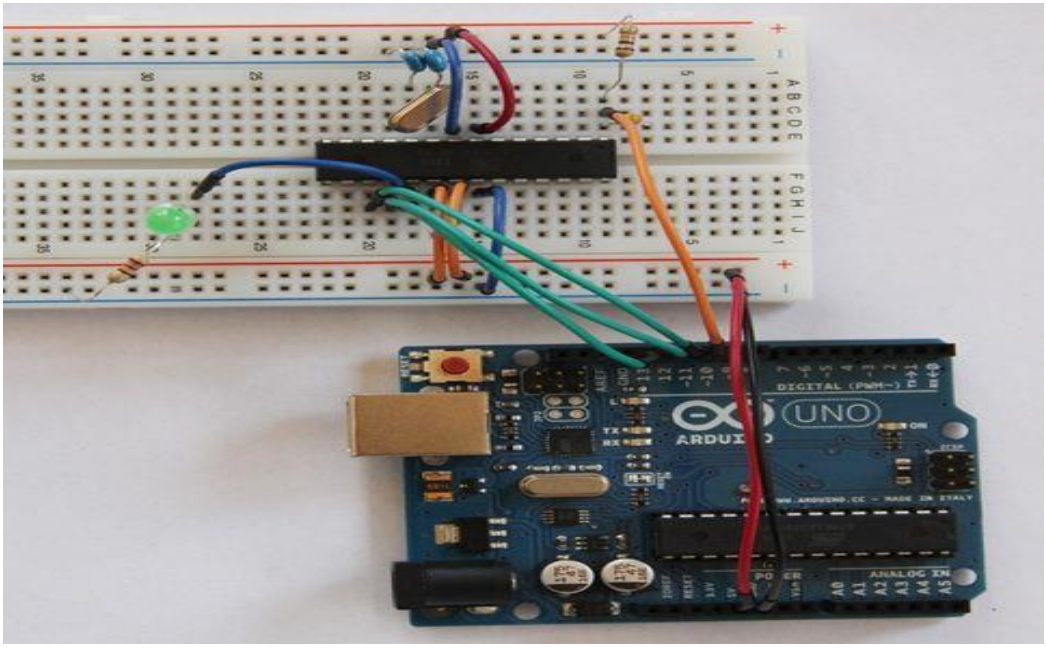
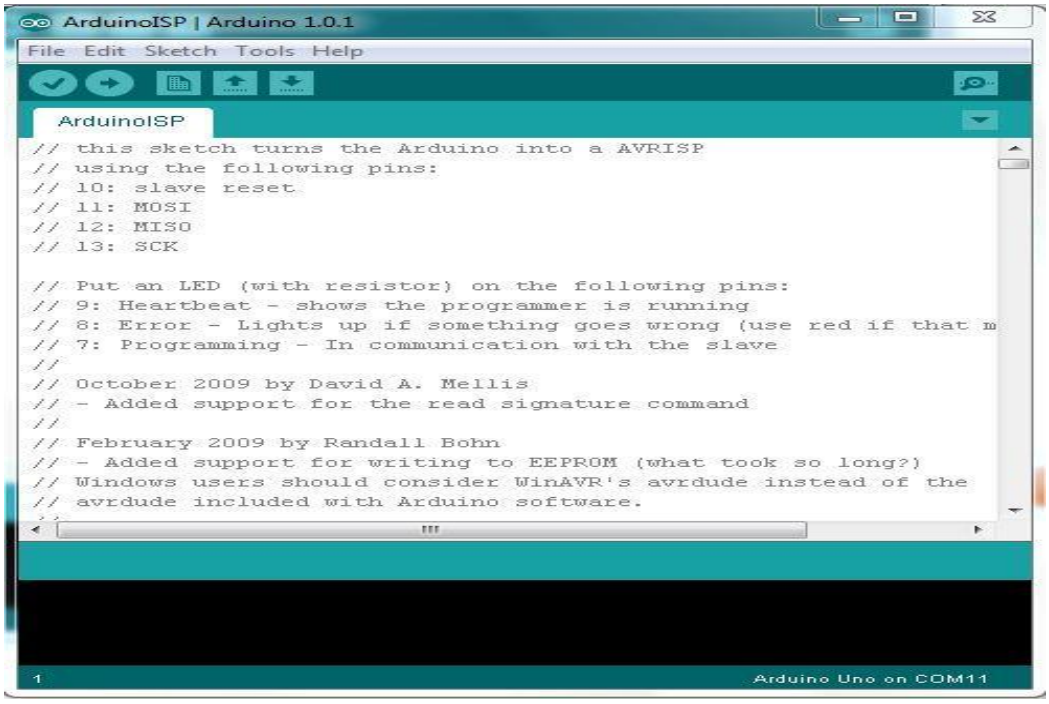


Figure: Program your Arduino UNO as an ISP



We need to program the Arduino UNO to act as an ISP (In-System Programmer), so that it can burn the bootloader onto the Breadboard chip.

1. Open the Arduino IDE
2. Open the ArduinoISP sketch (under File, Examples)
3. If you're using version 1.0 of the IDE:

Connect your UNO to the PC, making sure it's not connected to the Arduino on a Breadboard.
Ensure your UNO is selected under the Boards menu option, and upload the sketch.

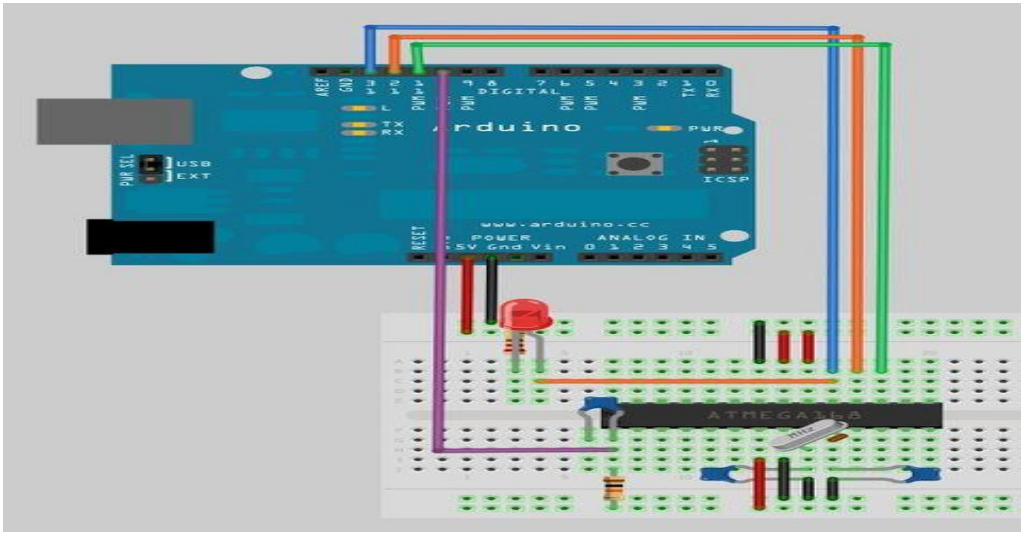


Figure: Connect your ATmega328

Figure: ATmega328-PU workaround

Each microprocessor has a **signature** – a unique code that identifies its model. When you bootload a chip (or even upload a sketch) the Arduino IDE checks that the chip selected matches the type it's connected to. Even though the ATmega328-PU in essence functions in the same way as the ATmega328P-PU, it has a different signature, and one that isn't recognized by the Arduino IDE.

5. RESULTS

The proposal was designed an intelligent system capable of monitoring different parameters in the irrigation system through IOT. The controlling device of the whole system is done using Arduino Microcontroller. Whenever the sensors unit gets the input from respected sensor like, soil moisture sensor, these inputs are fed to the Arduino microcontroller. If the soil moisture value is less than the predefine value motor will be ON. The Microcontroller performs appropriate task, system from the mobile phone application through Wi-Fi. The live data is continuously uploaded to a mobile phone application using Wi-Fi module interfaced to microcontroller.

6. CONCLUSION:

This presents the design of an IoT based automatic irrigation system. The proposed system can reduce the efforts of farmers and provides high yield. It also conserves water for irrigation by locating the sensor at the right position above the soil level. This work has shown that plants can still sustain at low moisture level when the temperature is moderate. Analysing more than one parameter has made this system an efficient one for managing the field.

7. FUTURE SCOPE:

It was designed an intelligent system capable of monitoring different parameters in the irrigation system through IOT. The live parameters and status of devices can be monitored on the mobile screen available in the system. The monitoring of parameters can be done on a mobile application. The monitoring of the devices is done using Wi-Fi with the help of mobile phone application.

This can also extended by using switches like Triac and programmed in such a way to control the electrical appliances depending on the sensors. The system can also be extended using GSM modem using which we can send the alerting messages about the fire and gas alerts. The project can be extended by using GPRS modem through which the alerting and monitored data about sensors can be viewed on the predefined website from any place in the world.

In future we can use this project in several applications by adding additional components to this project.

This can be extended by using GPRS technology, which helps in sending the monitored and controlled data to any place in the world. The temperature controlling systems like coolant can also use in places where temperature level should be maintained.

In 3-phase motor, if phase fault is detected, automatic circuit breaker operation is done.

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