CANDIDATE NAME	PrasadKumar R C
PROJECT ID	SPS_PRO_101
PROJECT NAME	Smart Agriculture System Based On Iot
PROJECT OBJECTIVE	By using smart devices, you can automate multiple processes across your production cycle, e.g. irrigation, fertilizing, or pest control. Enhanced product quality and volumes. Achieve better control over the production process and maintain higher standards of crop quality and growth capacity through automation.
STARTING DATE	20/05/2020

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

Smart Agriculture using Internet of Things, Internet of things are nothing but, the things which are handled by internet. In general ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. IOT plays major rule in Smart Agriculture, without the human presence the agricultural activities can be controlled using smartphones. Like humidity level, temperature level, moisture level and mineral level can be analysed and depending upon the required condition the respective further operations are handled. This can be possible only because of sensors, which play a major roll in IOT. Sensors called temperature(IR sensor)/humidity(hygrometer) or DHT11 is used to measure temperature and humidity of respective location, the analysed data will be transferred to cloud, from their it will be displayed on linked app.Depending upon moisture level in soil, motor will be on, if required level water irrigated, then motor will be off.

1.2 PURPOSE

Before going to Smart Agri let know about IOT purpose.The main purpose of Internet-connected devices has been to enable people to communicate with each other and to access online data and processes. The main **purpose of IoT** devices is to generate real-time data that we can then analysis and use to create desired business outcomes**.**

In India most of the population depend on agriculture,but due to some or other fault the crops may not yield better,one of the reason due to over irrigation are less irrigation below the required mark etc,their are many reasons but IOT can make it possible more efficient and smooth way.

CHAPTER 2

LITERATURE SURVEY

2.1 EXISTING PROBLEM

Internet of Things (IoT) is one of the fastest developing technologies throughout the India. But, most of the population (70%) in India depending on agriculture. Agriculture is the huge process which includes many steps like spraying, weeding, bird and animal scaring, keeping vigilance, moisture sensing(moisture contains in soil) which take lots of time and because of human errors crop many not be yield better,This situation is one of the reason, that hindering the development of country.But this can be overcome, by using appropriate technology,which may assurance a better crops.

2.2 PROPOSED SOLUTION

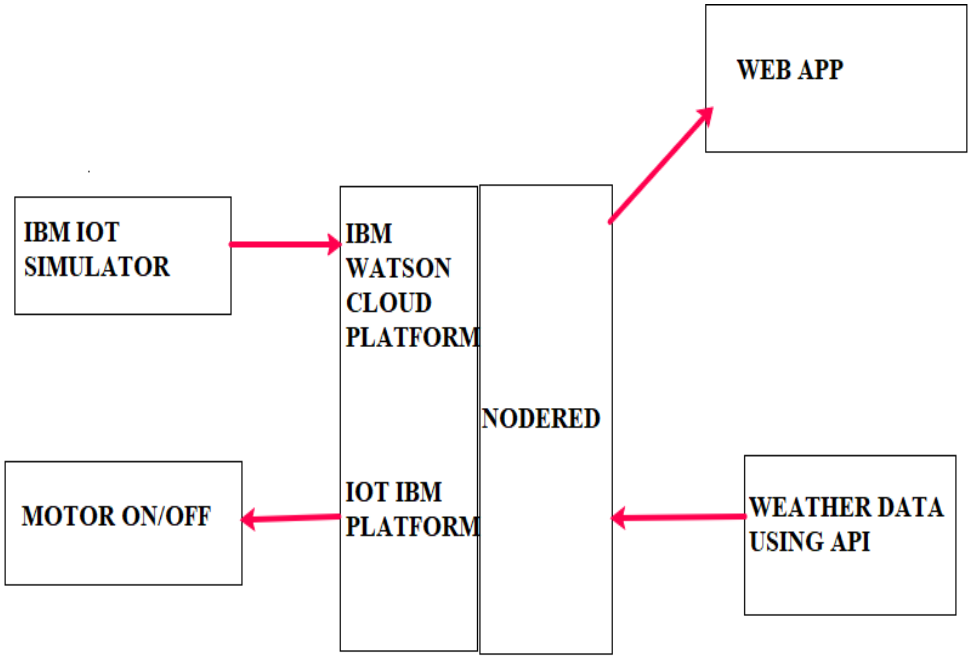
In order to solve this problem only one solution that, smart agriculture by adding new technological methods instead of present traditional agriculture methods. Hence we proposed new IoT technology with cloud computing and Li-Fi. Wi-Fi is great for general wireless coverage within buildings, whereas Li-Fi[10] is wireless data coverage with high density in confined area. Li-Fi provides better bandwidth, efficiency, availability and security than Wi-Fi and has already achieved blisteringly high speed in the lab. First this project includes remote controlled process to perform tasks like spraying, weeding, bird and animal scaring, keeping vigilance, moisture sensing, etc. Secondly it includes smart warehouse management which includes temperature maintenance, humidity maintenance and theft detection in the warehouse. Thirdly, intelligent decision-making based on accurate real time field data for smart irrigation with smart control. Controlling of all these operations will be through any remote smart device or computer connected to Internet and the operations will be performed by interfacing cameras, sensors, Li-Fi or ZigBee modules.But mainly sensors used in this project.

[Note-Virtual sensors from iot simulator IBM]

CHAPTER 3

THEORITICAL ANALYSIS

3.1 BLOCK DIAGRAM



3.2 HARDWARE/SOFTWAREDESIGN

- IBM cloud platform
- Weather API
- Node-Red to develop apps
- IBM Watson IOT platform
- IOT sensor simulator (Software)

[NOTE-no hardware,all required hardware's are available in virtual manner,by IBM cloud.]

CHAPTER 4

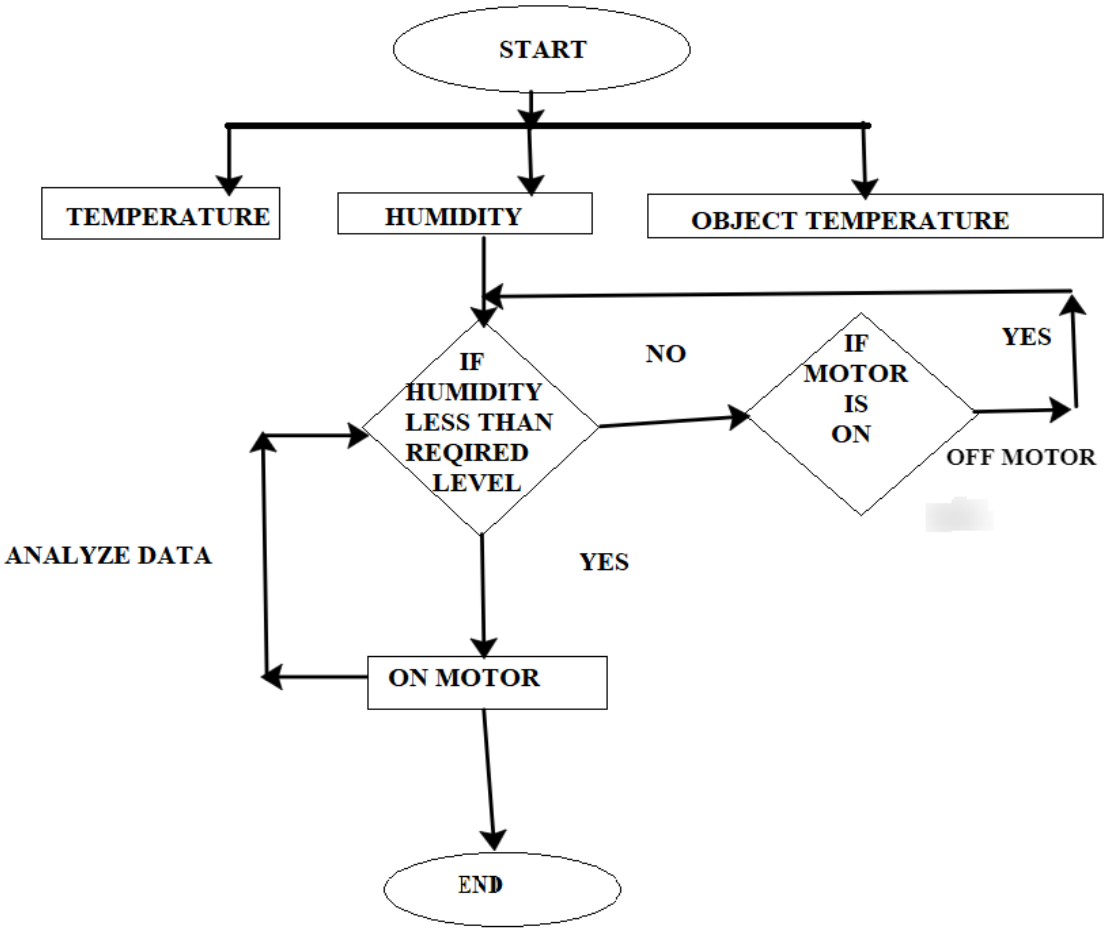
EXPERIMENTAL INVESTIGATIONS

By including IoT devices in agricultur**e**, a farmer could track the whole activity of the production process of crops, replacing the conventional methods used for agriculture. GPS is mainly used for field monitoring, by farmers in surface irrigation systems to monitor and analysis the water levels.

Smart farming based on recent Internet of Things (IoT) technologies is the most advanced method to grow food cleanly while making it sustainable. This method applies modern information and communication technologies to agriculture, targeted not only to reduce waste but also to increase agricultural productivity to an optimum level. Agriculture is considered the backbone of the world's economy. The end-product's quantity and quality both play a vital role. Using the proposed IoT technology, the identification of diseases in plants with focus on the affected area is more accurate. It also reduces the number of incorrect conclusions that may be drawn, which can lead to incorrect actions taken for sustaining the plants in farms. The proposed technique will also be able to predict the damage level by pests on plants to take appropriate actions to improve productivity. Digital images taken from the plants will be processed and examined using pattern recognition and digital image processing techniques. Proposed image analysis techniques will segment these images to identify diseases and the affected level. This will help to prevent plant disease and increase the nutrient level of the plant, with the help of IoT. The automatic detection of plant disease will be beneficial in monitoring a large field of crops.

CHAPTER 5

FLOW CHART

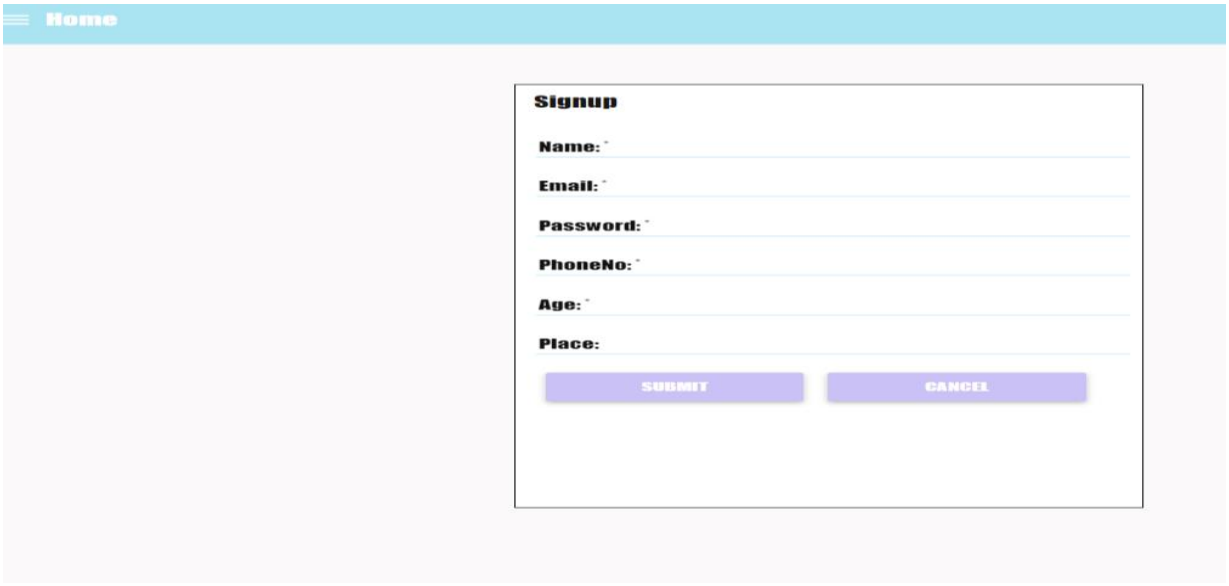


CHAPTER 6

RESULT

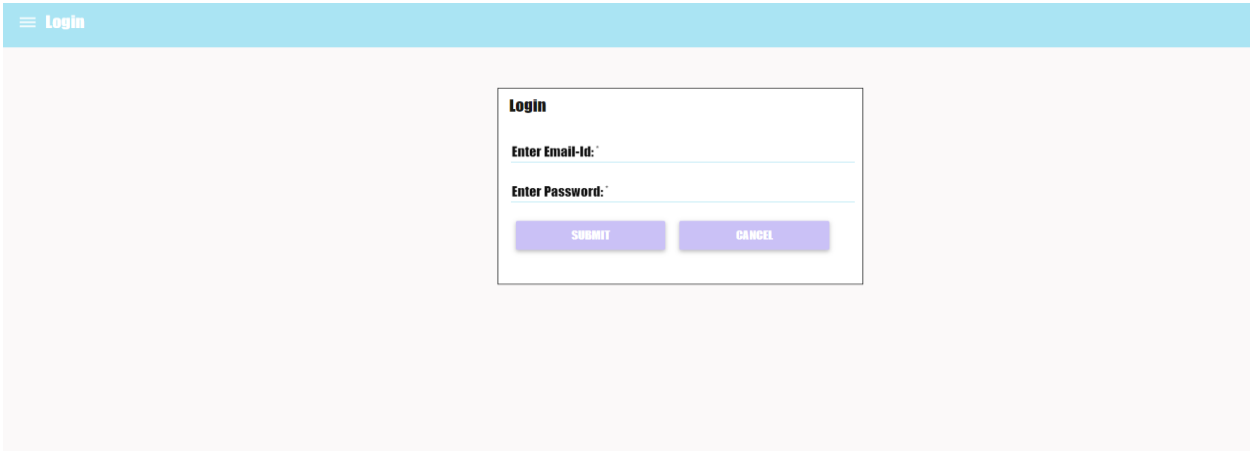
IoT based Smart Farming improves the entire Agriculture system by monitoring the field in real-time. With the help of sensors and interconnectivity, the Internet of Things in Agriculture has not only saved the time of the farmers but has also reduced the extravagant use of resources such as Water and Electricity.

1.SIGNUP



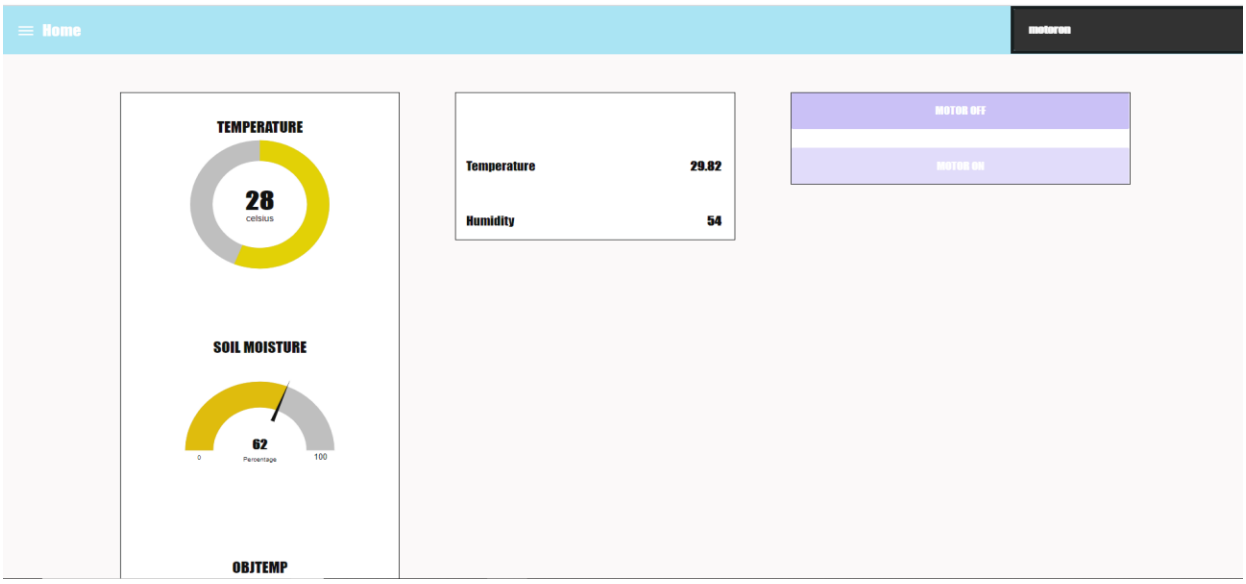
figure(6.1)

2.LOGIN

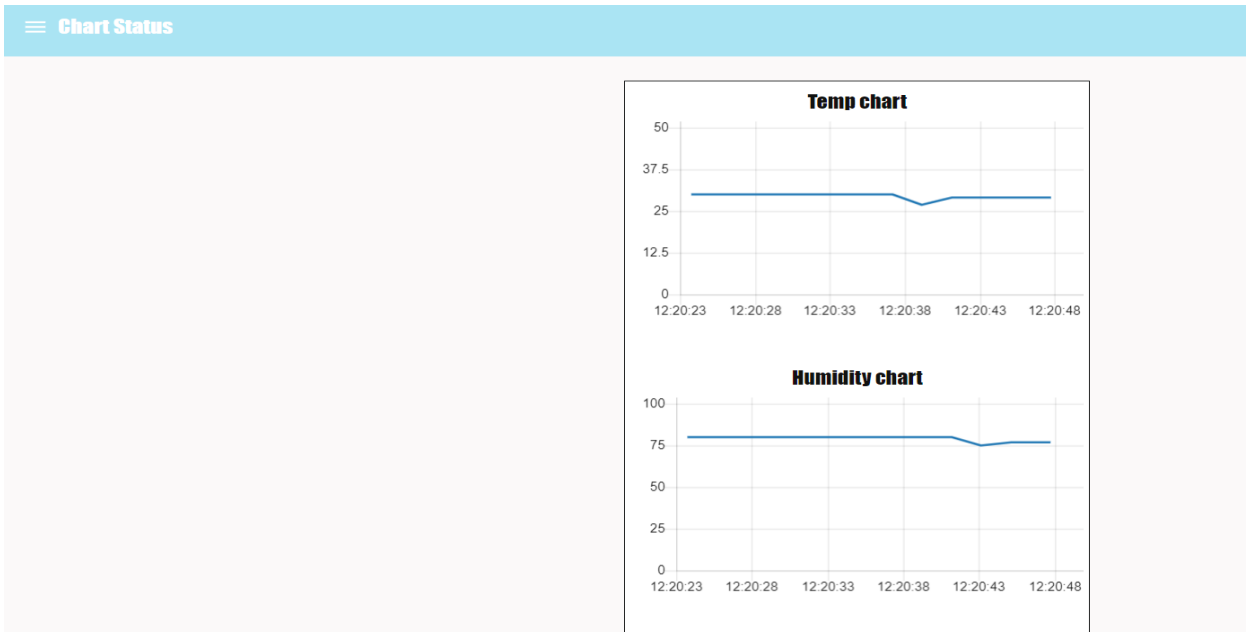


figure(6.2)

3.HOME PAGE

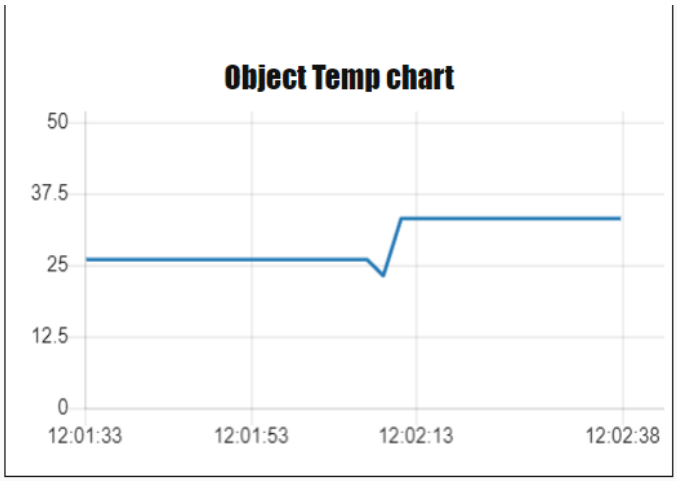


figure(6.3)



4.STATUS CHART OF ALL SENSORS

figure(6.4)


Object Temp chart
50
37.5
25
12.5
0
12:01:33
12:01:53
12:02:13
12:02:38

figure(6.4)

CHAPTER 7

ADVANTAGE AND DISSADVANTAGE

ADVANTAGES OF SMART AGRICULTURE

- It allows farmers to maximize yields using minimum resources such as water,fertilizers, seeds.
- Solar powered and mobile operated pumps save cost of electricity.
- Smart agriculture use drones and robots which help in many ways. These improves data collection process and help in wireless monitoring and control.
- It is cost effective method.
- It delivers high quality crop production.

DISADVANTAGES OF SMART AGRICULTURE

- The smart agriculture needs availability of internet continuously. Rural part of most of the developing countries do not fulfil this requirement. Moreover internet connection is slower.
- The smart farming based equipments require farmers to understand and learn the use of technology. This is major challenge in adopting smart agriculture farming at large scale across the countries.
- Costly internet. Internet is not cheap at all.
- Money needed. IoT devices need much money to implement.

CHAPTER 8

APPLICATION

PRECISION FARMING

- Also known as precision agriculture, precision farming can be thought of as anything that makes farming practice more controlled and accurate when it comes to raising livestock and growing crops. In this approach of farm management, a key component is the use of IT and various items like sensors, control systems, robotics, autonomous vehicles, automated hardware, variable rate technology, and so on.
- The adoption of access to high-speed internet, mobile devices, and reliable, low-cost satellites (for imagery and positioning) by the manufacturer are a few key technologies characterizing the precision agriculture trend. Precision agriculture is one of the most famous applications of IoT in the agricultural sector and numerous organizations are leveraging this technique around the world. CropMetrics is a precision agriculture organization focused on ultra-modern agronomic solutions while specializing in the management of precision irrigation
- The products and services of CropMetrics include VRI optimization, soil moisture probes, virtual optimizer PRO, and so on. VRI (Variable Rate Irrigation) optimization maximizes profitability on irrigated crop fields with topography or soil variability, improve yields, and increases water use efficiency.
- The soil moisture probe technology provides complete in-season local agronomy support, and recommendations to optimize water use efficiency. The virtual optimizer PRO combines various technologies for water management into one central, cloud-based, and powerful location designed for consultants and growers to take advantage of the benefits in precision irrigation via a simplified interface

SMART GREENHOUSES

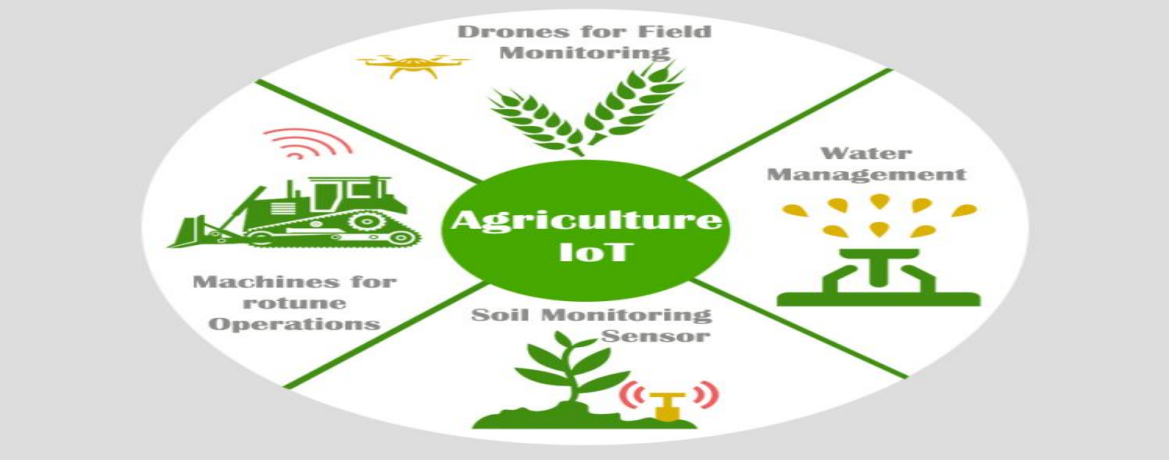
- Greenhouse farming is a methodology that helps in enhancing the yield of vegetables, fruits, crops, etc. Greenhouses control the environmental parameters through manual

intervention or a proportional control mechanism. As manual intervention results in production loss, energy loss, and labour costs, these methods are less effective. A smart greenhouse can be designed with the help of IoT; this design intelligently monitors as well as controls the climate, eliminating the need for manual intervention.

- For controlling the environment in a smart greenhouse, different sensors that measure the environmental parameters according to the plant requirement are used. We can create a cloud server for remotely accessing the system when it is connected using IoT.
- This eliminates the need for constant manual monitoring. Inside the greenhouse, the cloud server also enables data processing and applies a control action. This design provides cost-effective and optimal solutions for farmers with minimal manual intervention.

LIVESTOCK MONITORING

- Large farm owners can utilize wireless IoT applications to collect data regarding the location, well-being, and health of their cattle. This information helps them in identifying animals that are sick so they can be separated from the herd, thereby preventing the spread of disease. It also lowers labour costs as ranchers can locate their cattle with the help of IoT based sensors.



CHAPTER 9

CONCLUSION

Thus, the IoT agricultural applications are making it possible for ranchers and farmers to collect meaningful data. Large landowners and small farmers must understand the potential of IoT market for agriculture by installing smart technologies to increase competitiveness and sustainability in their productions. With the population growing rapidly, the demand can be successfully met if the ranchers, as well as small farmers, implement agricultural IoT solutions in a prosperous manner.

CHAPTER 10

FUTURE SCOPE

After implementing and detailing the project, still it has many future advancement possibilities of which are stated as below:

For current situation the project deals with weather API data,ON/OFF of motor and data interaction from cloud to web from sensors.

So in future depending on needs the fertilizer will be sprayed automatically by using drones and every data will be uploaded to cloud so it may help in future analysis.

Using machine learning technology defective plants and diseased plants will be analysed and preventive measure taken to yield a better crops.