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IoT Based Flexible Smart Agriculture

Pavithra R, Santhana Lakshmi S.I

Department of Computer Science &Engineering, Ganadhipathy Tulsi's Jain Engineering College, Vellore, India

Assistant Professor, Department of Computer Science &Engineering, Ganadhipathy Tulsi's Jain Engineering College, Vellore, India

ABSTRACT: Real Time Automation of Agriculture for Social Modernization of Agricultural System attracts great attention now a days. Efficient water management is a major concern in many cropping systems in semi arid and arid areas. Among the important things that may come to the farmers interest is how to control the use of natural sources and natural environment which agriculture depend on. Therefore, this problem has captured farmers interest to implement agro environmental remote monitoring method in their agriculture industries. This can be implemented in various situations such as in monitoring qualities of soil and water design and instrumentation of variable rate irrigation, a wireless sensor network, and software for real-time in field sensing and control of a site specific precision linear move irrigation system is discussed here. Here the crop field area can be monitored without human interaction. To minimize pesticide use it is necessary to detect at the early stage the present of plant disease and perform local treatment instead of global systematic treatment. To achieve this goal, one of the techniques may be used is OPENCV through the deployment of sensors in the cultivated field and using smart automation and IoT Technologies.

KEYWORD: Smart Automation & IoT Technologies.

I. INTRODUCTION

Agriculture is considered as the basis of life for the human species as it is the main source of food grains and other raw materials. It plays vital role in the growth of country's economy. Unfortunately many farmers still use the traditional methods of farming which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved.

OpenCV (Open Source Computer Vision Library) is a functions mainly aimed at real time computer vision, developed by Intel, and now supported by Willow and Itseez. It is free for use under the open source BSD license.The library is cross platform. It focuses mainly on real time image processing. OpenCV, the goals of the project were described as Advance vision research by providing not only open but also optimized code for basic vision infrastructure. There are now full interfaces in Python,Java and MATLAB.

II. EXISING SYSTEM

In the existing method of the agriculture field all the parameters such as the water monitoring, quality of soil checking and temperature monitoring all are done using the manual method. So the labour cost will increase and at the same time continuous monitoring can't be done. Manual labour is mandatory in the field . Labour cost will increase.Continuous monitoring will not be there. To avoid this, In our proposed system we are using the IOT technology which continuously updates to the user of the field.

III. PROPOSED SYSTEM

In irrigation process we use the temperature sensor, humidity sensor as well as water level sensors. If temperature is high in the field, then it will switch ON the pumping motors. Then the pumping motor is used to fill the tank level if water is empty or low, it could be find using level sensor. And all these parameters can be controlled and monitored

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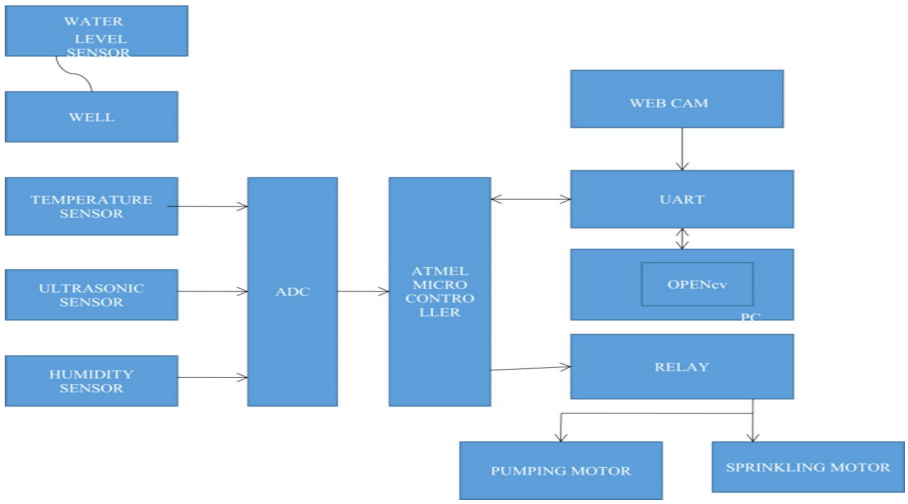
using IOT. Developing a computer vision system to detect, recognize, and classify disease affected on crops which will avoid human interference and hence lead to precised unbiased decision about disease infection and its further validation. Crop disease will be identified by OPENcv.The major advantages of proposed system is More efficient and accurate information is fetched. Reduced man power. Based on Wireless control plant growth can be monitored at any time. The proposed system has the following subsystems are,

IV. SYSTEM ARCHITECTURE



1. SENSOR INTERFACING:

The temperature sensor,humidity sensor and ultrasonic of the sensor are interfaced to the controller. Water level sensor is immersed inside the well to detect water flow. The sensor data are stored in the database or cloud.

1.a) ULTRASONIC SENSOR:

Ultrasonic sensorsare devices that use electrical mechanical energy transformation to measure distance from the sensor to the target object. Ultrasonic waves are longitudinal mechanical waves which travel as a sequence of compressions and rarefactions along the direction of wave propagation through the medium. Apart from distance measurement, they are also used in ultrasonic material testing Object detection, position detection, ultrasonic mouse, etc. These sensors are categorized in two types according to their working phenomenon piezoelectric sensors and electrostatic sensors. Here we are discussing the ultrasonic sensor using the piezoelectric principle. Piezoelectric ultrasonic sensors use a piezoelectric material to generate the ultrasonic waves.

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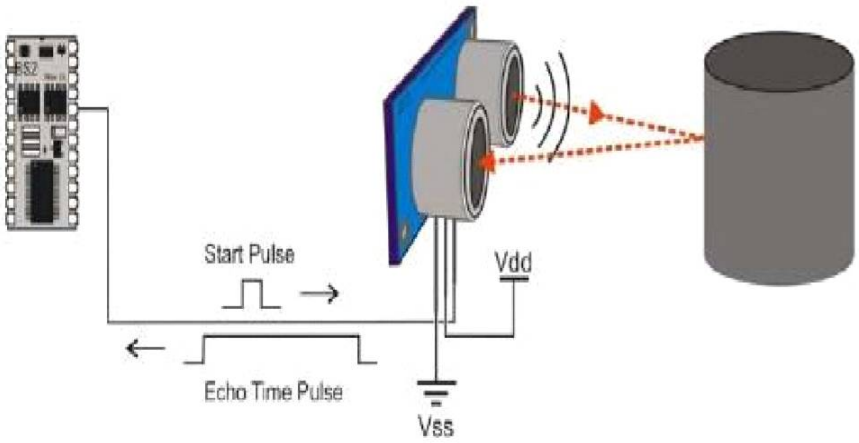
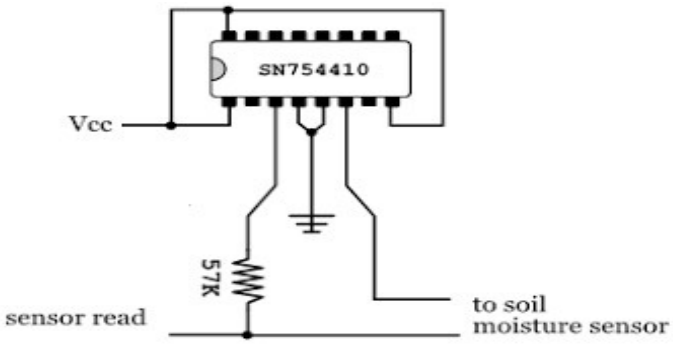


1.b) HUMIDITY SENSOR:

A humidity sensor (or hygrometer) senses, measures and reports the relative humidity in the air. It therefore measures both moisture and air temperature. Relative humidity is the ratio of actual moisture in the air to the highest amount of moisture that can be held at that air temperature.



1.c) WATER LEVEL SENSOR:

Level sensors detect the level of substances that flow, including liquids,slurries,granular materials, and powders. All such substances flow to become essentially level in their containers because of gravity. The substance to be measured can be inside a container or can be in its natural form. The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place, while point level sensors only indicate whether the substance is above or below the sensing point. Generally the latter detect levels that are excessively high or low.

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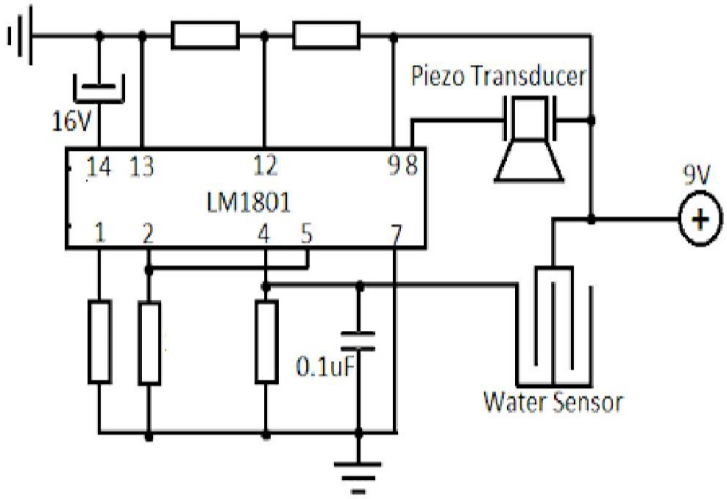
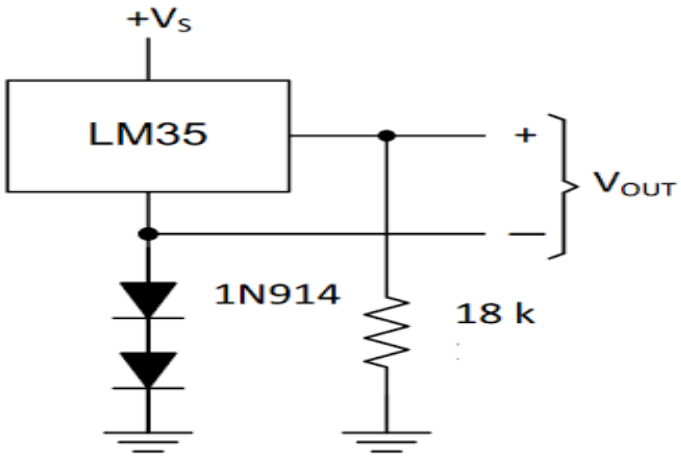


1.d) TEMPERATURE SENSOR:

The measurement of temperature is one of the fundamental requirements for environmental control, as the latter detect levels that are excessively high or low as well as certain chemical, electrical and mechanical controls. Many different types of temperature sensors are commercially available, Send the type of temperature sensor that will be used in any particular application will depend on several factors. For example, cost, space constraints, durability, and accuracy of the temperature sensor are all considerations that typically need to be taken into account.



1.e) ANALOG TO DIGITAL CONVERTER:

The ADC0809 data acquisition component is a monolithic CMOS device with an 8-bit analog to digital converter, 8-channel multiplexer and microprocessor compatible control logic. The 8-bit A/D converter uses successive approximation as the conversion technique. The converter features a high impedance chopper stabilized comparator, a 256R voltage divider with analog switch tree and a successive approximation register. The 8-channel multiplexer can directly access any of 8 single ended analog signals.The device contains an 8-channel single ended analog signal multiplexer. A particular input channel is selected by using the address decoder. Shows the input states for the address lines.

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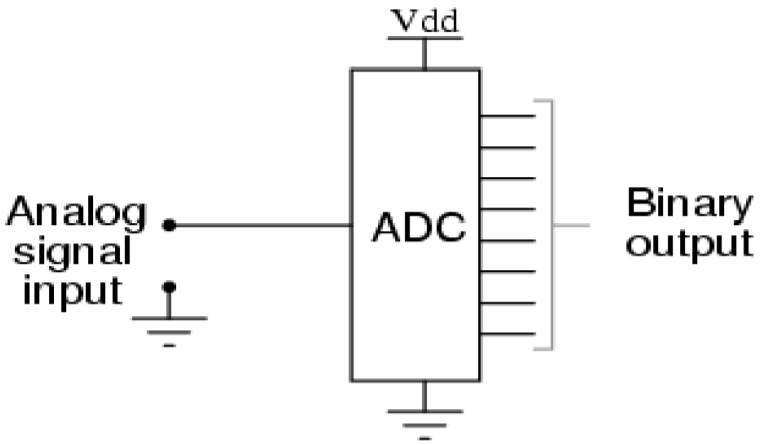
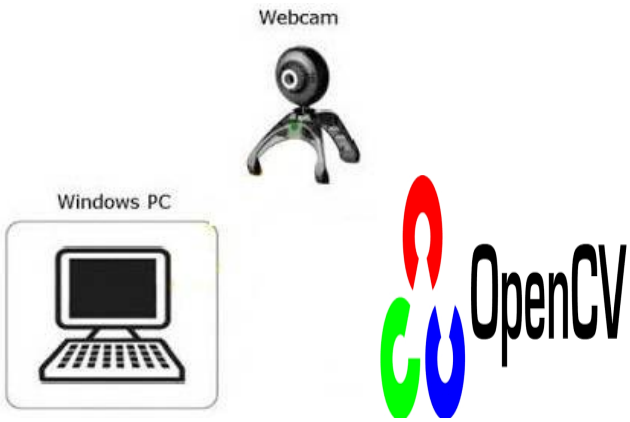


2.WEB CAMERA INTERFACING FOR MONITORING CROP CONDITION:

Here the crop field area can be monitored without human interaction. To minimize pesticide use it is necessary to detect at the early stage the present of plant disease. To achieve this goal one of the technique may be used is OPENcv tool.

2.a) WEBCAMERA INTERFACING:



2.b) UART:

A universal asynchronous receiver/transmitter is a type of "asynchronous receiver/transmitter", a piece of computer hardware that translates data between parallel and serial forms. UARTs are commonly used in conjunction with other communication standards such as EIA RS-232. The Universal Asynchronous Receiver/Transmitter (UART) controller is the key component of the serial communications subsystem of a computer.

The UART takes bytes of data and transmits the individual bits in a sequential fashion. At the destination, a second UART reassembles the bits into complete bytes. Serial transmission of digital information (bits) through a single wire or other medium is much more cost effective than parallel transmission through multiple wires. A UART is used to convert the transmitted information between its sequential and parallel form at each end of the link. Each UART contains a shift register which is the fundamental method of conversion between serial and parallel forms.

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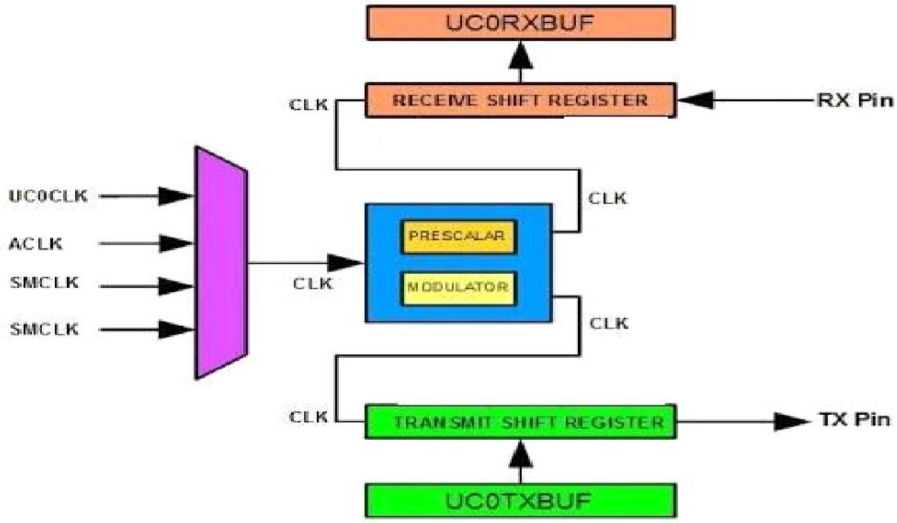
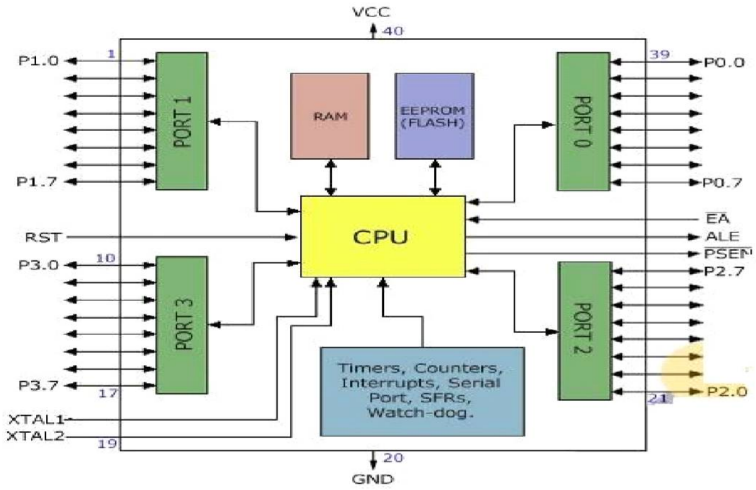


2.c) ATMEL89S52 MICRO CONTROLLER:

Like all good things, this powerful component is basically very simple. It is made by mixing tested and high quality "ingredients" as per following receipt. The simplest computer processor is used as the "brain" of the future system. Depending on the taste of the manufacturer, a bit of memory, a few A/D converters, timers, input/output lines etc. are added. All that is placed in some of the standard packages. Simple software able to control it all and which everyone can easily learn about has been developed.

The following things have had a crucial influence on development and success of the microcontrollers. Powerful and carefully chosen electronics embedded in the microcontrollers can independently or via input/output devices (switches, push buttons, sensors, LCD displays, relays etc.), control various processes and devices such as industrial automation, electric current, temperature, engine performance etc. Thanks to that, the world is overwhelmed today with cheap automatic devices and various “smart” appliances. Prior knowledge is hardly needed for programming. It is sufficient to have a PC and a simple device used for “loading” ready to use programs into the microcontroller.



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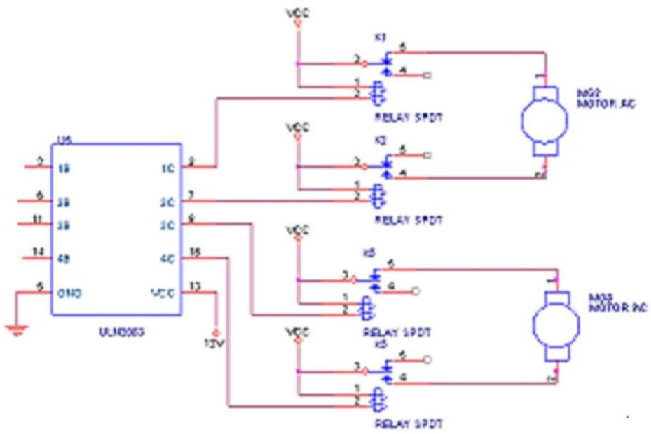
3. ACUTATORS CONTROLLING (MOTOR):

The sprinkling and pumping motor is connected to relay for the purpose of automatic on-off condition. Pumping motor is used when the temperature level is high and water level is low. Sprinkling motor is the contrast of pumping motor.

3.a) MOTOR CONTROLLING:

Two factors are important in the selection of a motor for a particular application. the variation of the speed with a change in load, and the variation of the torque with a change in load. A shunt motor is basically a constant speed device. If a load is applied, the motor tends to slow down. The slight loss in speed reduces the counter enfant results in an increase of the armature current. This action continues until the increased current produces enough torque to meet the demands of the increased load. As a result, the shunt motor is in a state of stable equilibrium because a change of load always produces a reaction that adapts the power input to the change in load.

Every DCmotor has six basic parts axle,rotor,stator,commutator,field magnet(s),and brushes. In most common DC motors, the external magnetic field is produced by high strength permanent magnets. The stator is the stationary part of the motor, this includes the motor casing, as well as two or more permanent magnet pole pieces. The rotor rotate with respect to the stator. The rotor consists of windings, the windings being electrically connected to the commutator. The above diagram shows a common motor layout with the rotor inside the stator (field) magnets.



3.b) RELAY:

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switchpositions and most have double throw (changeover) switch contacts as shown in the diagram. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical.

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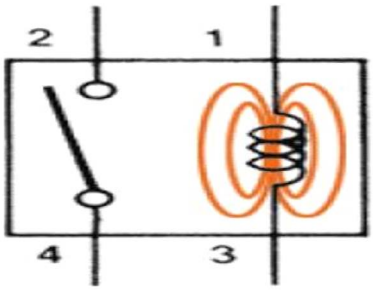
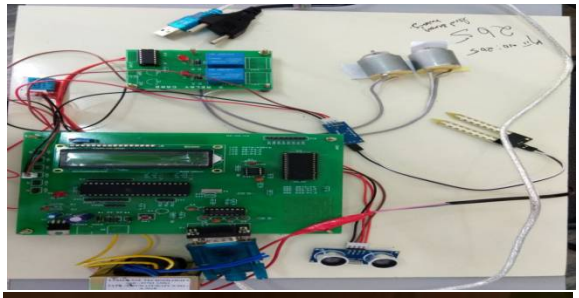
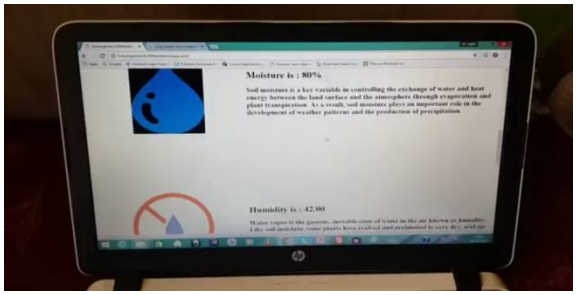


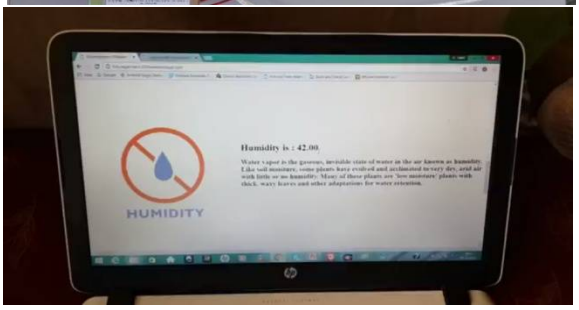
V. CONCLUSION

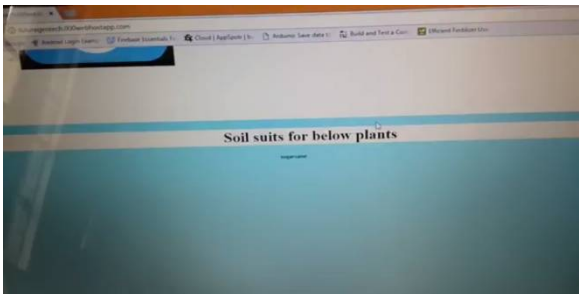
In this paper we designed smart automation of agriculture the process needs of soil environment monitoring system and analysing those problems with existing monitoring system. we implemented a sensor based on the soil moisture level monitoring system to control the water flow available on the pipe. This system can rapidly realize the automatic irrigation system, transmission and display. Through the Internet of Things technologies and web services, we can realize the functions of monitoring and the rerived sensor details are updated via web page. It shows that the system can meet the requirements of the moisture level of the soil and water flow level for the agricultural field monitoring and the updated information will be available on the webpage. At the same time the crop will be affected in any disease the webcam will be captured the image, the crop will be affected in disease normal or ubnormal condition with using to the help of ultrasonic sensor. The user can continuously monitoring at anytime view their sensor data details and the intimation about the water flow level, the crop normal or ubnormal conditions, and growth level of the crop also identified.

OUTPUT:









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VI. FUTURE WORK

In future, this system will be enhanced to monitor a large scale area.

REFERENCES

1. Jiber, Y.:,Harroud, H.:,Karmouch,A. "Precision agricultural monitoring framework based on WSN". Wireless communications and mobile computing 7th international, vol.,no.pp.2016,2020, 4-8 july 2015.
2. Qiangwang, terzis A. and szalay A …A novel measuring wireless sensor network, instrumentation and
3. measurement technology 2010 IEEE, vol.,no.,pp.412,415,3-6 may 2010.
4. Castelloc.c.fan j., davari a. and ruei-xi chen, optimal sensor placement strategy for environmental monitoring using wireless sensor networks, system theory, 2010 42nd southeastern symposium on , vol., no., pp.275,279,7-9 march 2010