# Smart Warehouse Monitoring and Controlling System

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*Abstract*— A warehouse is a commercial building for storage of fruits and food. Warehouses are used by manufacturers, importers, exporters, wholesalers, transport businesses, customs, etc. these warehouses to store large amount of Vegetables/ Fruits. These fruits and vegetables required a certain temperature, light, humidity to be maintained for proper storage. So, we performing the tasks like; spraying, moisture sensing, bird and animal scaring, keeping vigilance, temperature sensing, water – air – chemical spraying etc. with smart control based on real time field data. Smart warehouse management which includes; light maintenance, temperature maintenance, humidity maintenance and theft detection in the warehouse. 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 sensors, GSM modules, and mainly MICRO-CONTROLLERS.

***Keywords:*** Automation, GSM, Security etc.

## I. INTRODUCTION

In warehouse management and controlling system Temperature and moisture are determining factors in accelerating or delaying the complex phenomena of the biochemical transformation (especially the "breathing" of the strawberry) that are at the origin of strawberry degradation. The temperature depends not only on climatic conditions but also on the biochemical changes that are produced inside a strawberry mass, provoking undesirable natural heating of the stored products. As for the moisture Contents of the stored strawberry, it depends on the relative humidity of the air.

So, we performed the tasks like; spraying, moisture sensing, keeping vigilance, temperature sensing, water – air – chemical spraying etc. with smart control based on real time field data. Smart warehouse management which include ; light maintenance, temperature maintenance, humidity maintenance in the warehouse. Controlling of all these operations will be through any remote smart device like mobile phone and the operations will be performed by interfacing sensors, gsm modules, and actuators with MICRO-CONTROLLERS.

During storage, quantity as well as quality of strawberry will be decreased due to insects, rodents, increasing temperature. Almost all species have remarkably high rates of multiplication and, within one season, may destroy 10-15% of the strawberries and contaminate the rest with undesirable odors and flavors. Insect pests also play a pivotal role in transportation of storage fungi.

A warehouse is a commercial building for storage of fruits and food. Warehouses are used by manufacturers, importers, exporters, wholesalers, transport businesses, customs, etc. These fruits and vegetables required a certain temperature, light, humidity to be maintained for proper storage.

So, in order to provide solutions to all such problems, it is necessary to develop integrated system which will take care of all factors affecting the productivity in every early stage.

## II. LITERATURE REVIEW

This technological development in wireless sensor networks made it possible to using monitoring and controlling of strawberry warehouse parameter in precision in agriculture. However the use of technology in the field of agriculture plays an important role in increasing the production as well as in reducing extra man power efforts.

In this paper we had to proposed a model that analyses temperature, moisture, light. And after that a GSM module is used for data values sensed in real time and also for analysis results. User is alerted via messages.

Whole system consist wireless sensor networks based on GSM module. A relay was connected with the microcontroller to switch between GSM module, monitoring and controlling unit and spraying units. After measuring the temperature and humidity, the data was sent to the monitoring unit. The Central monitoring unit receives the monitoring data of sensor units and after that receiving the data, the whole system was controlled by controlling unit and send the alerted messages to mobile phone.

This technology had important unit this is the spraying unit, this unit consist washing, drying and for better preservation of fruits use chemicals. After this processes the fruits are in good quality with hygiene.

## III. SYSTEM OVERVIEW

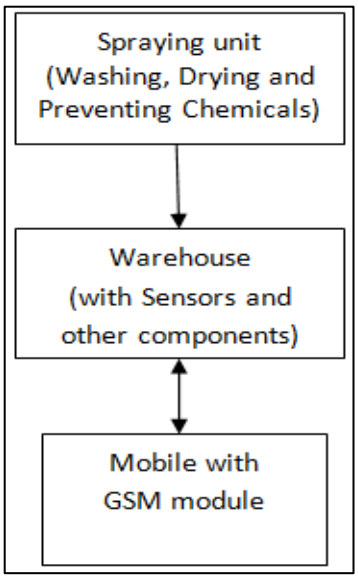



Fig. 1: System Overview

The paper consist of three sections; spraying unit, warehouse unit with sensors, and GSM module with mobile to control system. In the present system, every unit is

integration with different sensors and devices and they are interconnected to each other with sensors and via wireless communication modules.

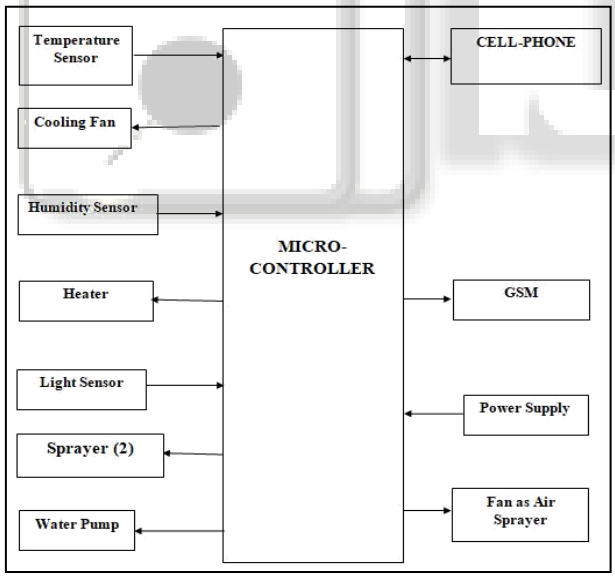
The GSM module sends and receives information from user end using wireless connectivity. There are important modes of operation of the system; auto mode. In auto mode system takes its own decisions and controls the installed devices.

## IV. ARCHITECTURE OF THE SYSTEM

This is our unit in this unit the controlling and the monitoring the warehouse, which store the fruits in it. Temp sensor, humidity sensor, gsm module and the light sensor are used in this unit.

1) UNIT 1: Sprayers is also used in it to washing the fruits for cleaning and also spraying chemicals for preserving strawberry for long time etc. This unit is in real time using for greater productivity and quality we have to to use this unit.
2) UNIT 2: Every sensor is monitoring the warehouse atmosphere, like temperature will high or low, if there is high then the cooling fan will start or the temp is low then the heater will start. Humidity sensor will also monitor the atmosphere of the ware house. Light sensor monitor the light is minimum or maximum in shelter. All the information will send to the farmer by using the GSM module.

### *A. Block Diagram*




3) UNIT 3: Every information about the warehouse will be message to the farmer or the owner on their mobile through the SMS using GSM. For the product storing there is object counter is used means all the record about the our fruits is collected through the GSM by using the mobile phone, Then decides what we do, here it is in our paper explained.

## V. COMPONENTS

1) AT89C52 MICROCONTROLLER
2) TEMPERATURE SENSOR
3) 16*2 LCD DISPLAY
4) SIM800-GSM MODULE
5) CELLPHONE
6) FAN (use for cooling)
7) HUMIDITY SENSOR
8) WATER PUMP
9) BULB (use as heater)
10) Some other useful component

## VI. EXPERIMENTS AND RESULTS

This proposed a model that analyses temperature, moisture (Humidity) for preservation. The significant challenges facing the food security at warehouse is the interaction between the Security devices and to provide them a intelligence to control other parameters.

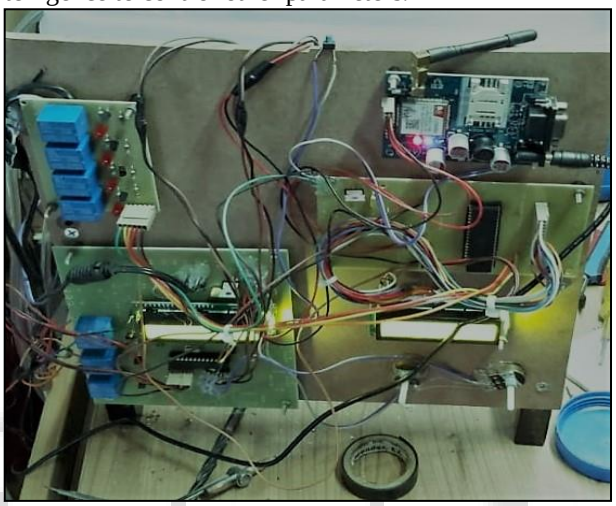


Fig. 1:

This project shows various steps of results which are:

Firstly we put the strawberry on the platform in the warehouse. This warehouse contain the sprayers: First sprayer is of water sprayer which is used to wash the strawberry in to the box, because in the strawberry farm for better growth and quality of the fruit, farmers used various chemicals for the fruits are saving from dieses and for greater growth farmers are used fertilizer which contain chemicals or organic also that's why we must want to wash the fruits before storing in warehouse.

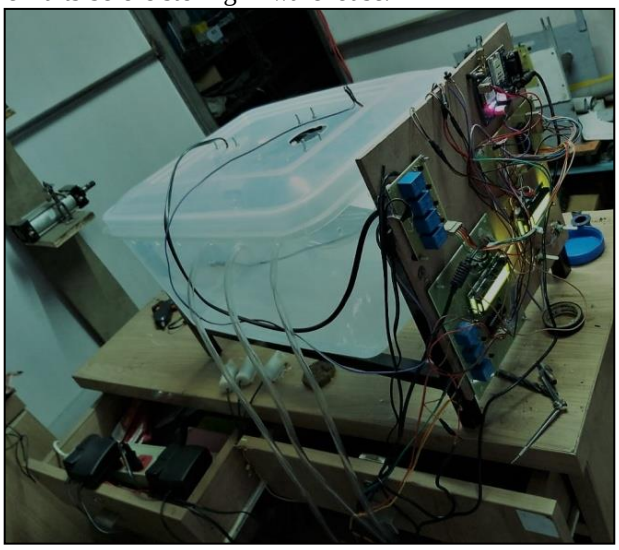


Fig. 2:

After the washing process is completed we have to remove extra water from the fruit that's why we use high speed fan. This fan is removing the extra water from the fruits for the next step which is again spraying a preserving chemical.

After this step we going to next step which is very important, in this step we spraying a preserving chemicals on the fruit surface, which is used to preserve these fruits for long time before export to the destination.

Now we going to experiment the second unit which is in that unit sensors are used into the warehouse first we check the temperature and humidity in warehouse.

1) When the temperature is going high than the actual set value of temperature then firstly system is alerted that the whole system is not OK and then at that time cooling fan is power ON to control the warehouse.
2) The temperature going low than the actual set value then the system is alerted that the system is not OK and at that time the system is control by using the BULB which is increasing the temp to the set value and again alert system which is controlled.

Third unit means the GSM module this unit is very important which is used to interaction between storing warehouse and the farmer, food engineer, exporter etc. Before and after every action this GSM module alerted which is very useful. No need to go every time and check the system which is OK or NOT OK.

## VII. Conclusion

A warehouse is a storage building for fruits and food. Warehouses is very useful for the manufacturers, importers, exporters, wholesalers, transport businesses, customs, etc. this warehouses to store large amount of Vegetables/ Fruits. These fruits and vegetables require a certain temperature, light, humidity to be maintained for proper storage.

So, in order to provide solutions to all such problems, that's why we developed an integrated system which will take care of all factors affecting the productivity in every early stage.

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