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Smart Farming Using IoT

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Abstract:- Farming is a backbone of India from ages. Due to the migration of people from rural to urban, there are some obstructions. Every Plants and crops have their own requirements in terms of water, Fertilizers and weather. This can be overcome through Smart Farming Techniques using IoT. This project includes various features such as protecting crop, Rain water harvesting, crop monitoring via Applications and Intruder Detection. This can be achieved by interfacing sensors and Microcontroller. This project helps farmer by control the farm field through an Application. This concept is created as a product and given to the farmer's welfare.

Keywords:- *Farming, Metal Flips, Iot, Sensors, Actuators, Android Application.*

I. INTRODUCTION

The basic source of livelihood in India is Agriculture. India is in Second place when it comes to Farming, Agriculture production varies in terms of Temperature, Soil Fertility, rain fall and pesticides. Agriculture is affected mainly due to insufficiency of water and it uses almost 85% of water resources worldwide. On an average 60% of water used in irrigation is wasted. As the demand on water consumption is increasing, there is an urgent need to create strategies for sustainable use of water.

Farmers need not be present in the field where checking of water availability to crops will be checked and based on that motors will be worked automatically as well as manually.

Heavy rainfall can damage the crops, which will be a complete loss of agriculture production to farmers which can be avoided by closing the metal flips in the farm land when there is a rainfall by checking the water content in the soil.

This paper presents the Farming by monitoring and controlling the farmland by using the sensors such as soil moisture sensor, Rain water sensor, Temperature sensor and Infrared sensor. The system can control water supply to farm land manually or automatically.

The farmer can monitor the farmland via the Android application, if any illegal activities on going on or if someone enters the field the farmer will be notified and by noticing who has entered the farmland the farmer can Turn off the Buzzer.

The farmer can post his grown crops along with the details in an android application. The Dealer by logging in to the application can view all the crops posted by the farmer, If the Dealer wish to buy the crops he can directly communicate with the respective Farmer which helps in eliminating the Mediator so that the Farmer get more Profit.

II. RELATED WORKS

To improve the performance of the farm background research work has been done. The paper presents monitoring and controlling the farm field in smart way. Wireless sensor network is used by the system to monitor the environmental condition such as Humidity, soil moisture level, water level in farm field for controlling the farm [7].

The proposed system helps user to improve quality and quantity of their farm field by sensing ambient temperature, soil moisture value and water level in the farm field without any human interaction. The paper focuses on intelligent, dynamic and automated irrigation system for the agriculture crops. The system mainly concentrates on controlling the irrigation process and preservation of water resources automatically by Raspberry Pi. The automation part will be controlled through python programming [8].

III. EXISTING SYSTEM

Farm Lands and Fields situated miles away from your home. Long walk-ways in remote agriculture lands also face associated threats from wild animals, bugs, bees, snakes and other potential hazards from lightning. Protecting your equipment from theft and power fluctuations could be a serious concern for many.

In the existing system for crop protection Arduino boards are used and Arduino board acts as a microcontroller. Here the set up cost is bit high which may pose problems for the installation.

In order to overcome all these features Raspberry Pi3 is used instead of Arduino boards or Renessa Microcontrollers, Raspberry Pi3 a latest version and also it acts as a microcontroller and microprocessor. Here in this system one can access and control agriculture system via laptop, mobile or a computer.

IV. PROPOSED SYSTEM

➢ *Remote control and Monitoring system*

It provides the farmer to gain better control and visibility of farm field operations and to get better decisions about the water level and intruder activities.

➢ *Wireless Communication*

The purpose of this project is to reduce the manual monitoring in the farm field and get the farm field information through an application [1].

➢ *Protect the crops from natural disasters*

Avoiding the crops getting damaged from the heavy rain.

➢ *Read the soil moisture level*

Different crops will have the different moisture level [3]. So depending on the moisture level in the field, the required amount of water will be allowed to flow to the crops [2].

➢ *High reliability*

With great quality and reliable of irrigation, farmer can provide required amount of water to the farm field which results in avoiding crops from heavy water supply. So farmer will obtain high yield response even with scarcity of irrigation of water.

V. FLOW DIAGRAMS

Level0 DFD contains process and primary input and output. They are also known as fundamental system models.

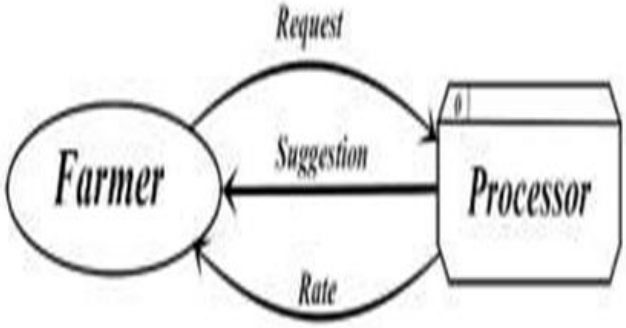

Fig. 1:- DFD-Level 0

The 1st level DFD includes the major processes within the system. It describes the old target system.

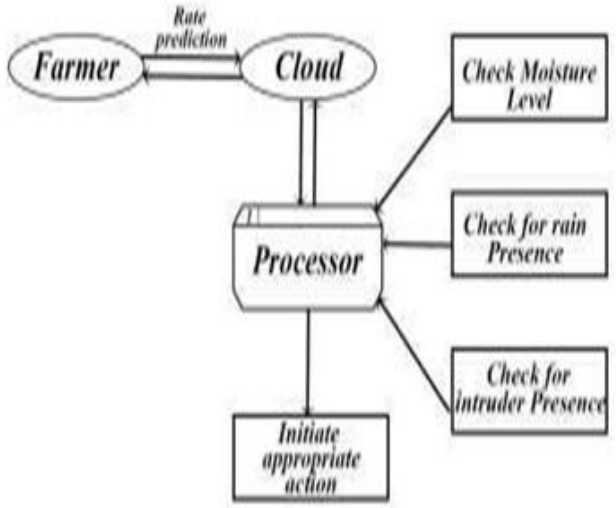

Fig. 2:- DFD-Level 1

Here Process box is decomposed as an second level diagram which explains the working of an each individual sensor.

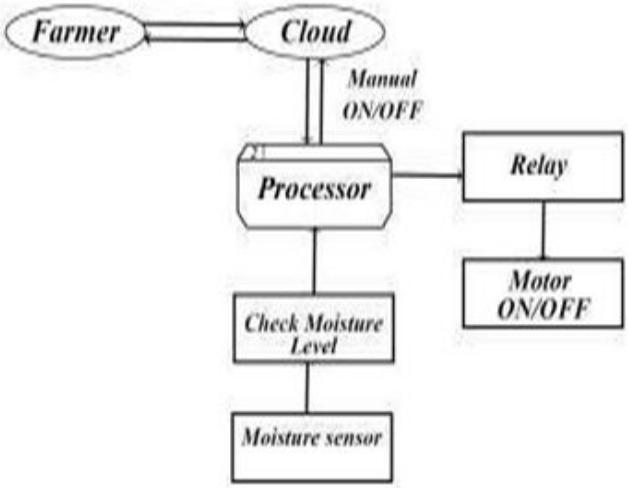

Fig. 3:- DFD-Level 2 MOISTURE BASED ON/OFF

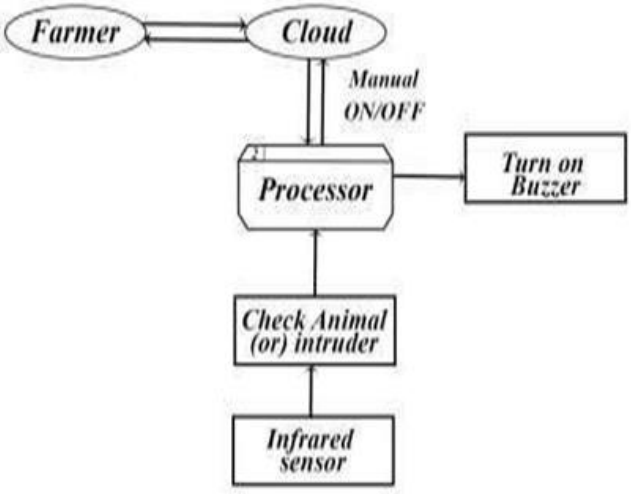

Fig. 4:- DFD-Level 2 INTRUDER DETECTION

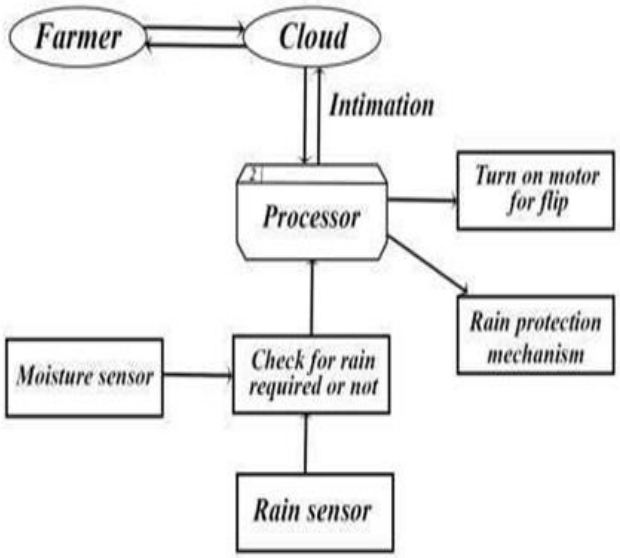

Fig. 5:- DFD-Level 2 PROTECTION MECHANISM

VI. TECHNOLOGY STACK

A. Internet of Things (IoT)

It is the Scope of Internet to extent to interconnect different objects. The goal of IoT is to connect the unconnected objects which have not connected currently to network. There are number of wireless communications protocols that are currently used to support IoT technologies.

We define IoT into three categories as below:

- People to people,
- People to machine/things,
- Things/machine to things/machine, interacting though internet.

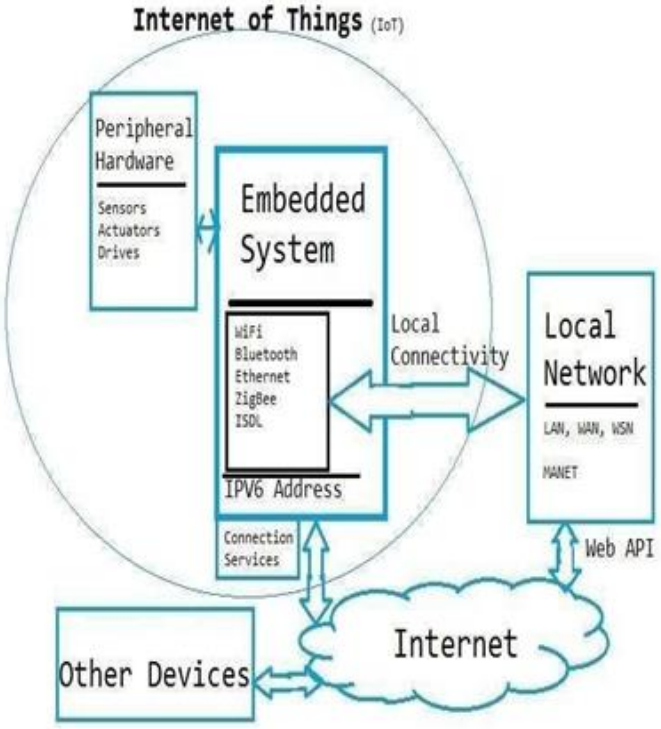

Fig. 6:- Overview of IoT

B. System Architecture

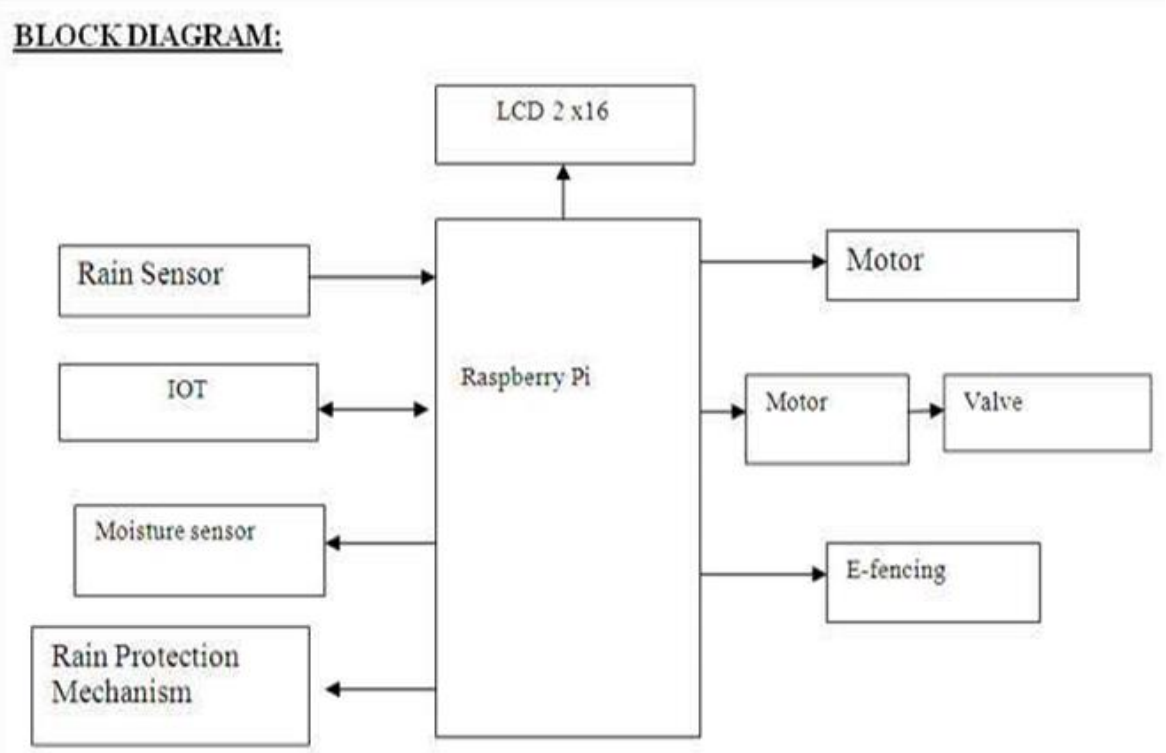

Fig. 7:- System Architecture

Sensors will be giving the value and through the python code comparision will be done with the threshold value. Rain sensor mainly checks the presence of the rain that helps in closing the metal flips to save the crops from the heavy rain. The water will be allowed to supply to the crop field based on the moisture content in farm field using moisture sensor. If the moisture level is low, Moisture sensor will send the value to the Raspberry pi and it will provide sufficient water to the crops.

C. Raspberry Pi 3, Model B Structure

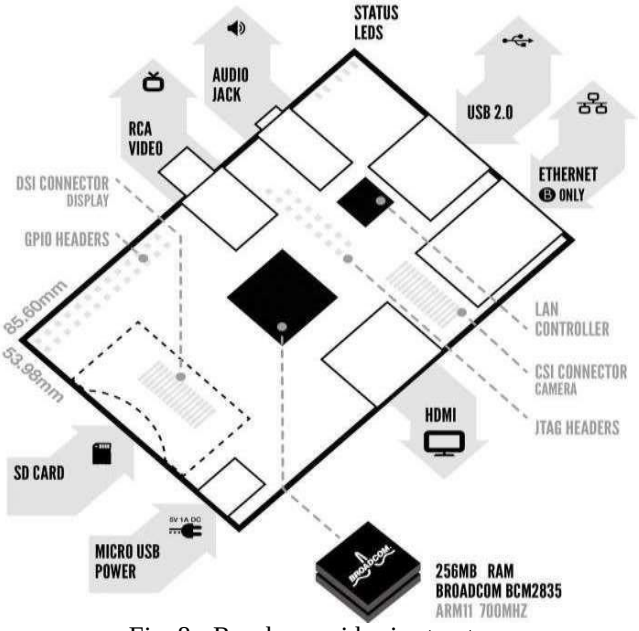

Fig. 8:- Raspberry pi basic structure

Raspberry pi is designed by the Raspberry pi foundation and it is manufactured in micro size computer. It includes ARM1176JZFS700 MHz processor, Video Core IV GPU and was originally shipped with 256 megabytes of RAM, later upgraded to 512MBIt uses SD card for booting and storing it in model B+ using a Micro SD, it will not include any of the built-in hard disk or a solid state drives.

The main programming language used by Raspberry pi is Python.

D. Types of Sensors

- *Rain water sensor:*

It detects the presence of a rain. When rain drops falls on the metal board, some amount of current is generated which detects the rain.

Fig 9

- *Infrared sensor:*

An infrared sensor detects the motion of the object. It will detect the heat of an object when an object passes near to the sensor.

Fig 10

- Soil moisture sensor:

The Moisture sensor detects the water level in the soil. When the soil has insufficient water then the output will be high or else the output will be low. This sensor will remind the user to water the farm land and monitors the moisture present in the soil.

Fig 11

VII. CONCLUSION

Through sensors agriculture can be connected to IoT which will be useful to create a connection between farm field and the farmer etc... By using latest IoT concepts farmer can get information and notification of various mechanism performed in the farm field by using various sensors. IoT based agriculture production system can be used to provide quality in their agricultural product and farmers observe the whole cycle from seeding to selling. Using IoT application farmer can monitor the farm land via mobiles or computers constantly.

REFERENCES

[1]. Tanmay Raranwal, Nitika, Pushpendra Kumar Pateriya, "Development of IoT based smart security and monitoring devices for agriculture" IEEE conference publication,2016.
[2]. Joaquin Gutierrez, "Automated Irrigation System Using a Wireles Sensor Network and GPRS Module", IEEE Transaction on Instrumentation and Measurement, Vol.63, No.1, January2014.
[3]. Rajeev R, Mahesh dali, "Implementation of IoT in Monitoring and Control of Agricultural Activities" International Journal of Engineering Research And Technology, Vol.4 issue-07,July-2015.
[4]. Zheng, Deng, X, 2011, "Development of a Smart Mobile Farming Service System", Mathematical and Computer Modelling. 54(3):1194-1203.
[5]. Kresimir Grgic, Ivan Speh, "A web based IoT solution for Monitoring data using MQTT Protocol" IEEE conference publication,2016.
[6]. N. Putjaika, S. Phusae, A Chen-Im, P. Phunchongham and K. Akkarajitsakul, "A control system in an intelligent farming by using arduino technology", 2016 Fifth ICT International Student Project Conference (ICT-ISPC), Nakhon Pathon, 2016, pp. 53-56.
[7]. Shweta B.saraf, Dhanashri H, Gwali "IoT Based Smart Irrigation Monitoring And Controlling System" 2017 2nd IEEE International Conference On Recent Trends in Electronics Information & Communication Technology(RTEICT), Ma 10-20,2017,India.
[8]. Bhagyashree K.Chate, Prof.J.G.Rana, "Smart Irrigation System Using Raspberry Pi" International Research Journal of Engineering and Technology(IRJET), vol. 03, Issue 05, pp. 1, May-2016.
[9]. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education. (ISBN: 978-9386873743)
[10]. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition,McGraw Hill Education, 2017. (ISBN: 978-9352605224)