IOT BASED SMART REAL TIME AGRICULTURE WAREHOUSE MONITORING AND CONTROL SYSTEM USING RASPBERRY PI

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Abstract-India is the agrarians country agriculture is considered as the basis of life for the human species as it is the main source of the food grains and other raw material. In which farmer faced many difficulty while storage agricultural product. In Warehouse, farmers are keeping their agriculture product to increase the lifetime of the storage materials. Farmers should know their storage product have been damage or not. Hence our project aims to making agriculture smart real time monitoring and controlling system with the help of computer, laptop and latest technologies. So, we design a system that to maintain the quality of the products and collecting information with the help of sensor like temperature, humidity, smoke, motion and odour sensor. All this sensor can be easily controlled with the help of mobile application and Web Services.

Keywords-Internet of Things, Sensors, Camera, Raspberry Pi, Smartphone.

I.   INTRODUCTION

India is one of the largest agricultural lands in the world with approximately 179.9 million hectares under cultivation. Agriculture sector being the backbone of the India economy deserves food security. Food grains are stored at warehouse using traditional technology which leads to faced many problems due to variation in temperature and humidity. This device can be controlled and monitored in real time temperature, humidity, smoke and a light data and also allows the user to control changes. In that all these sensors can be easily controlled with the mobile or computer. Warehouse are basically constructed for the protection of the quality and quantity of the stored product. The role of ware housing and storage has change drastically and there are demand and expectation in today's industry.The main purpose of the monitoring system is to obtain temperature, humidity, moisture and light sensor readings from the storage to be relayed to a remote user over theinternet. These sensors reading are sent back into our control system to enable automated control. The main purpose of the control system is to allow storage internal environment to be controlled remotely via web server as well as mobile application. Means if an unexpected situation is created then admin can control the situation via the internet using website and mobile application as well. The secondary purpose is to automate this process where everything like storage temperature, humidity, light is automatically maintained without human interaction. The automated control mode can be overridden by admin commands sent from the system admin via the website or mobile application.

II.   BLOCK DIAGRAM
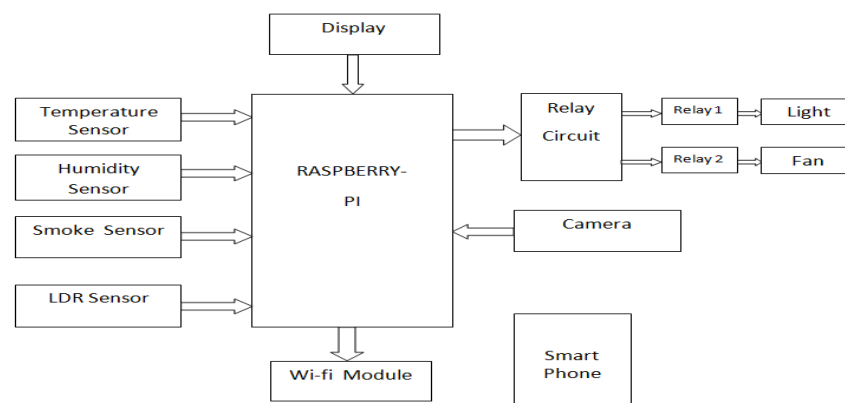
A. *Raspberry* pi

The latest addition to the Raspberry Pi family, the Raspberry Pi 2 takes the platform to a completely new level. Combining a six fold increase in processing power and a doubling of memory capacity with complete backward compatibility with the existing Model B+, Raspberry Pi 2 is the perfect board for professionals and hobbyists alike. The new Raspberry Pi 2 - Model B is jam packed with features! With a new quad core processor and twice the memory with a massive 1GB RAM, It's a whopping 6x faster than its predecessor. The ultra-low-cost, deck-of-cards sized Linux computer has had a makeover, and it's a good one.

B. *DHT22 temperature sensor*

The DHT22 is a low cost digital temperature and humidity sensor with a single wire digital interface. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed).

C. *Humidity Sensor*

Humidity Sensor also known as hygrometer senses and reports both moisture and air temperature. Relative humidity is the ratio of moisture in air to the highest amount of moisture at a particular air temperature and also is one of the important factors.

D. *Smoke sensor:*

Smoke sensors are used to detect smoke based on the voltage levels. More smoke indicates greater voltage. This sensor has a built-in potentiometer to adjust sensitivity to smoke.. Hence it's a form of calibrating it to adjust how much voltage it will put out in relation to the smoke it is exposed to. By wiring the MQ-2 to a raspberry pi it can read the amount of voltage output by the sensor and output to us if any smoke has been detected if the value is above threshold

E. *Motion sensor:*

A PIR-based motion detector is used to sense movement of people, animals, or other objects. They are commonly used in burglar alarms and automatically activated lighting systems. They are commonly called simply "PIR", or sometimes "PID", for "passive infrared detector".

F. *Camera:*

Is also connected to our warehouse which will give real time status of the warehouse to the owner, with the help of Wi-Fi module.

G. *Relay:*

It is use as ON/OFF switch for light, peltier and fan.

1) PROBLEM DEFINATION

Nowadays farmers are facing huge losses due to some storage requirements which are not being fulfilled and due to lack of access to affordable refrigeration systems. Hence we have come up with a project where in all the crops are being monitored in real time with the help of sensors. Basically this project uses raspberry pi which acts as a microcontroller as well as server and like temperature, moisture, smoke and a light sensor. All these sensors can be easily controlled with the mobile through a web application developed using python. This project helps us to monitor in real time and allows the user to control the changes if required.

III.   ADVANTAGES

A.   Reduced investment risk.
B.   Flexibility to design to specifications.
C.   Greater direct control on warehousing activities.
D.   If the volume is sufficient, this may workout cheaper.

IV. DISADVANTAGES

A.   Cost of manpower.
B.   Administrative problems.
C.   Warehouse cause high prices of goods due to rent charges by owners of the warehouse.

V.   APPLICATION

A.   Government Sector.
B.   Industrial warehouses.
C.   Food warehouses.
D.   It is used in agriculture field.

VI. FUTURE SCOPE

In future, we can add two more sensors and system parameters. In the future, this system will improve and more accurate. It will also send warning text message using GSM feature to authority in case of Emergency. A better automated system will be implemented which can learn from monitoring human interaction with the system. Monitoring system can be implemented with artificial intelligence. Also it may be used as not only agricultural purposes also in every household to maintain a better environment by maintaining temperature, humidity and other facts which makes the residents feel more comfortable. That means system also can be used as smart home.

VII. FLOW CHART
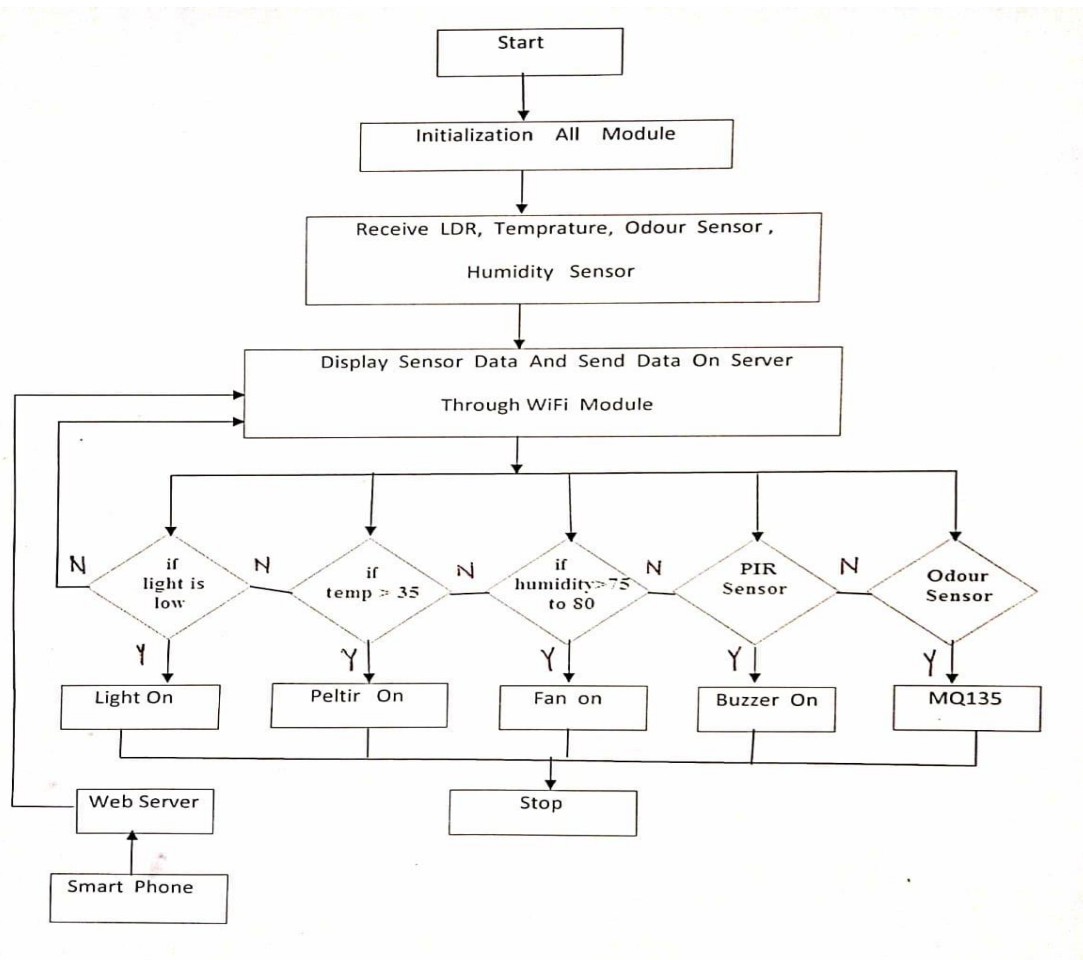
VIII. CONCLUSION

This project shows the significance of using wireless device net in correctness undeveloped area. This project is helpful to monitor the various parameters of warehouse and also it will inform to the manager, customers and farmers by uploading the data on cloud computing server using IOT.

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