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Automatic Drip Irrigation Using Wireless Sensor Network

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Abstract : *The automatic drip irrigation is aprocees which help everyone tp take care of agriculture area.Because of sensors to identify the moisture content of the specific area.Zigbee been used to transfer information to the connected pc.Motor will be working according to the information recived .*

Keywords *- ARM, RS232 , ZIGBEE Module, Relay , Motor*

I. INTRODUCTION

Drip is low-pressure, low-volume irrigation. The water is usually carried through polyethylene tubing, and is applied directly to the root zone of the plants. Efficient irrigation systems require the selection of an appropriate method for the crop being grown, adequate monitoring of the irrigation system and of water delivery, and appropriate application rates depending on the growth stage of the crop. The important parameters to be measured for automation of irrigation system are soil moisture and temperature. The entire field is first divided in to small sections such that each section should contain moisture sensor and a temperature sensor.Advantages of drip irrigation systems as compared to overhead sprinkler systems include reduced water use, reduced erosion and runoff potentials, and decreased weed growth.

The installation of an efficient irrigation system begins with good design and choosing appropriate pipe and emitter sizes to assure adequate water delivery. The drip system used 50% less water, and produced 50% fewer weeds with 75% less biomass than the overhead system. The disadvantages of drip irrigation systems include: more time required for initial installation; greater up-front costs; and regular monitoring and maintenance to assure adequate water delivery. The disadvantages of the overhead sprinkler system include greater water usage, greater weed growth, soil erosion potential and surface water or ground water potential contamination. Replacing the traditional agriculture by affordable system to produce more crop and more income from the same available land and water. With adequate design and monitoring in the field, the advantages of the drip system far outweigh its disadvantages.

II. OBJECTIVE

- Drip irrigation saves water up to 30% to 70% for various crops
- Saving of water saves electricity which is used for pumping ground water.
- Drip irrigation also improves the yield of the 30% to 200% for various crops.
- This assures good technology transfer and knowledge tool in the hands of illiterate farmers.

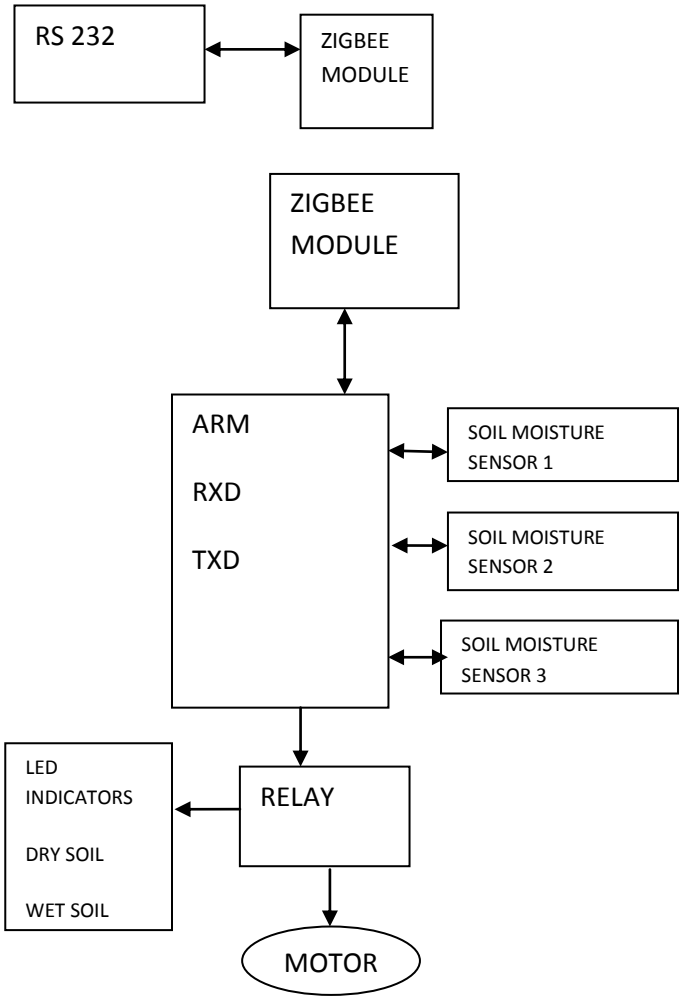
III. BLOCK DIAGRAM

The above block diagram consists of monolithic temperature sensor(lm35),ARM processor(lpc 2129),relay sensors, soil moisture sensors ,zigbee ,RS 232 and motor.

In this project we are using temperature sensor which is connected to the ARM board as shown in the block diagram above. Whenever there is raise in temperature ,the sensor pick up the data and the same is then sent to the ARM processor and to the pc connected to it and immediately sends the message and at the same time activate the water pump and thus the field receives the water without any wastage.

When temperature sensor senses the raise in temperature above the certain value, it give information it the ARM (LPC2129)which is programmed to do the following:

- Activate the motor in order to turn the water pump on.
- Water is given to the root of plant automatically.
- Without any wastage when the plants get enough water msg is send to make the motor off.

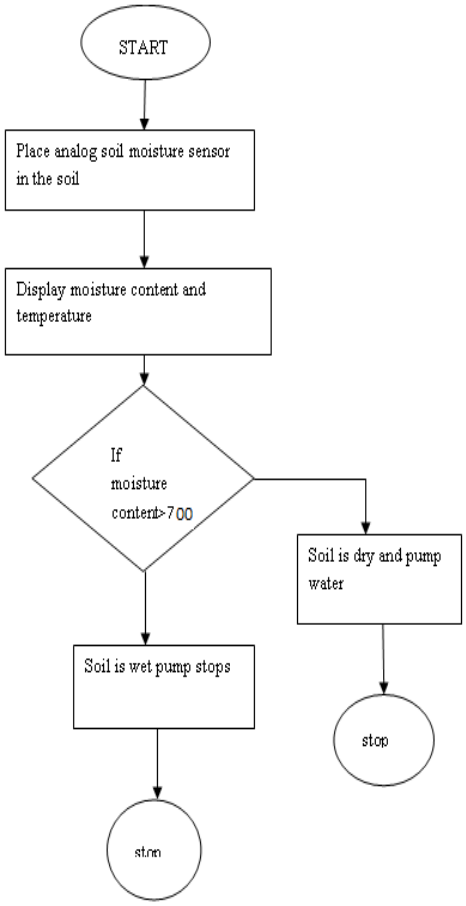


IV. SOFTWARE OVERVIEW

KEIL 4 micro vision: Programs are written in embedded c using Kiel 4 micro vision. The µvision 4 IDE is a windows based software development platform that combines a robust editor, project manager and makes facility. µVision4 integrates all tools including the c compiler, macro assembler, linker/loader, and HEX file generator.vision4 helps expedite the development process of your embedded applications by providing the following

- Full featured source code editor
- Device database for configuring the development tool setting
- Integrated make facility for assembling, compiling and linking embedded applications
- Dialogs for all development tool settings
- True integrated source level debugger with high speed CPU and peripheral simulator
- Flash programming utility for downloading the application program into flash ROM's
- Links to development tool manuals, device datasheets and user's guide

Flow chart : In this project drip irrigation depends on the soil moisture sensor and temperature sensor.Soil moisture sensor senses the condition of the soil i.e whether it is dry or wet. The temperature and the soil moisture is displayed on the monitor. Based on the condition of the soil the motor will turn on or off. The motor is on when the value of the soil moisture is above 700 and if below 700 motor turns off. Zigbee used here is used to transmit the soil moisture and temperature values. These values received by another zigbee on the receiver end and displayed on the monitor .



Result :

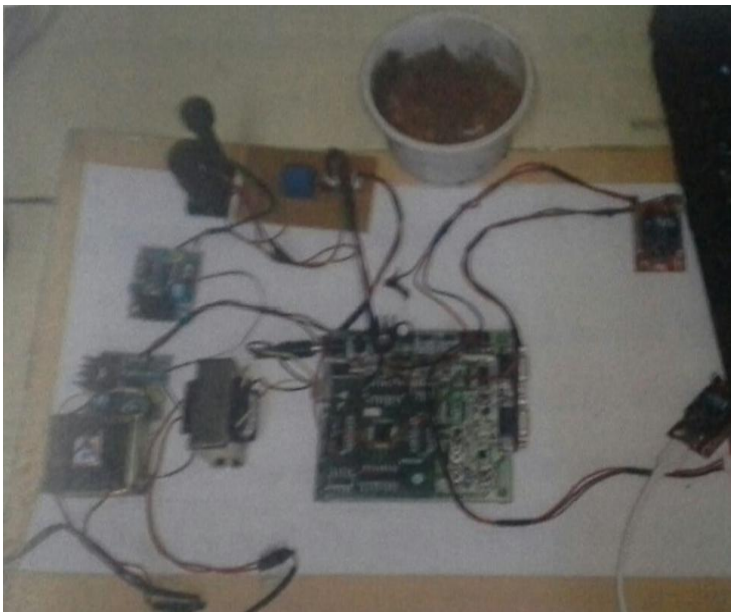


Fig.no1.2: Model of Drip Irrigation

The above image depict the wireless drip irrigation Here two sensors been used-analog soil moisture sensor and temperature sensor. where the analog sensor been inserted 2 inch into the soil inorder to sense the moisture content of the specific area.First we tested the dry soilcondition.When the soil is dry motor will be

automatically switched on the water will be pumped into the field.once soil will get inough water motor will be automatically switched off.Here red soil has been used for the analysis.As in the case of wet soil by motor because sensor will sense moisture content in the specific area.The temperature and soil moisture has been displayed on the monitor .Motor will be on when the value of soil moisture be above 700.If below 700 motor will be turn off.Zigbee used to transmit the moisture and temprature values.These been received by other zigbee on opposite side.

V. CONCLUSION

Future plans are to cover maximum crops under drip irrigation, in addition to continuous refinement and improvement of our existing practices. This technology would also like to develop viable technologies for rain-fed agriculture to increase the productivity of land and water resources. This will be done through integrated approach of rainwater harvesting, storage and better irrigation management methods. Use of solar energy for drip irrigation is high on our agenda. This technology can be very effective in arid regions of India. The use of biotechnology for pomegranate and sweet lime for different geographical areas will also be implemented soon.

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