International Journal of Advance Research in Science and Engineering
Volume No.06, Issue No. 10, October 2017
www.ijarse.com
IJARSE
ISSN: 2319-8354

# A Review and Analysis Effective Irrigation System for Outdoor Environment

**S.Asvani[1], K.Deepikavalli[2], R.Puviarasi[3]**

*[1,2,3]Department of ECE, Saveetha School of Engineering, Saveetha University, Chennai*

## ABSTRACT

*As of late remote sensor systems are broadly utilized as a part of numerous robotized framework like vehicle checking, overwhelming obligation plants, mechanical control and so on. One of the best robotized frameworks is the keen watering system framework. In this paper we have proposed a straightforward and financially savvy keen watering system framework. Our framework sends remote sensor bits from a remote sensor system. The framework is displayed in outside environment utilizing TINY OS based IRIS bits to quantify the dampness level of the paddy field and to set the limit esteem. MDA100CB sensor bits can make the grade regarding - 40°c to 80°c and work at an extent between 1.6 to 2.7 volts. The proposed plan utilizes information representation and checking instrument MOTEVIEW 2.0f created by crossbow innovation. Proposed plan is anything but difficult to execute and requires less number of IRIS sensor bits when contrasted with other manual working individuals.*

***Keywords:*** *Irrigation, Mote, monitoring, soil, Tiny OS*

## I. INTRODUCTION

As we know water is essential and important resource in the world, whose value increase day by day. Especially country like India which has got more population depends only on this resource. If we save a drop of water it will be a great resource for tomorrow. In olden days our elder used large amount of water agriculture. The proposed work, monitor the level of water in the field to control the same through sensor from remote station.

Watering system frameworks are totally robotized after the innovation of remote sensor systems. In the greater part of the created nations financial development relies on upon agribusiness. Because of water lack issue a fate of water level is an obligatory for paddy field. Observing of water level can mechanized utilizing numerous procedures accessible and among them remote innovation remains in the lead position.

Remote innovation prompts a savvy watering system framework. It utilizes sensor hubs to gauge the mugginess level present in the dirt there by insinuating it to the engine room in any great place where there is paddy field. The majority of the customary framework use microchip and zigbee module. Zigbee is interfaced with the processor which gets the remote sensor information avoided the engine control room of a paddy field. One of the impediments confronted by the customary framework is number of hubs. Additionally as framework outline perspective is viewed as conventional framework are intricate in nature. Thus another sensor system framework is created by analysts from Berkely University. The new WSN is named as bits which are intended for particular application and keep running by RTOS named as TinyOS. Applications are composed in MOTEWORKS for perusing and sending message to the sensor. Proposed bit has showed signs of improvement representation and checking GUI. TinyOS Supports outside interfaces with its own board processor. We proposed another model which presents a shrewd watering system framework for a dry level soil.

## II. PROPOSED METHODOLOGY

MoteWork is the end-to-end empowering stage for the production of remote sensor systems. The upgraded processor/radio equipment, industry-driving lattice organizing programming, entryway server middleware and customer checking and administration devices bolster the formation of solid, simple to-use remote OEM arrangements. OEMs are liberated from the nitty gritty complexities of planning remote equipment and programming empowering them to concentrate on adding novel separation to their applications while putting up creative answers for sale to the public rapidly. A remote system sending is made out of the three particular programming levels:

1. The Mote Tier, where XMesh dwells, is the product that keeps running on the billow of sensor hubs shaping a cross section system. The XMesh programming gives the systems administration calculations required to frame a solid correspondence spine that associates every one of the hubs inside the lattice cloud to the server.

2. The Server Tier is a dependably on office that handles interpretation and buffering of information originating from the remote system and gives the extension between the remote Motes and the web customers. X Serve and XOtap are server level applications that can keep running on a PC or Star entryway.

3. The Client Tier gives the client representation programming and graphical interface for dealing with the system. Crossbow gives free customer programming called MoteView, however XMesh can be interfaced to custom customer programming also.

The software platform given with MoteWorks™ is advanced to low-control battery-worked organizes and gives a conclusion to-end arrangement over all levels of remote sensor organizing applications.

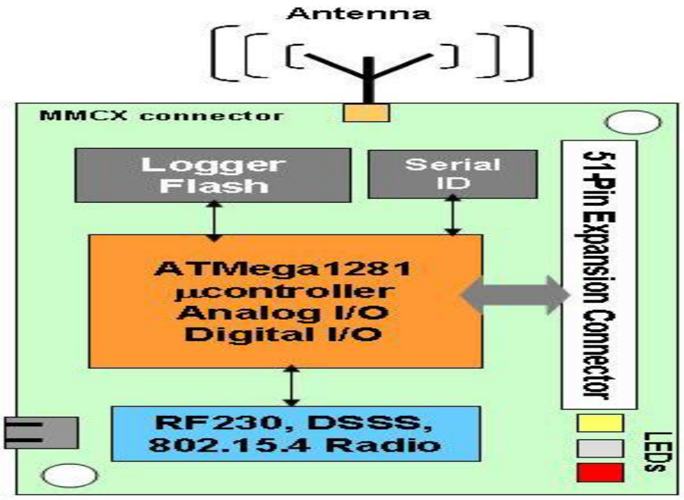


**Fig 1. XM2110CA Block Diagram**

MoteWorks empowers the improvement of custom sensor applications and is particularly enhanced for low-control, battery-worked systems. MoteWorks depends on the open-source TinyOS working framework and gives solid, impromptu work organizing, over-the-air-programming capacities, cross advancement instruments, server middleware for big business system incorporation and customer UI for investigation and design.

### 2.1 Processor and Radio Platform

The XM2110CB depends on the Atmel ATmega1281. The ATmega1281 is a low-control microcontroller which runs MoteWorks from its interior glimmer memory. A solitary processor board(XM2110) can be arranged to run your sensor application/handling and the system/radio interchanges stack all the while. The IRIS 51-pin development connector underpins Analog Inputs, Digital I/O, I2C, SPI and UART interfaces. These interfaces make it simple to associate with a wide assortment of outside peripherals.

### 2.2 Sensor Boards

MEMSIC offers an assortment of sensor and information securing sheets for the IRIS Mote. These sheets interface with the IRIS by means of the standard 51-pin extension connector. Custom sensor and information securing sheets are likewise accessible. It would be ideal if you contact MEMSIC for extra data

**Table specification of XM2110CB**

| Processor/Radio Board | XM2110CB | Remarks |
|---|---|---|
| **Processor Performance** | | |
| Program Flash Memory | 128K bytes | |
| Measurement (Serial) Flash | 512K bytes | > 100,000 Measurements |
| RAM | 8K bytes | |
| Configuration EEPROM | 4K bytes | |
| Serial Communications | UART | 0-3V transmission levels |
| Analog to Digital Converter | 10 bit ADC | 8 channel, 0-3V input |
| Other Interfaces | Digital I/O,I2C,SPI | |
| Current Draw | 8 mA | Active mode |
| | 8 µA | Sleep mode (total) |
| **RF Transceiver** | | |
| Frequency band[1] | 2405 MHz to 2480 MHz | ISM band, programmable in 1 MHz steps |
| Transmit (TX) data rate | 250 kbps | |
| RF power | 3 dBm (typ) | |
| Receive Sensitivity | -101 dBm (typ) | |
| Adjacent channel rejection | 36 dB | + 5 MHz channel spacing |

### 2.3 ATmega128 PROCESSOR

8-bit Atmel Microcontroller and 128Kbytes in system programmableFlash.

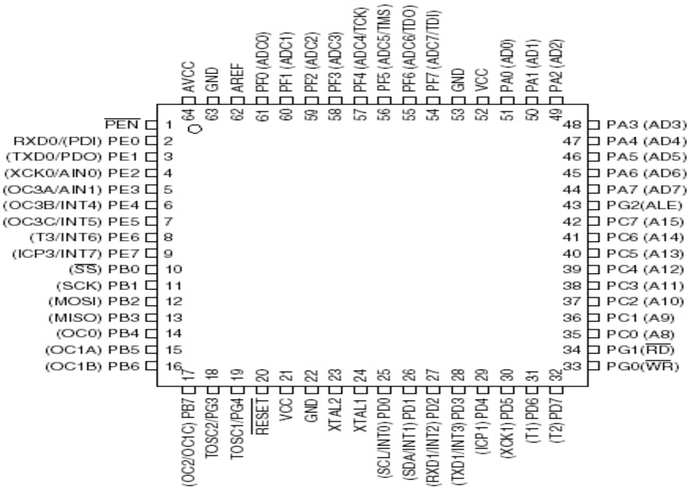

**Fig 2.Pin configuration of ATmega128**

IJARSE
ISSN: 2319-8354

The elite, low-control Atmel 8-bit AVR RISC-based microcontroller joins 128KB of programmable glimmer memory, 4KB SRAM, a 4KB EEPROM, a 8-channel 10-bit A/D converter, and a JTAG interface for on-chip investigating.

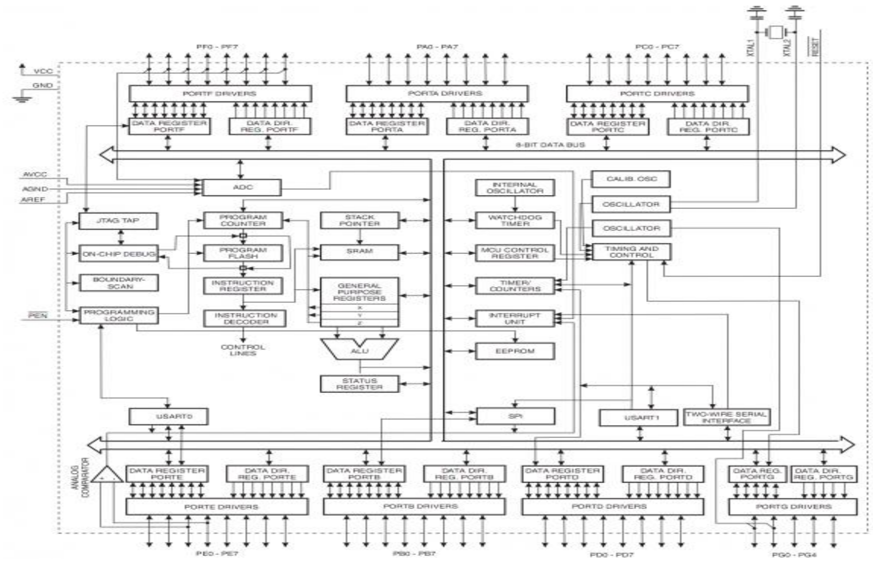


**Fig 3. Block Diagram of ATmega128**

The gadget bolsters throughput of 16 MIPS at 16 MHz and works between 4.5-5.5 volts.

## III. RESULTS AND DISCUSSION FOR SMART IRRIGATION SYSTEM USING MOTE VIEW

### 3.1 GENERAL

The engine interfaced with the bit set up is appeared in Fig.4, where three distinctive soil dampness level examples are tried. The primary level of soil is measured with a dampness estimation of 30° C and the voltage is measured. The second level of dampness is tried for a temperature of 25° C and the voltage level is measured. Additionally the third level is measured for 24° C and its comparing voltage level likewise measured. The voltage checking is finished by method for the bit view GUI for three examples and the limit is set for the most dry area and a caution message is shown on the representation window. Once the message is gotten the engine is exchanged on by utilizing the switch catch as appeared in Fig.3.1. The server framework where the passage hub associated is constantly put around few meters (>100).

Initially the moisture sensor is tested for three different patterns of soil maintained at three different humidity values. The moisture sensor is kept few kilometers away from the gateway station  The gateway and the mote setup arrangement  makes the remote monitoring station The remote monitoring station includes the sensor side application that runs on client motes for communication and monitoring. The sensor side Mote view GUI panel display the visualization tabs required for real time control. The acquisition terminal module includes driver circuit that runs the motes The signal to the acquisition terminal is given to the sensor motes through the sensor using wireless transmission protocol. The humidity data is acquired and the humidity threshold value is fixed in the server side ON-OFF control. Thus the sensor side monitoring and control through motes is done.

**Fig 4. Trial Setup for Dry soil checking utilizing Mote**

Motor driver circuit designed for BC547 transistor. Wireless data received from our base station motes. Getting ADC (Analog to digital converter) values in MDA100CB sensor board, MDA100CB output is connected to input of the breadboard circuit in fig 5

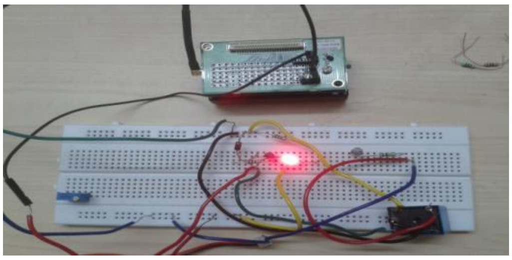

**Fig 5. Motor driver circuits with sensor board**

### 3.2 Monitoring sensor data

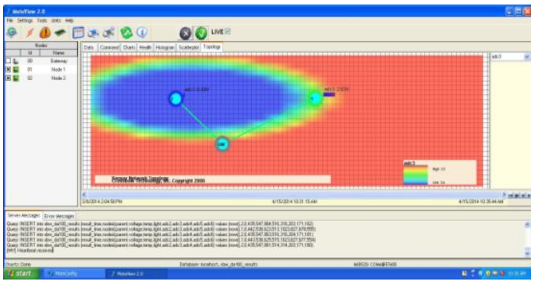

**Fig 6. Topology result using Moteview**

The topology diagram using ADC3 value is noted at different time interval in fig 6

**Fig 7. Data result using Moteview**

The data diagram using ADC3 value is noted at different time interval in fig 7

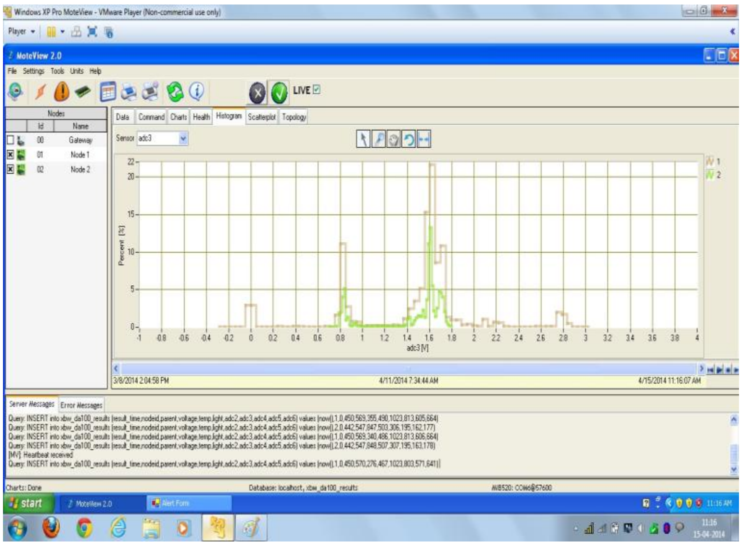

**Fig 8. Histogram result using Moteview**

The Histogram diagram using ADC3 value is noted at different time interval in fig 8

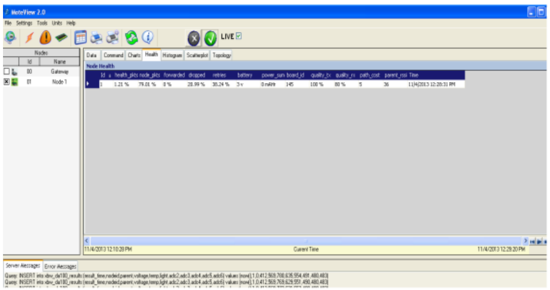

**Fig 9. Health result using Moteview**

The Health chart diagram using ADC3 value is noted at different time interval in fig 9

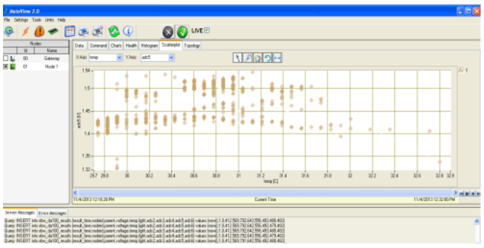

**Fig 10. Scatterplot result using Moteview**

The scatterplot diagram using ADC3 value is noted at different time interval in fig 10

### 3.3 Routing between the sensor nodes

The sensor information is exchanged to the passage hub through another bit which is going about as a switch between the door and the sensor bit. The directing is appeared in Fig 11

International Journal of Advance Research in Science and Engineering
Volume No.06, Issue No. 10, October 2017
www.ijarse.com
IJARSE
ISSN: 2319-8354

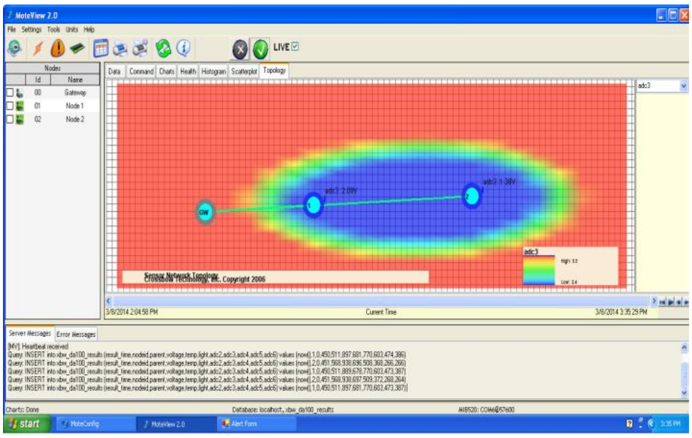

**Fig 11. Routing between sensor nodes using Moteview**

3.4 Setting threshold value

In sensed ADC value is compared to pre-setting threshold value.

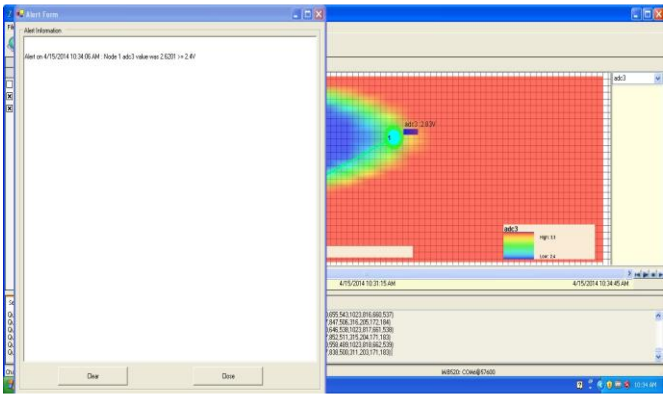

**Fig 12. Setting threshold value using Moteview**

Reach ADC value is 2.4V DC alarm information indicated, that time pump OFF in fig 3.9. Reach ADC value is 1.00V DC alarm information indicated, that time pump ON in fig 13.

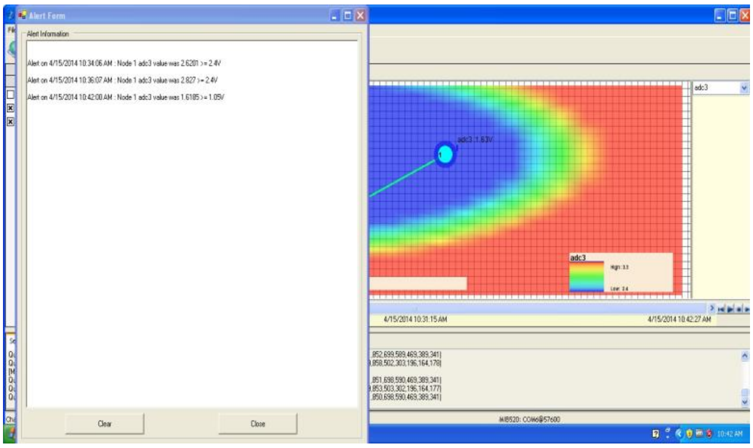

**Fig13. Setting threshold value for control voltage using Moteview**

### 3.5 Visualisation Tap for control panel

The programmed ON and OFF control of the engine on the server side is finished by means the perception tab gave by the MOTEVIEW programming. Once the edge esteem for dry soil is perused by the Gateway server the engine is exchanged ON by flipping the red LED in the representation board as appeared in Fig 14.

**Fig14. Engine ON and OFF control Panel**

Distinctive example of soil is measured with its resistance and voltage esteem as appeared in Table 4. The driest soil is anticipated with most astounding resistance and voltage esteem because of less dampness current and subsequently we have settled 2.4V as edge quality and thus a ready message is gotten by the server. Once the message is achieved the engine is exchanged ON by the representation board.

**Table Results for different pattern of soil**

| S. No | Moisture Pattern Of Soil | | |
|---|---|---|---|
| | ***Degree (°C)*** | ***Resistance (Ω)*** | ***Voltage (V)*** |
| 1 | 30 | 1695 | 2.7 |
| 2 | 25 | 920 | 2.18 |
| 3 | 24 | 783 | 1.83 |

## IV. CONCLUSION

In this anticipate, WNSs plan for outside applications, utilizing the MoteWorks stage, has been appeared. The primary favorable position of this stage is the effortlessness of utilization through which is conceivable to make a WSN impeccably working, screen a given territory and store data into a database. Presently we are attempting to test system exhibitions in horticulture application with ongoing necessities. A savvy watering system framework is accomplished with the assistance of MoteView representation instrument. The trial examination is done in this work. A future expansion of work will be done in enhancing the directing systems utilizing a superior steering administration strategy.To utilize in all the prototyping area in MDA100CB Sensor board, just like serial communication protocol (USART serial ports, SPI Communication, the I2C digital communications bus).

## REFERENCES

[1] Marco Gattuso, Mario La Rosa “An Indoor wireless sensor network using moteview development kit”IEEE May 2011.

[2] Mokhloss I. Khadem, Valentin Sgarciu "Monitoring of Environmental Parameters in Nano electronic Fabrication"ICWMC2012:The Eighth International Conference on Wireless and Mobile Communications.

[3] Tarun Dubey, O.P. Sahu "A simple scheme for location and distance estimation of wireless sensor node in outdoor environment" Feb. 20, 2013.

[4] A Wireless remote Monitoring Of agriculture Using Zigbee, GopalaKrishna Moorthy.K,Dr.C.Yaashuwanth, Venkatesh.K. IEEE 2012

[5] SMART IRRIGATION TECHNIQUE USING VOCAL COMMANDS V.Divya, Umamakeswari International journal on engineering and technology,International Journal of Engineering and Technology (IJET),Vol 5 No 1 Feb-Mar 2013.

[6] Rajesh Kannan et.al, "Wireless sensor network for vehicle speed monitoring and traffic routing system", 2010, ICMET, pp 631-635.

[7] V. Divya,"Smart Irrigation Technique using vocal commands" 2013, IJET,vol No 5 No 1, pp 385-390.

[8] V. Sreenithi Nithya selvabala, Balaji Ganesh," Implementation of wireless sensor network based human fall detection system", ELSEVIER pp 767-773.

[9] Raul Morais et.al,"A wireless sensor network for smart Irrigation and Environmental Monitoring: A position article",2005, EFTA/WCCAV pp 845-850