

Precision Farming

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ABSTRACT

precision mean "the quality of being clear or exact". Farmer tries hard to get the result but we need the smart way and result oriented. The history of India's development has been inexorably linked to that of its farmers, and the nation's growth with that of its agronomics. Agronomics provides highest contribution to nation income. Agronomics needed top most priority because the Government and the nation would both fail to succeed if agronomics could not be successful. Today we are living in 21st century where automation is playing significant role in human life. Automation allows us to control appliances automatic control. Today industries are using automation and control machine which is high in cost and not suitable for using in a field.

So as to help both government and our farmer, we can use intelligent irrigation techniques with the use of IoT (internet of things) and by building network of farmer and agriculturist to share their ideas and experience, as a full-fledged force solution to the need. This can be easily done by organizing and analysing the live and collected over time data, allowing farmers to take pre-emptive action for healthy harvest of their crops collecting live data using sensors which are placed across the land further sent to the cloud further under taking predictive analytics to enhance crops nutrition thus using predictive analysis on data to find better solution. The IoT connected devices stream live data on the land allowing data-informed decisions on planning the resources and harvesting of farm.

Keywords: Precision Farming; IoT; Raspberry pi; Cloud-data; Farming; Automation; Intelligent Irrigation

1. INTRODUCTION

As per 2018, Agronomics employed 50% of the Indian work force and contributed 17-18% to country's GDP. India ranks second worldwide in farm outputs. The history of Agronomics in India dates back to Indus Valley Civilization Era and even now nothing much has changed. We are still using the old method of Irrigation we need to come up with a precision way of farming. Our agronomics active will improve tremendously.

The farm big data collects and stores the data about farmer's name, crops, pest control for different crops, climate change, water availability in different place and seasons, government support for different area, type of crops etc. the entire farm big data stored in various storage devices which is under the control of 3rd party vendors. Here data privacy and security come into mind. Because the farm big data is a combination of public data, private data, industrial data and data from Government. Therefore the data privacy and security is required hence data security and private have to keep in mind.

2. EXISTING TECHNOLOGY

2.1. Smart Agronomics

Present day agronomics includes use of expansive number of horticultural actualizes from sowing to edit collecting and

stockpiles. Utilizing countless makes the whole task shrewd and savvy because of high exactness. The agronomics part has been encountering robotization and mechanical hardware are playing pivotal operational exactness. Self-governing tractors, mechanical collectors, automated weeders and automated information scouts as of now supplement ranch gear. Flying symbolism is another operational procedure where substantial homestead zones are checked. Satellites, planes and as of late unmanned automatons are sent for areal symbolism tasks. For accomplishing the keen agronomics, the accompanying instruments and advancements are required:

- Sensor fusion
- Combinational sensors
- Developing newer sensor types
- Robotics
- Remote Sensing
- In-field Sensing
- Data Management
- Variable Rate Applications
- Telematics
- In-field Sensing
- Artificial intelligence (AI)
- Key Sensors, Robotics and Artificial Intelligence

2.2. Need of Sensors in agronomics

- A huge lose 10% of worldwide nourishment generation, can occur with plant sicknesses and irritation in business horticultural yields on the planet. Pesticides are exceptionally useful to control the plant illnesses and bugs. The utilization of pesticides can expand the expense for yielding the business harvests and raises the threat of dangerous buildup. When the plant illnesses and vermin are recognized in cutting edge, at that point Plant maladies and nuisance control would be proficient. The expense for distinguishing these infections and vermin utilizing conventional methodologies is more. Today, the new innovation came into the general population. The whole agronomics fields are secured by satellites, sensors, rambles and so forth. The ranchers are utilizing rambles for gathering and keeping up the information of various yields, bothers, water offices and so forth. The key purposes behind utilizing sensors are:
- Absolute need to increase global food production
- Being able to analyze soil conditions
- Adverse environmental impact reduction
- Continuous monitoring to enable corrective measures in real time
- High precision achieved while using agricultural implements
- Effective cost savings by waste reduction
- Automate agricultural produce monitoring

The remote detecting framework gives an innocuous and savvy procedures for distinguishing and measuring the plant infections and nuisances effectively. With quick urbanization, cultivable zone is probably going to contract. So as to capture decay and increment crop creation both horticultural researchers and sensor technologists have been working intently. Sorts of sensors for agronomics segment

- Biological
- Water sensors
- Meteorological sensors
- Range finders
- Temperature sensors
- Sensors for positioning, navigation, and obstacle detection
- Level sensors – for crop storages silos
- LiDAR, Radar, Laser, Sonar – for accident avoidance
- Hygrometers
- Position sensors – sprayers, harvesters, sowing
- GPS (for geolocation-GNSS receivers, RTK signals) - can accurately position a moving vehicle within 30cm or less using GPS

3. PROPOSED SYSTEM

In this paper the refreshed information with respect to temperature and stickiness in any zones can be gotten to utilizing sensor, Raspberry pi3 and IOT innovation. The principle point of the proposed framework is to observing the continuous temperature and relative mugginess in a financially savvy at fixed interim of time. In this observing hub is raspberry pi3 and sensor is DHT11. Raspberry pi is utilized to store and show the temperature and relative stickiness, and is modified utilizing python language. The DHT11 Temperature and Humidity Sensor includes a temperature and moistness sensor gives computerized yield however DHT11 is for the most part utilized for the stickiness estimation. Highlights of sensors incorporates high unwavering quality and long haul soundness In this the temperature is shown degree Celsius or Fahrenheit. The information being prepared by Raspberry pi will be refreshed ceaselessly on cloud server. WIFI is appended so it gets information with assistance of web and client can access or control temperature and moistness from any piece of the world.

Advantages of proposed system

We can get present information regarding temperature and humidity in a particular place.

The size of python code is very less and it reduces the time complexity and space complexity in raspberry pi 3 model B. It is very useful for industries, pharmacies as it is used to detect the temperature.

Accessible from anywhere, efficient, user friendly.

The continuous temperature and stickiness is being observed by the proposed framework viably. Here observing hub is raspberry pi3 demonstrate b and detecting hub is DHT11 Temperature and Humidity sensor. The sensor is associated with raspberry pi3 show b with the assistance of jumper wires. The jumper wires must interface with GPIO pins of the raspberry pi3 display b. Raspberry pi3 module is modified utilizing python language. The yield temperature is shown as far as degree Celsius or Fahrenheit or both as required. In this undertaking, SQLite questions are utilized to recover information from the database. By making the tables information is put away into those tables alongside date and time. Least, Maximum and Average estimations of the temperature and mugginess over a specific period likewise known with the assistance of SQLite. The detecting information is ceaselessly gone into database. SQLite questions are utilized to recover those information. The xming server is utilized to associate with raspberry pi 3 display b module. The square chart of the proposed framework is shown beneath:

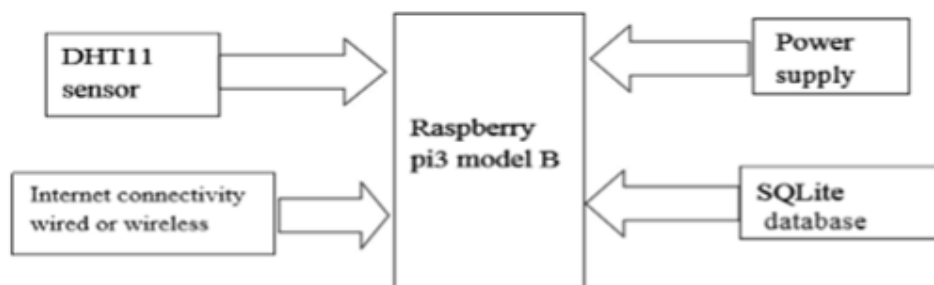


Figure 1: Block diagram of Raspberry Pi3 Model B

Sequence diagram The Sequence Diagram models the collaboration of objects based on a time sequence. It shows how the object “user” interacts with others “Raspberry Pi” and “database”.

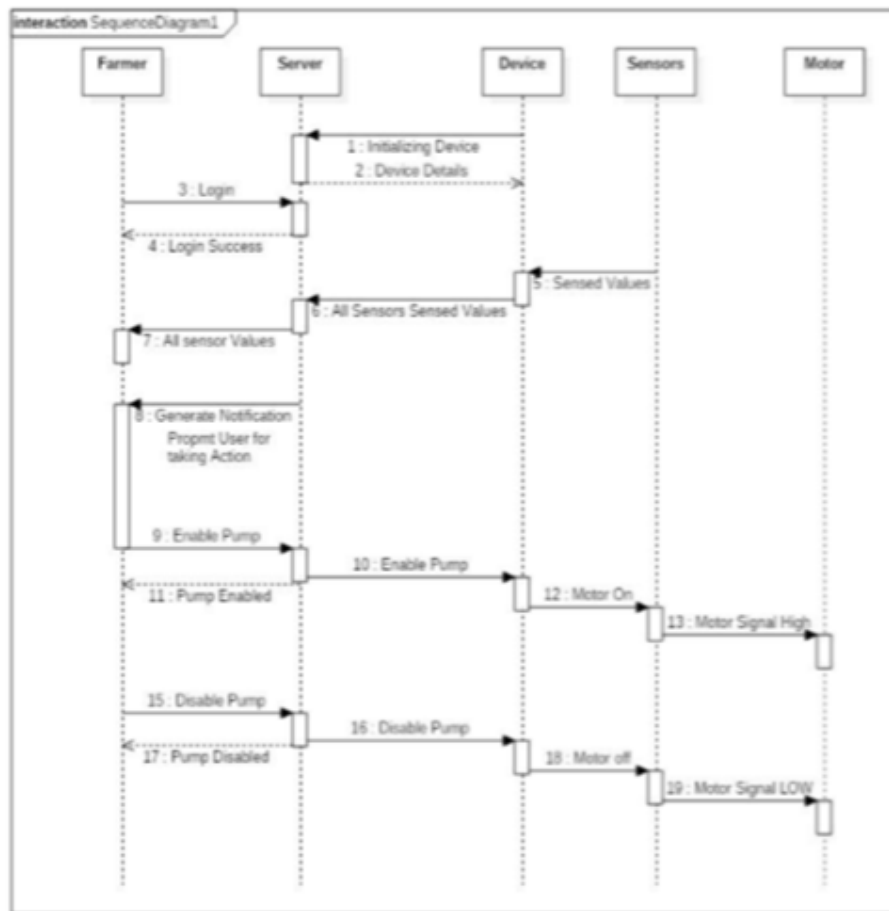


Fig. 2.2 Sequence Diagram

4. IMPLEMENTATION

The information is being assembled from different information sources on the planet utilizing sensors, satellites, machines and so on. Here IoT assumes an essential job. In this paper, a basic IoT execution has been started for social event temperature information and stickiness information from different sensors. At that point the information is investigated and offer expectations to the general public like what type crop is suggestable dependent on the ebb and flow atmosphere, in view of water level, in view of cost upheld by Government and so forth. Procedure to associate raspberry pi to workstation

- Firstly make wifi connection into shared mode.
- Connect the raspberry pi to the laptop using USB cable and ethernet cable.
- Then advanced IP scanner is used to scan the IP address of raspberry pi.
- After that putty and Xming server is used to view the GUI interface.

Xming server

By using this GUI interface is obtained. It is act like a server for windows. It is fast, simple to install.

Advanced IP Scanner

It scans all the IP addresses in a range of IP addresses and their ports without installing the software.

Putty

It is a free and open-source terminal emulator, serial console and network file transfer application.

Enter IP address in the host name field.

Now open SSH and in that double click X11, then enable X11 Forwarding.

Secure Socket Shell (SSH) provides administrators to access a remote computer securely.

X11 forwarding can be useful when a GUI is required, especially for system and configuration tools that don't have a CLI interface.

After giving IP address in putty, a terminal will be displayed where we have to give login ID and password. By default login ID is pi and password is raspberry but we can change the password using passwd command

Now the commands lxterminal and startlxde are used to view the GUI interface Connections

Now connect Raspberry pi with dht11 sensor using bread board and jumper wires

RaspberryPi	DHT11Module
3.3vP1 -----	VCC (V)
GNDP6 -----	GND (G)
GPIOP17 P11 -----	DATA (S)

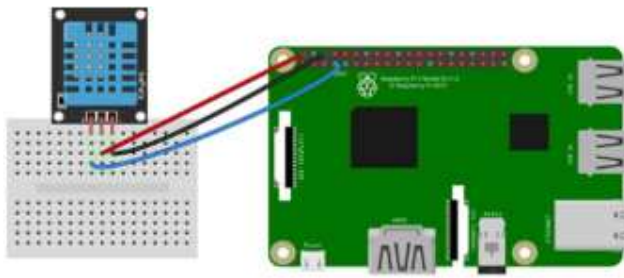


Figure 5: Connections

5. RESULTS AND DISCUSSION

The data has been taken from the sensors using IoT setup. The data is as follows:

Table 1: Temperature and Humidity from IoT devices

Date	Sample 1	Sample 2	Sample 3	Max	Min	Avg
29.03.2018	Temp: 30	Temp: 31	Temp: 30	Temp: 31	Temp: 30	Temp: 30.33
	Humidity: 77	Humidity: 78	Humidity: 77	Humidity: 78	Humidity: 77	Humidity: 77.05
	Temp: 29	Temp: 28	Temp: 30	Temp: 30	Temp: 28	Temp: 29
31.03.2018	Humidity: 75	Humidity: 76	Humidity: 77	Humidity: 77	Humidity: 75	Humidity: 76
	Temp: 31	Temp: 32	Temp: 30	Temp: 32	Temp: 30	Temp: 31
	Humidity: 74	Humidity: 72	Humidity: 70	Humidity: 74	Humidity: 70	Humidity: 72

From the above table, we take three examples of temperature and stickiness. The example are from three

distinctive days. Temperature and mugginess are changes everyday in encompassing condition. From these three distinct examples figure least, most extreme and normal estimations of both temperature and dampness.

6. CONCLUSION

This paper presents distinctive apparatuses and systems for executing keen cultivating. The yield has different bits of knowledge including climate conjecture, bug control, appropriate harvests for the dirt, water prerequisites examination, crop cost bolstered by Government, portion of manures for different harvests, crop yields and so forth. The investigation likewise personal the ranchers about Government current plans, rainstorm notices, appropriations from Government and private part, most recent news about different kinds of irritations and so on. The usage in this paper gives the outcomes about the temperature and dampness in the horticultural fields utilizing sensors. IoT-Based temperature and mugginess observing framework give an effective and solid framework for checking. The proposed system can interface the Raspberry pi. Thusly, by utilizing DHT11 sensor we are capable get the temperature and dampness esteems. And afterward these qualities are put away in the database with relating date. In this manner, the base, most extreme, normal qualities are recovered from the database for the predetermined date. The future work will concentrate on huge information where a wide range of information is gathered from different information sources utilizing IoT on the planet, store the information in cloud, investigate the cloud information and apply AI techniques for getting the ideal result in agronomics fields.