Scientific Journal of Impact Factor (SJIF): 5.71
e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

Volume 5, Issue 05, May -2018

SMART AGRICULTURE

[1]Raghavendra L R, [2]Anusha B M , [3]Nandisha K N, [4]Shreeraksha J K, [5]Tejas Gowda K

[1] Assistant Professor, Dept. of ECE, BGSIT, B.G.Nagara,
[2]Student , Dept.of ECE, BGSIT, B.G.Nagara,
[3]Student , Dept.of ECE, BGSIT, B.G.Nagara,
[4]Student , Dept.of ECE, BGSIT, B.G.Nagara,
[5]Student , Dept.of ECE, BGSIT, B.G.Nagara,

Abstract: *Agriculturalist and agriculture plays a vital role in our country from old ages. Since people are lazy and they started to migrate from rural region to urban region. Hence they want the agriculture to be smart so we go for smart agriculture using IOT. This project of smart agriculture includes the specialized features like GPS based remote controlled monitoring, moisture & temperature sensing, intruders scaring, security, leaf wetness and proper irrigation facilities. In this project we will overcome the issues like water wastage, security, soil level, crop growth. By adapting wireless sensor we will check out the moisture level and by temperature sensor the temperature .Also by placing LCD display we will provide the security to the field .This agenda is completely a smart work on smart agriculture.*

Key words—*IOT, Raspberry-Pi, Twilio, Sensors ,GPS based remote controlling monitoring.*

I. INTRODUCTION

In India the population is more so people directly or indirectly depend upon the agriculture for their one of the basic need i e food. Since 90% of the farmers are illiterate in our country even for small things like testing soil, to check the sensors they to go to lab or bring the person to the field.so to avoid these problems we have gone through smart agriculture using IOT. IOT has been already in raising with novel multiple techniques. The monsoons are irregular and unevenness of availability of water throughout the year poses a major Problem. All this leads to inadequate yield and low productivity. The implementation of scientific Methods in the field of agriculture can bring about radical changes in the productivity of crops, due to improved efficiency in the farming techniques. Of the various advantages that IoT brings to the table, its ability to innovate the current scenario of farming methods is absolutely ground-breaking. Mostly, we come across ideas that suggest a wireless sensor network that collects data from the various sensors present in the field and sends the data to the main central server. This method focuses on studying the environmental factors to improve crop yield. But it turns out, monitoring environmental factors alone are never adequate to increase productivity of crops since a lot of other factors have a role to play. This may include spraying of insecticides and pesticides to prevent invasion of pests and insects, monitoring the fields at all times to stay aware of attacks by animals, birds and thefts of crops during the stages of harvesting. We need to implement an integrated system that will ensure increased levels of productivity, and crop monitoring at all stages of cultivation and harvesting. This paper proposes smart farming by the aid of automation and IoT technology. We aim to implement a smart GPS based remote controlled vehicle that performs various tasks like monitoring fields to prevent thefts, scaring birds and animals, sensing soil moisture content, spraying fertilizers and pesticides, weeding, sensing soil moisture, etc. Smart irrigation, by usage of optimum amounts of water, depending on the requirement of each crop type and the soil will be executed. Finally, we plan on enforcing smart warehouse management, with temperature and humidity sensing for the benefit of the products being stored, and detection of presence of any invader who tries to steal from the warehouse. Controlling and monitoring of all these operations will be through a remote smart device with Internet connectivity and the operations will be performed by interfacing sensors.

RASPBERRY-PI

Raspberry Pi is a credit-card sized computer manufactured and designed in the United Kingdom by the Raspberry Pi foundation with the intention of teaching basic computer science to school programming and DIY-Do-it Yourself projects. The Raspberry Pi is manufactured in three board configurations through licensed manufacturing deals with Newark element 14 (Premier Farnell), RS Components and Egoman. These companies sell the Raspberry Pi online. Egoman produces a version for distribution solely in China and Taiwan, which can be distinguished from other Pis by their red coloring and lack of FCC/CE marks. The hardware is the same across all manufacturers.

The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, Video Core IV GPU and was originally shipped with 256 megabytes of RAM, later upgraded (Model B & Model B+) to 512 MB. It does not include a built-in hard disk or solid-state drive, but it uses an SD card for booting and persistent storage, with the Model B+ using a MicroSD.

Something had changed the way kids were interacting with computers. A number of problems were identified: majority of curriculums with lessons on using Word and Excel, or writing webpages, the end of the dot-com boom, and the rise of the home PC and games console to replace the Amigas, BBC Micros, Spectrum ZX and Commodore 64 machines that people of an earlier generatio n learned to program on.

Fig.1: Raspberry Pi model

The major aim behind the Raspberry Pi was to educate people, especially children and teenagers, towards programming and basic hardware interfacing. The open body structure of the Raspberry Pi makes it a machine on which one can learn computer concepts.

Applications of the Raspberry Pi can be given as follows:

- Teaching programming concepts.
- Teaching hardware interfacing.
- Raspberry Pi being very cost effective can be deployed in large numbers in underdeveloped and developing countries like Africa, India, China, Brazil etc. to schools and colleges and to everyone who is interested in computers and electronics.
- It can be used in robotics for controlling motors, sensors, etc.
- It can be used as a downloading machine replacing desktop computers. It consumes very low power and also can be accessed remotely.
- It can be used as a media centre at home. Any television can be converted to a smart TV with internet capabilities with the Pi.
- It can be used for designing prototypes of DIY projects and certain embedded devices. It becomes very cheap option for testing and evaluation purpose.
- Can be used in creating and handling small servers.
- It can be used for making digital photo frames, tablets etc at home.

TWILIO

Twilio is a developer platform for communications. Software teams use twilio api to add capabilities like voice, video, and messaging to their applications. This enables businesses to provide the right communication experiences for their customers. Behind twilio api is a super network, a software layers that connects and optimizes communications network around the world. This is what allow your users to reliably call and message anyone anywhere With Twilio, you can reach customer in the ways they prefer, and engage with them effectively using context related to that interaction. As customer become more crucial than ever to the success of business today.Twilio has taken the global telecom network and turned it into cloud communications platform with these capabilities and more.

Voice:
API and SDKs to build calling capabilities within web and mobile apps. Connect to landlines, mobile devices or even Web RTC clients to make calls from apps or power multinational call centers.

Video:
Real-time video infrastructure and SDKs to embed video collaboration and context-sharing into your web or mobile app. A global infrastructure that handles signaling, registration, and media relay.

Messaging:
API and SDKs are send and receive SMS, MMS, and IP messages globally from your web and mobile app, and intelligent delivery features to ensure messages get through.

II. METHADOLOGY

This paper is a presentation of the design and implementation of Smart agriculture through Raspberry-Pi module. Our project is mainly designed to reduce an human intervention in the agricultural field .We are implementing three main applications they are,

- **Irrigation indication level**: It can be implemented by automatic pump motor, this system switches the pump motor ON/OFF on sensing the moisture content of the soil.

  - **Farming securement:** Main of this application is to ensure the proper security in agriculture farm by using buzzers or alarms, when only external objects or animals enter to the farm.
  - **Crop development indication**: In this we use pi cameras to get to know the growth of the crops.

Finally whatever the things will happen in the form and overall result will be sent to the farm owner and he could control the things through his mobile only.

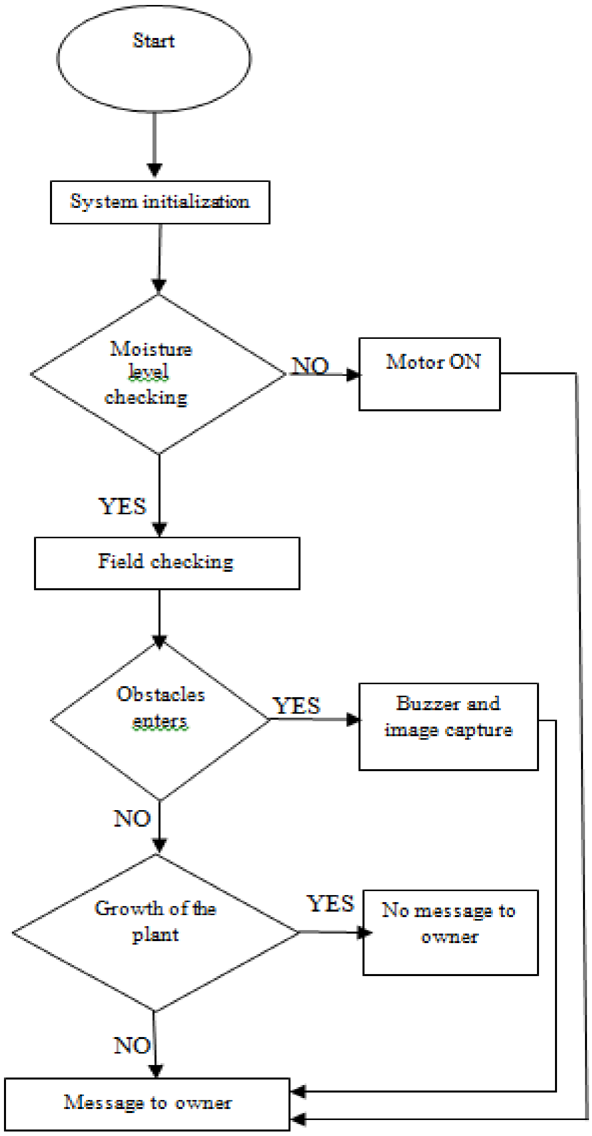

Fig.2: Flow chart of smart agriculture.

At first all the sensors and Raspberry-Pi modem initialization occurs. The land owners can sit at home and look after the field. If the moisture content of the soil is drained he will get the message using Twilio account and he will get to know about the land and it automatically turn on the motor. Secondly if any obstacles like domestic features comes into the land the buzzer turn on to give indication to the land owner. And also to check the growth of the crop in the field is done in this flow diagram as shown fig(2).

III. SYSTEM OVERVIEW

We divided our system into four parts. These are four different types of sensors i.e temperature sensor, IR sensor, moisture sensor, pi camera and pumping motor. All this sensors and pi camera will be connected to the ADC board and finally all the connection to the raspberry pi.

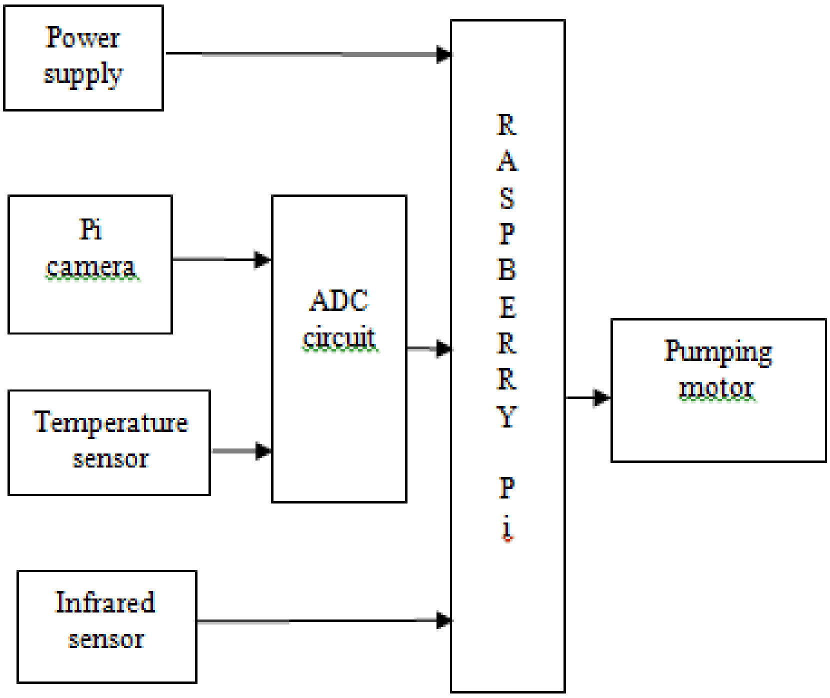

Fig. 3: Block diagram of Raspberry pi

IR sensor: This device emits and/or detects infrared radiation to sense a particular phase in the environment. Generally, thermal radiation is emitted by all the objects in the infrared spectrum. The infrared sensor detects this type of radiation which is not visible to human eye.

ADC 0809: In this system, the ADC 0809 is used for converting the analogue data into digital data for giving the logic signal to the Raspberry-Pi chip. It is powered up with 5V dc.

Pumping motor: In this remote monitoring of transformer health over internet system, the voltage sensor is used for sensing the voltage of cross ponding components such as transformer or small motor (ac induction, permanent magnet dc, or brushless dc) designed specifically with an integral (not separable) gear reducer (gear head). The end shield on the drive end of the motor is designed to provide a dual function. The side facing the motor provides the armature/rotor bearing support and a sealing provision through which the integral rotor or armature shaft pinion passes.

Temperature Sensor: You can measure temperature more accurately that using a thermistor. The sensor circuitry is sealed and not subject to the LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.

IV. WORKING PRINCIPLE

Initially the sensors like temperature sensor, moisture sensor, IR sensor is connected to the raspberry pi microcontroller where it places in a field of agriculture. By using sensor pi microcontroller can able to understand the temperature range, moisture content and any obstacle detections in the field based on this the pumping motor will starts and sprinkles the water on the thing which causes the harm. Then after with the help of PI-camera it can able to recognize the growth of the plant and sends the image to the server.

V. APPLICATIONS

- Environmental monitoring
- Energy management
- Building and home automation
- Better quality of life for elderly

]

VI. EXPERIMENTAL RESULTS

The experimental setup consists of the RPI and the ADC section as shown in the figures 5.1.

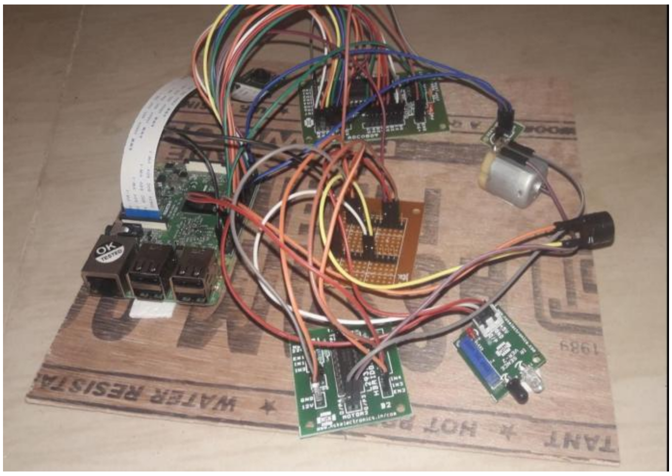

Fig 4. Overall view of smart agriculture

The overall view of smart agriculture consisting of ADC board, Raspberry pi, temperature sensor, IR sensor, Gear motor, soil moisture sensor, buzzer, pi camera, HDMI cable. RPI acts as a main interconnection to all the sensors. ADC board converts the message from analog to digital medium. IR sensors helps to detect the animals which destroys the field and obstacle's. Gear motor helps in providing water to the field. Soil moisture helps to check out the moisture content to the land. Buzzer makes the sound and gives alert to the owner of the land. Pi camera captures the picture of the obstacle's or animals and sends it the land owner through GSM model.

VII. FUTURE WORK

If any external objects or birds arises from the top of the field it cant be recognized. i e IR sensors will be only on the sides of the farm not on top of the farm so birds and any flies cant be recognized.IR sensors cant be placed on the top of field because crop will keep on growing continuously so crop covers the IR sensors.

VIII. CONCLUSION

For future developments it can be enhanced by developing this system for large acres of land. Also the system can be integrated to check the quality of the soil and the growth of crop in each soil. The sensors and microcontroller are successfully interfaced and wireless communication is achieved between various nodes. All observations and experimental tests prove that this project is a complete solution to field activities and irrigation problems. Implementation of such a system in the field can definitely help to improve the yield of the crops and overall production

IX. REFERENCES

[1] K.Lakshmisudha, Swathi Hegde, Neha Kale, Shruti Iyer, " Smart Precision Based Agriculture Using Sensors", International Journal of Computer Applications (0975- 8887), Volume 146-No.11, July 2011

[2] Nikesh Gondchawar, Dr. R.S.Kawitkar, "IoT Based Smart Agriculture", International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE), Vol.5, Issue 6, June 2016.

[3]M.K.Gayatri, J.Jayasakthi, Dr.G.S.Anandhamala, "Providing Smart Agriculture Solutions to Farmers for Better Yielding Using IoT", IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2015).

[5] Chetan Dwarkani M, Ganesh Ram R, Jagannathan S, R. Priyatharshini, "Smart Farming System Using Sensors for Agricultural Task Automation", IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2015).

[6] S. R. Nandurkar, V. R. Thool, R. C. Thool, "Design and Development of Precision Agriculture System Using Wireless Sensor Network", IEEE International Conference on Automation, Control, Energy and Systems (ACES), 2014.

[7] Joaquín Gutiérrez, Juan Francisco Villa-Medina, Alejandra Nieto-Garibay, and Miguel Ángel Porta- Gándara, "Automated Irrigation System Using a Wireless Sensor Network and GPRS Module", IEEE Transactions on Instrumentation and Measurements, 0018-9456,2013.

[8] Dr. V .Vidya Devi,G. Meena Kumari, "Real- Time Automation and Monitoring System for Modernized Agriculture" ,International Journal of Review and Research in Applied Sciences and Engineering (IJRRASE) Vol3 No.1. PP 7-12, 2013.

[9] Meonghun Lee, Jeonghwan Hwang, Hyun Yoe, "Agricultural Protection System Based on IoT", IEEE 16th International Conference on Computational Science and Engineering, 2013.

[10] Monika Jhuria, Ashwani Kumar, Rushikesh Borse, “Image Processing for Smart Farming: Detection of Disease and Fruit Grading”, IEEE Second International Conference on Image Information Processing (ICIIP), 2013.

[12] Orazio Mirabella and Michele Brischetto, “A Hybrid Wired/Wireless Networking Infrastructure for Greenhouse Management”, IEEE Transactions on Instrumentation and Measurement, vol. 60, no. 2, pp 398- 407, 2011.

[13] Nikesh Gondchawar, Prof. Dr. R. S. Kawitkar, “IoT based Smart Agriculture” International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 6, ISSN(Online) 2278-1021 ISSN (Print) 2319 5940,June 2016.

[14] Rajalakshmi.P, Mrs.S.Devi Mahalakshmi“IOT Field Monitoring And Irrigation Automation”10th International conference on Intelligent systemsand control (ISCO), 7-8 Jan 2016 published in IEEE Xplore Nov 2016.

[15] Tanmay Baranwal, Nitika , Pushpendra KumarPateriya “Development of IoT based Smart Securityand Monitoring Devices for Agriculture” 6thInternational Conference - Cloud System and Big Data Engineering, 978-1-4673-8203-8/16, 2016 IEEE.

[16] Nelson Sales, Artur Arsenio, “Wireless Sensor andActuator System for Smart Irrigation on the Cloud”978-1-5090-0366-2/15, 2nd World forum on Internet Things (WF-IoT) Dec 2015, published in IEEE Xplore jan 2016.

[17] Mohamed Rawidean Mohd Kassim, Ibrahim Mat,Ahmad Nizar Harun “Wireless Sensor Network in Agriculture Application” 978-1-4799-4383-8/14, [18] Mohamed Rawidean Mohd Kassim, Ibrahim Mat,Ahmad Nizar Harun, “Wireless Sensor Network in Precision agriculture application” International conference on computer, Information and telecommunication systems (CITS), July 2014 published in IEEE Xplore.

