AN INTELLIGENT CULTIVATION SYSTEM USING IOT

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Abstract: **— A semi-automated irrigation system was developed in order to facilitate continuous and efficient irrigation under water and labour scarcity conditions. Due to reliability, robustness and limited resources, resistive sensors were chosen. It proposes an automatic irrigation system for the agricultural lands. Currently the automation is one of the important role in the human life. It not only provide comfort but also reduce energy, efficiency and time saving. Now the industries are use automation and control machine which is high in cost and not suitable for using in a farm field. So here it also design a smart irrigation technology in low cost which is usable by Indian farmers. The present system can be used for the home gardens only. Renesas microcontroller is the main heart of the whole system. Temperature, humidity, soil moisture of the land will be given to user via GSM module. Water pump can be operated by the user through the android application and data is stored in the database.**

***Index Terms*- Smart agriculture, IOT Sensor technology, Renesas microcontroller, Pir sensor, soil humidity sensor, temperature sensors, IOT is developing rapidly and widely applied in all wireless0environments sensor, LCD display, GSM**

I. INTRODUCTION

The requirement of building an automation system for an office or home is increasing day-by-day. Industrialist and researchers are working to build efficient and economic automatic systems to control different machines like lights, fans, air conditioners based on the requirement. Automation makes an efficient use of the electricity and water and reduces much of the wastage. Drip irrigation system makes the efficient use of water. Water is slowly dripped to the roots of the plants through narrow tubes and valves. Water is fed directly to the base of the plants which is a perfect way to water plant. There should be proper drainage in the fields or pot plants to avoid any water logging which in case may affect the productivity. There already exist automatic drip irrigation systems which water plants based on soil humidity, pH value of soil, temperature and light0. These parameters are required in big agricultural fields where productivity of the crop matters. In small areas like office premises, buildings, house gardens etc.Where watering plants at regular interval matters, our proposed irrigation system will be very efficient.This paper presents a smart irrigation system to water plants with the use of devices like Renesas microcontroller and other sensors. GSM is used to control the system wirelessly while embedded C programming language is used for automation purpose.This paper contributes an efficient and fairly cheap automation irrigation system System once installed has no maintenance cost and is easy to use.

II. Literature survey

IN based automated GSM Irrigation System R.Suresh,S.Gopinath,K.Govindaraju,T.Devika,N.SuthanthiraVanitha mentioned about using automatic microcontroller based rain gun irrigation system in which the irrigation will take place only when there will be intense requirement of water that save a large quantity of water. These system brings a change to management of field resources where they developed a software stack called Android is used for mobile devices that include an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Mobile phones have almost become an integral part of us serving multiple needs of humans. This application makes use of the GPRS feature of mobile phone as a solution for irrigation control system. These system covered lower range of agriculture land and not economically affordable. In Irrigation Control System Using Android and GSM for Efficient Use of Water and Power - LaxmiShbadi, NandiniPatil, Nikita. M, Shruti. J, Smitha. P Swati. C Automated

irrigation system uses valves to turn motor ON and OFF. These valves may be easily automated by using controllers. Automating farm or nursery irrigation allows farmers to apply the right amount of water at the right time, regardless of the availability of labor to turn valves on and off. In addition, farmers using automation equipment are able to reduce runoff from over watering saturated soils, avoid irrigating at the wrong time of day, which will improve crop performance by ensuring adequate water and nutrients when needed. Those valves may be easily automated by using controllers. Automating farm or nursery irrigation allows farmers to apply the right amount of0water at the right time, regardless of the availability of labor to turn valves on and off. They lack in a featured mobile application developed for users with appropriate user interface. It only allows the user to monitor and maintain the moisture level remotely irrespective of time.

III. SYSTEM MODEL

This paper presents proposed model for smart agriculture to develop real time monitoring system for soil properties like temperature, moisture, pH and to implement decision support advisory models for Pest & Disease forewarning, Crop Disease identification using image analysis and SMS based alerts. It will also be possible to control various operations of the field remotely from anywhere, anytime by mobile as well as web application In Android based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile The system supports water management decision, used for monitoring the whole system with GSM module The system continuously monitors the water level (Water level Sensor) in the tank and provide accurate amount of water required to the plant or tree (crop).The system checks the temperature, and humidity of soil to retain the nutrient composition of the soil managed for proper growth of plant. Water pump is controlled by the microcontroller through relay on decision made by user. Every information is stored in the data base for further process Low cost and effective with less power consumption using sensors for remote monitoring and controlling devices which are controlled via SMS using a GSM using android mobile.

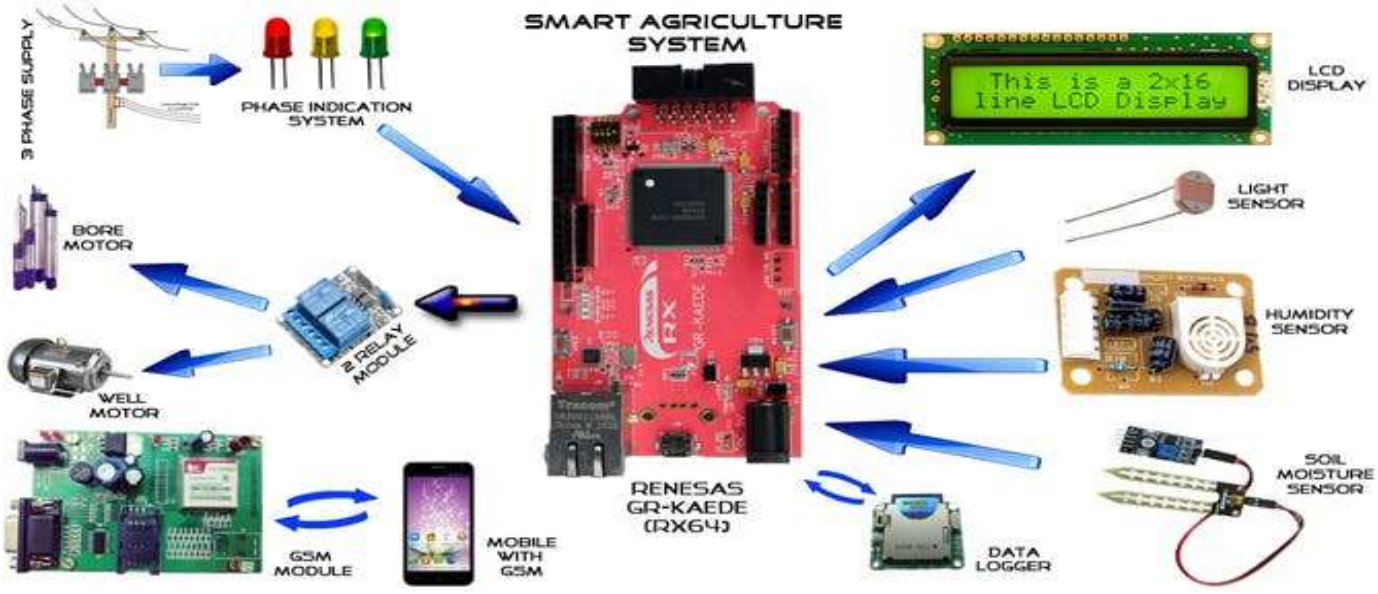

Figure.1 SYSTEM ARCHITECTURE

Soil moisture sensor: This is a simple and easy moisture sensor that can be used for the detection of soil moisture. The module outputs a high level, when soil moisture is deficit, the output is low level. Using the sensor produces a watering device automatically, let you don't choose0and employ persons to manage the plants in the garden.

Temperature Sensor: Temperature is a standout amongst the most generally estimated factors and it is in this way not astounding that there are numerous methods for detecting it. Temperature detecting should be possible either through direct contact with the warming source, or remotely, without coordinate contact with the source utilizing transmitted vitality.There are a wide assortment of temperature sensors available today,including Thermocouples,ResistanceTemperature Detectors (RTDs), Thermistors, Infrared, and Semiconductor Sensors.

PIR SENSOR: PIR stands for Passive Infrared. PIR sensors are often used in the construction of PIR-based motion detectors. These0sensors measure infrared radiation emanating from objects in the field of view. All objects emits what is known as black body radiation. It is usually infrared radiation that is invisible to the human eye but can be detected by electronic devices designed for such a purpose. The term passive in this instance means that the PIR device does not emit an infrared beam but merely passively accepts incoming infrared radiation.

Humidity sensor: Humidity0sensor is DTH 11Humidity is the presenc0 of water in air. The amount of water vapour in air. Humidity control0is also necessary in chemical gas purification, dryers.

Renesas microcontroller: chip is mounted on PCB. Renesas having 64 pins Renesas is a 16 bit microcontroller with 11 ports and 4 channels. Ports : P0 to P7 and P11 – P14 total 11 ports. 32 MHz and10 bit resolution A/D converter

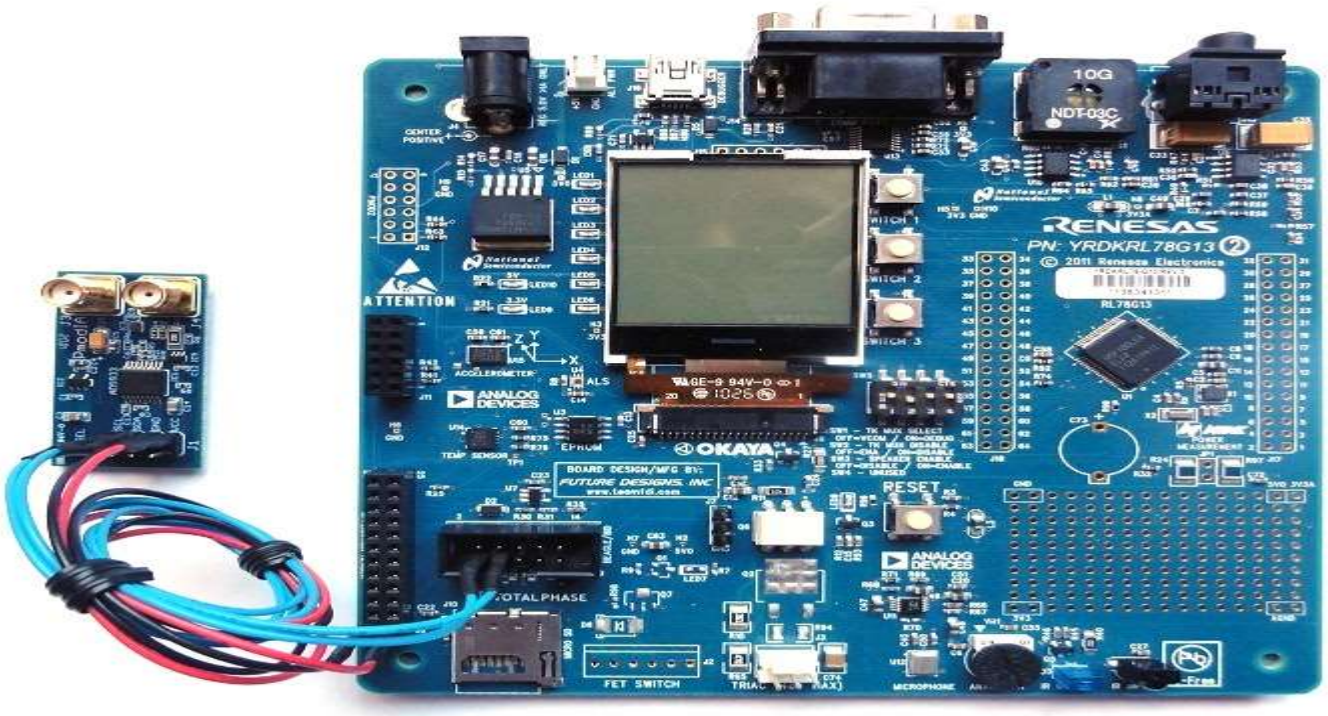

Figure.3.Renesas microcontroller

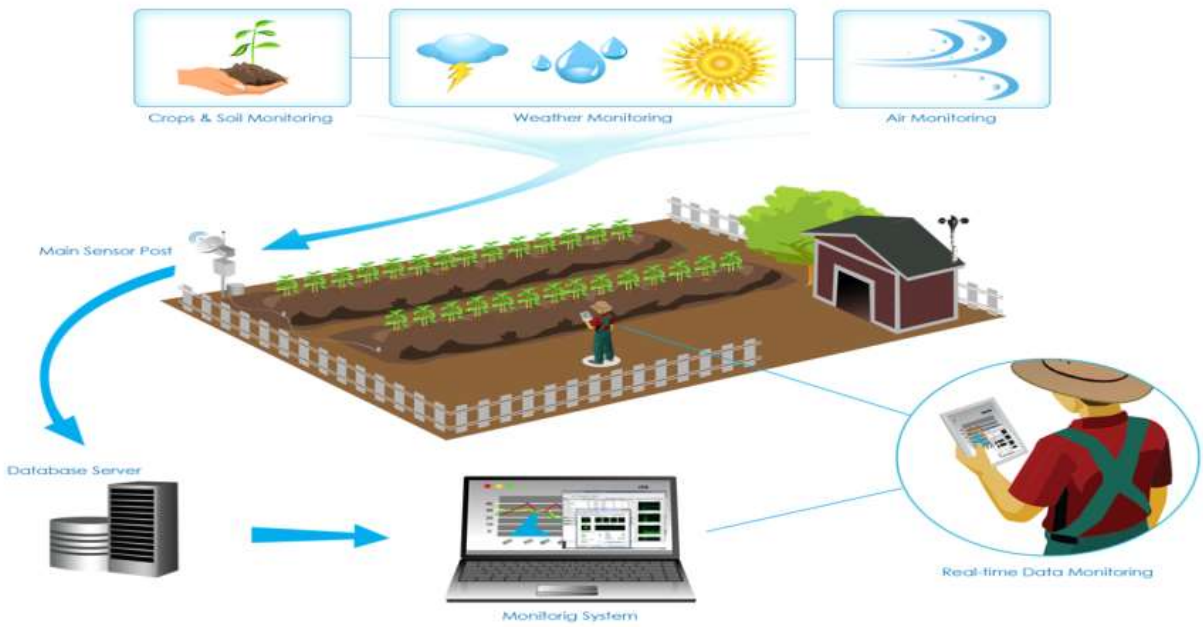

Figure.3. Model of system

GPRS (General Packet Radio service) AT Commands: General Packet Radio Service (**GPRS**) is a packet-based wireless communication services that promises data rates from 56 up to 114 Kbps and continuous connection to the Internet for mobile phone and computer users.

GSM: GSM stands for Global System for Mobile Communications formerly called as Group Special Mobile. This is a standard set developed by the (ETSI)

Water pump: This pump is intended for use in 4WD and other RV applications in conjunction with a BOAB poly water tank. The pump incorporates an automatic pressure demand switch such that the pump will commence when a tap is opened and turn off when the tap is closed. Alternatively the pump can be connected to an open hose and a suitable12v switch used to turn the flow On/Off.

Installation: Mount the pump in a suitably protected location between the tank outlet and the tap location. The pump can be mounted at any angle or position. Mount the pump close to the tank as the pump will "push" water much further than "draw" water. Screw or bolt the pump using the 4 x rubber feet to ensure the quietest operation. Ensure the pump has room to vibrate a little in operation (if the pump is touching a hard surface it will make more noise)Using 3/8" ID hose suitable for suction and pressure to 35PSI, connect between the tank outlet, pump and tap/outlet location. NOTE: The pump body is marked with a direction arrow to show the flow through the pump .Electrical Connection: (only suitably qualified personnel should undertake0electrical connections) Mount a 12v switch in a convenient location so the pump can be isolated when not in regular use. Using a minimum of 3mm automotive cable and a 10amp fuse, connect from the vehicle battery to the switch then to the red wire on the pump. Connect the green wire on the pump to vehicle ground.

Figure.4. Android Application

IV. RESULTS DISCUSSION

Intruder is detected. Identifying the soil humidity Identifying the moisture Water level and flow are monitored. Marketing application for crop sales Identification of weather fore casting, send each and every activities to farmer .we are developing an android application to having local market prices that may be helpful to farmer to develop in financially. Because if crop is good in case and

price is low whole actives of farmer is wasted. most of crop destroy by wild animals like monkey, elephant, pig, birds etc.. We are eliminating this problem from the Pir sensors.

V. CONCLUSION AND FURTHER ENHANCEMENT

For project demo concern, we have developed a prototype module. In future, this project can be taken to the product level. To make this project as user friendly and durable, we need to make it compact and cost effective. Going further, most of the units can be embedded along with the controller on a single board with change in technology, thereby reducing the size of the system**.** The paper proposes a wise agricultural model in integration with ICT. ICT have always mattered in Agriculture domain. Village farmers may have planted the "same" crop for centuries, but over period, weather patterns and soil conditions and epidemics of pests and diseases changed. By using the proposed approach, received updated information allows the farmers to cope with and even benefit from these changes. It is really challenging task that needs to provide such knowledge because of highly localized nature of agriculture information specifically distinct conditions. The complete real-time and historical environment information is expected to help to achieve efficient management and utilization of resources.

VI. ACKNOWLEDGEMENT

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