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Hands Free Agriculture Monitoring Using IOT

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Abstract: This Paper is an attempt to develop to observe the water quality along with the environment conditions in the agriculture field hands-free and remotely. A Raspberry controller based IOT implementation with a webserver and mail service to update the current environment of the agriculture field, which includes the moisture content in the field with the water pH value is developed. For the warehouse protection the camera with motion sensor is utilized.The temperature sensor and the moisture sensor are observed from the field and pH sensor is observed from the water. All these sensor data are got and tabulated in the webserver for further decision-making.As the idea of the Internet of Things' turns out to be progressively pervasive, numerous frameworks are being concocted to enable all way of information to be assembled and examined and gadgets controlled through remote information systems. The Agriculture observing framework has the reliance among the different devices like MCP3008, ph sensor,lm35(temperature sensor),ultrasonic sensor, motion sensor. This paper takes care of both the field and the warehouse. The godown is monitored using the motion sensor.

Keywords: Internet Of Things ,Webserver, Raspberry Pi, Agriculture Automation

I. Introduction

Joaquín Gutiérrez etal., [1] depicts a passage unit that handles the data from sensors, for example, soil dampness sensor and temperature sensor which are set at the root zones of plant. Door likewise sends the information to web applications, for example, site page. One strategy was created which will gain the limit estimations of temperature and in addition dampness substance of soil and microcontroller is modified to control the water amount in light of detected information. In this paper sun oriented boards are utilized a power supply and furthermore an idea called cell web interface is utilized to assess information and water system ventures through site page. By utilizing the above idea around 90% of water is spared when contrasted with conventional water system framework by testing the model for 136 days. Because of its lessening in cost and self controlling ability this model is utilized restricted water regions.

SamySadekyetal.,[2] proposed a framework in which acoustic anticipated usage procedure is utilized to recognize soil dampness content. That procedure incorporates measuring soil dampness in bona fide time strategy. Connection between sound speed and level of water content in soils are anticipated in the legitimate time strategy. The significant outcomes incorporates sound. Sound declines with dampness content, which relies upon kind of soil.

Jia Uddin etal., [4] clarifies a model in view of expectation on microcontroller and sunlight based power a model of programmed water system framework was planned. In this paper, detecting of water level is finished utilizing sundry sensors. In light of data from the paddy documented ,agriculturist will control the engine, utilizing cell phone. Naturally water pump will be turned off when the water content level accomplishes the limit esteem.

In this paper, soil dampness sensor, temperature sensors set in root zone of plant and entryway unit handles the sensor informations and transmit data to a web application. One calculation was made for measure limit estimations of temperature sensor and soil dampness sensor that was customized into a microcontroller to control water amount that is supplied. Webserver is utilized that took into consideration information examination and water system planning to be customized through a web page. The paper is structured as follows,Section II Block Diagram of the work,Section III talks about the methodology of the work,Section

IV talks about the Hardware and Software requirements and Section V talks about the Results and Discussion, followed by Conclusion and References.

II. Block Diagram Of IOT Based Agriculture Monitoring

In this venture, a remote sensor based intelligent framework is arranged and that idea is utilized for checking the water quality and temperature conditions. The savvy agribusiness monitoring framework as appeared in Figure 1, consolidates the brilliant method for checking the different parameters of the horticulture conditions in the homestead arrive .The hourly data of the specific real estate parcel that is under checked is put away in the remote database i.e fire base record from which the rancher (client) can get the information whenever and at any moment from his fire base server just by refreshing the sensor esteem on web server .

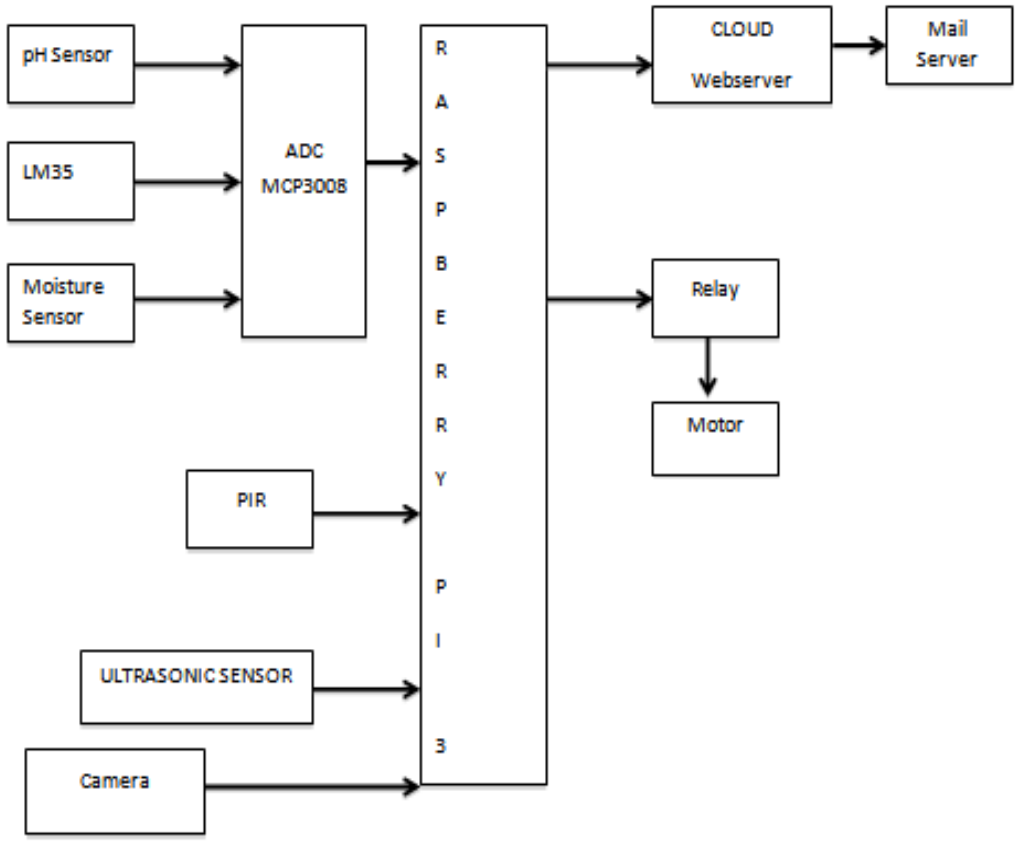

Figure 1: Block diagram of Agriculture monitoring system

Each and every arrangement of simple information measured by the introduced sensor is digitized utilizing MCP3008 which goes about as a simple to advanced converter. The explanation behind utilizing MCP3008 as a guide for A/D converter in light of its level of exactness, unwavering quality, most elevated accuracy and diminished many-sided quality in information giving.

The digitized yield is then bolstered as the Input to the foundation of our whole framework i.e. Raspberry Pi that is in charge of the distribution of unique IP address and cooperation with the remote online server going about as a database for database administration arrangement of the agriculturist information. The Raspberry Pi in this venture is favored because of its less cost, easy to use programming style, accessible I/O pins, supporting of USB port and other basic UI ports for availability.

Promote this important information will be put away in the web server and it is painstakingly observed for controlling the air contamination specifically region,for adjusting the deliberate information from the sensors.

III. METHODOLOGY

The predefined framework gadget contains PH sensor, LM35 sensor, PIR sensor sensor,MCP3008 , Raspberry Pi and Fire based web server Figure 2, demonstrates the stream diagram of horticulture checking framework.Firebase helps in developing the webserver for this monitoring system.

Keeping in mind the end goal to see every one of the information gathered by our Pi by means of the Internet, we'll make a precise based webapp which will show data about gadgets seen by our Pi. It will just take a couple of minutes to do with yeoman's rakish firebase generator.

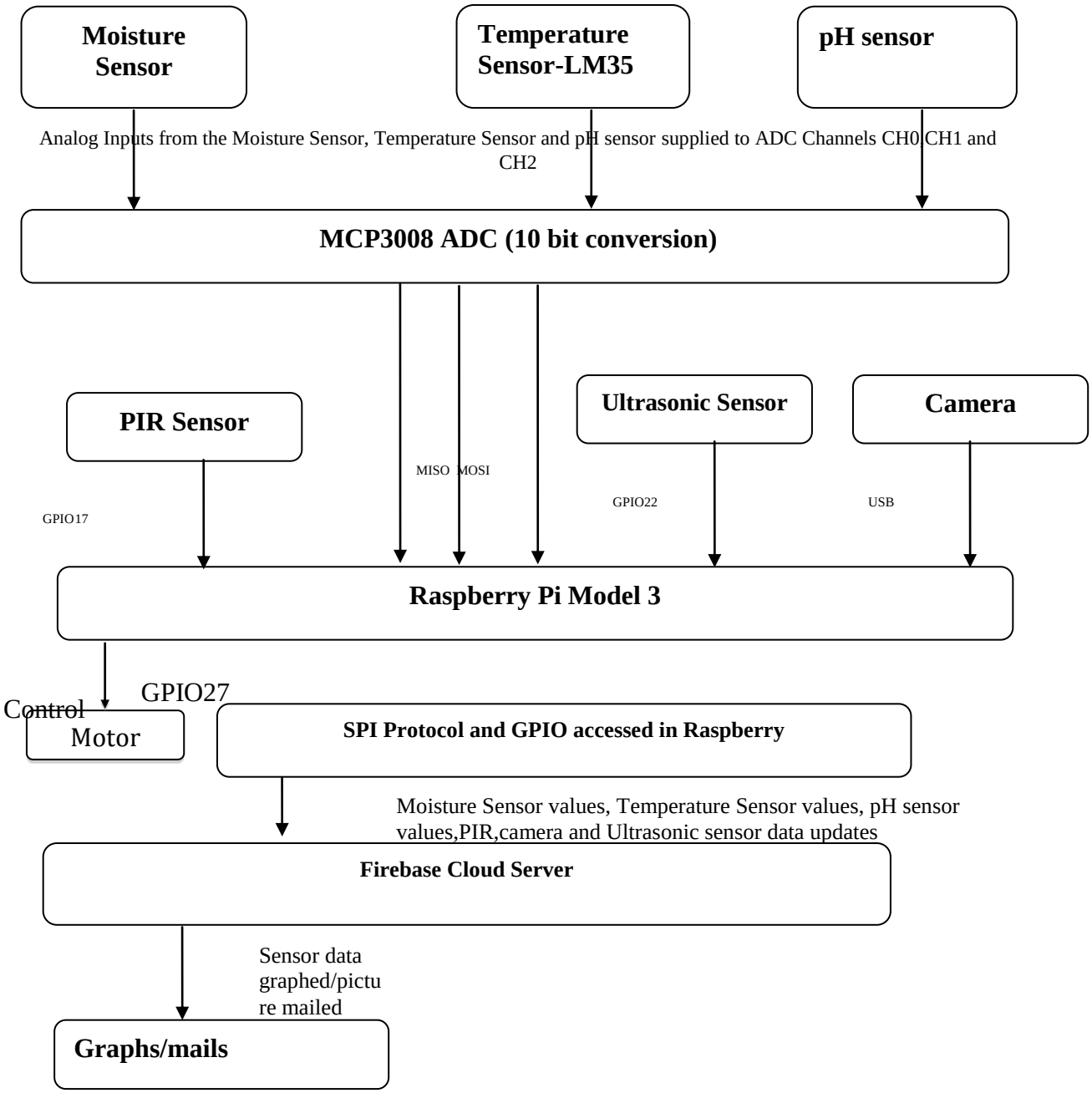

Figure 2. Overall Block Diagram Flow chart

IV. Hardware and Software Requirement

This section talks about the equipment in light of which the framework was constructed. Entire framework depended on various open source equipment and programming with the goal that the cost of building the framework.

- Raspberry pi3
- PIR sensor
- Ultrasonic sensor
- Moisture Sensor
- PH sensor
- LM35(temperature sensor)
- Relay
- Motor
- MCP3008(ADC)

PIR sensors enable you to detect movement, quite often used to recognize whether a human has moved in or out of the sensors run.The Raspberry Pi 3 Model B is here it boasts enhanced performance, connectivity and power management with a 64-bit CPU and on-board WiFi and Bluetooth.Ultrasonic extending module HC - SR04 gives 2cm - 400cm non-contact estimation work, the running exactness can reach to 3mm. The modules incorporates ultrasonic transmitters, recipient and control circuit. The motivation behind this test is to decide whether a pH cathode is working inside adequate points of confinement. The asymmetry potential (AP) and slant (proficiency) can be utilized as rules to judge a cathode's execution. Ordinarily an anode is supplanted when the AP is more noteworthy than ±40 mV as well as the incline dips under 85%. Thought ought to likewise be given to the terminals speed of reaction. If you don't mind take after this well ordered technique to decide the execution of an anode. Required test gear incorporates 7.00 and 4.01 pH cushion arrangements with a pH meter that has a mV readout.

The LM35 arrangement are accuracy incorporated circuit temperature sensors, whose yield voltage is straightly corresponding to the Celsius (Centigrade) temperature. The LM35 accordingly has favorable position over straight temperature sensors adjusted in ˚ Kelvin, as the client is not required to subtract an expansive steady voltage from its yield to acquire helpful Centigrade scaling.

The Microchip Technology Inc. MCP3004/3008 devices are the successive approximation 10-bit Analog-to-Digital (A/D) converters with on-board sample and hold circuitry. The MCP3004 is programmable to provide two pseudo-differential input pairs or four single-ended inputs. The MCP3008 is programmable to provide four pseudo-differential input pairs or eight single-ended inputs. Differential Non-linearity (DNL) and Integral Nonlinearity (INL) are specified at ±1 LSB.

Software

Raspbian is an open source working framework which is Debian based OS. It is accessible for Raspberry Pi equipment. It is an arrangement of projects and modules which keep running on Raspberry Pi. This OS incorporates more than 35,000 bundles and prefunded programming which is utilized for establishment on Raspberry Pi.

Python gives programming ideas, for example, making clear projects for both little and huge applications. The components of python are dynamic writing framework, programmed memory administration and multiprogramming which is protest situated. And the Firebase webserver is used for te webserver development in the cloud environment.

V. Results And Discussion

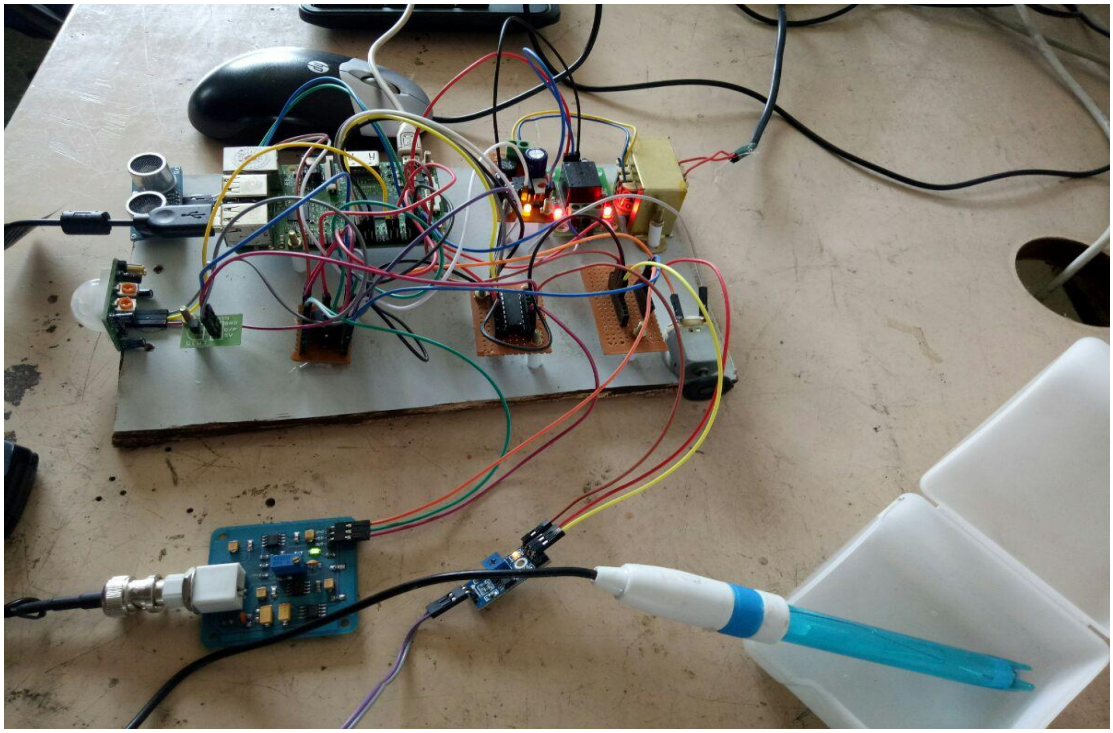

Figure 3: Hardware setup

The results are as shown in the following, The Figure 4 shows the Python Programming that is used to initiate the process of the agriculture monitoring,

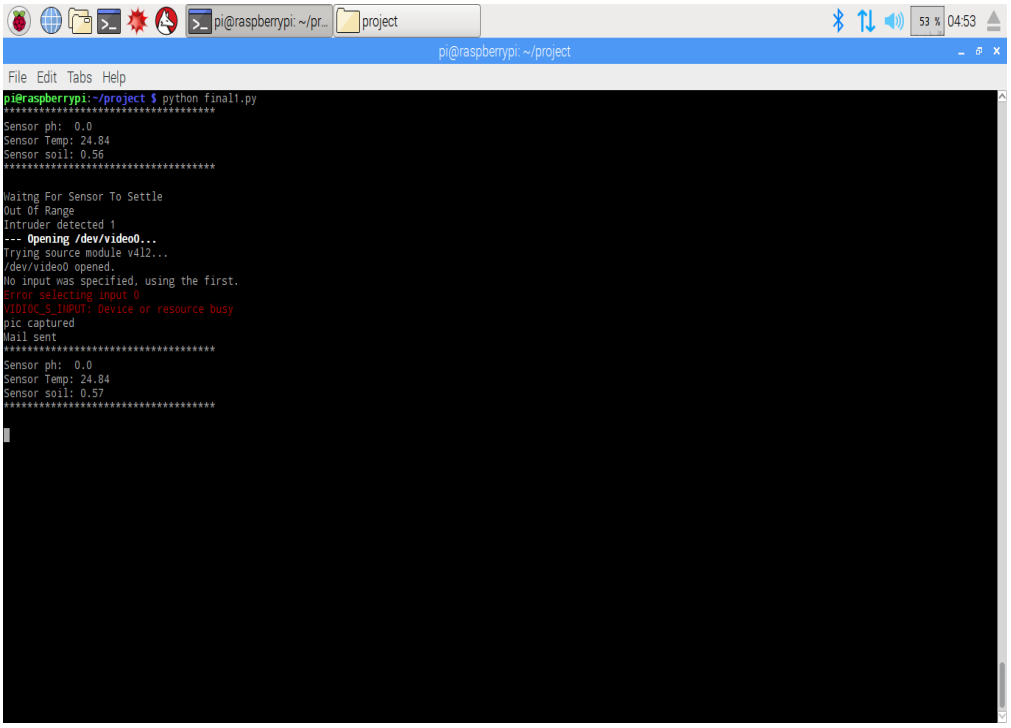

Figure 4: The Python Screen on the Raspberry Pi running the Program

The python program after running and sensing the sensor data would obtain the webserver page in which all the sensor data are displayed.As shown in figure 5.

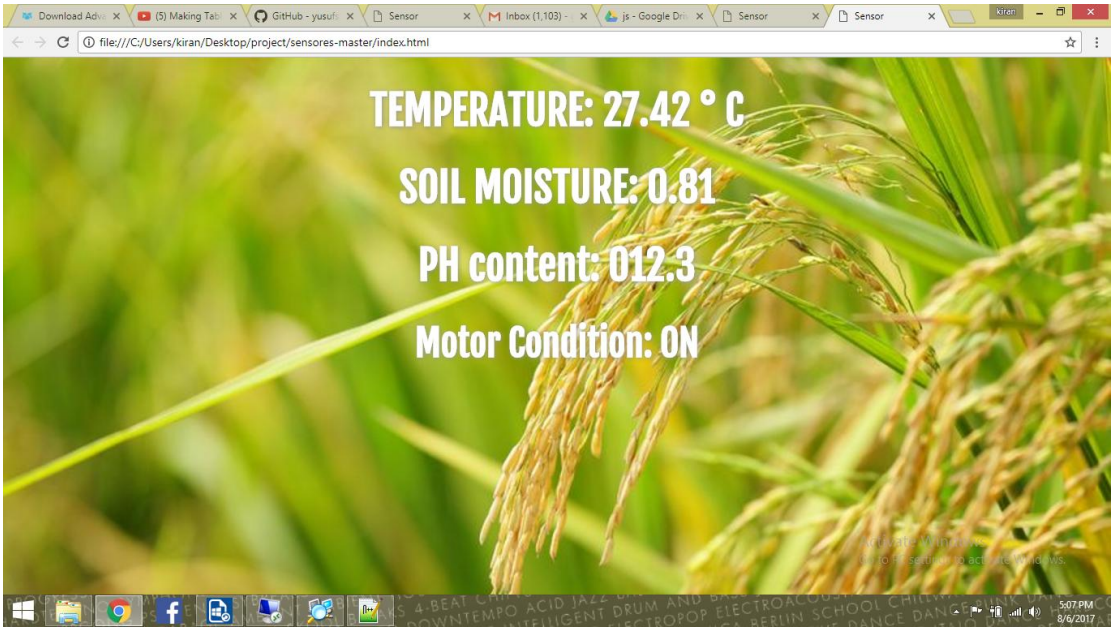

Figure 5: Webserver Output

The Mail is sent to the concerned person if there is a major change in the sensor output while the output of the sensor has changed to a major change.The Figure 6. Shows the mail screenshot which is sent when the client while there is a breach in the warehouse or in the sensor values.

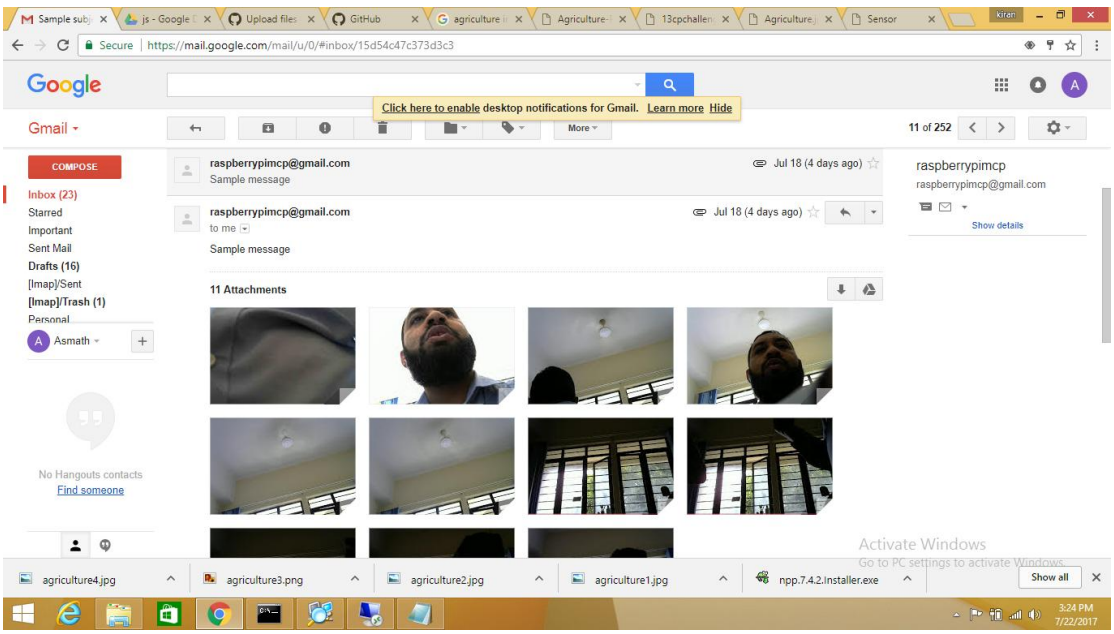

Figure 6: Mail sent to the client automatically

Thus the overall implementation is carried out uisng the raspberry pi processor with the help of python programming and the Firebase webserver.

VI. Conclusion

The overall hardware and the software setup of the IOT based agriculture monitoring is carried out the results are satisfactory. The webserver's capabilty to display the current value of the sensor and the ability to send the mail to the concerned person is an added advantage where the log of the different failures are in the mail .One can utilize these mail and able to develop the system in a better manner.Thus the overall implementation had given good efficiency and this makes a attempt to make the agriculture a handsfree controlled business.

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