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Harvest Waste Management System

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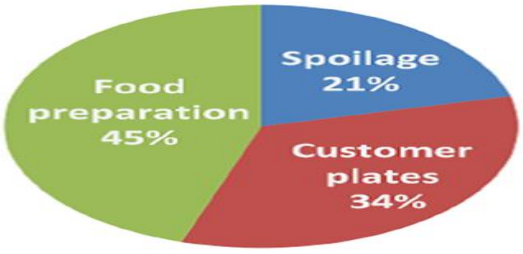
Abstract;- **This proposal effectively manages the food produce in the country. Millions of tons of harvest are rotted every year due to ineffective and ignorant ways. Hectares of land are deforested to grow food. According to a survey conducted by Bhook (an organization working towards reducing hunger) in 2013, 20 crore Indians sleep hungry at night. Food produced in the lands can't reach the places of poor. The government has been trying hard to tackle this problem but has failed due to inadequate and inconsistent data. Appropriate measures cannot be executed without real time data of food produce. Some measures that the government needs to take include containing wastage in transportation, improve storage facilities (the cold storage chain is 50% less than required and need to be brought up to world standards) and with this work, IoT based working prototype can play a major role in solving this problem. It can help the appropriate authorities by providing real time data of the produce and accordingly generate alerts when the crops are going to be perished. The proposal is basically based on the smart food waste management system which can sense optimum conditions for proper storage of variety of crops & with the help of IoT a central record system can actually work as a reminder of when the grains are going to be perished. It can collect the health status of the crops which will be stored in the central monitoring system. This data which will be stored in the central database will show tentative time in which the harvest will be perished and accordingly actions would be taken.**

I. LIMITATIONS

There are a lot of problems which are currently being faced by the public. These problems are concerned with the mismanagement of the total harvest. The total Indian production is increasing every year but due to improper storage system around 10%(FOA statistics 1984) of the total production is wasted every year and these stats have been increasing. This problem has made a severe impact on the lives of the common people as the food which is wasted can't be reused and is dumped. So accordingly there are necessary changes to be done in the storage system:

•Reducing food wastage.
•Enhancing GDP by food export.
•Better infrastructure.
•Reducing hunger and malnutrition.

•Equal distribution of food.
•Implementation of technology-a step toward DIGITAL INDIA.
•Growth in technical employment.



2.1 Food

II. GOALS/OBJECTIVES

What if this problem can be solved with the help of technology?

With the concept of IoT the issue can be handled in a very efficient and effective manner. The concept deals with inter connecting of the basic objects which can't be easily monitored (here the temperature and moisture content). The grains which are stored in the sacks in the open storage method can now be stored with the sensors. The sack containing grains will have sensors which will monitor the humidity, temperature and moisture of the sack. The data from the sensors will be analyzed by a central server which generates alerts whenever the optimal conditions are exceeded.

The IoT based prototype will act beneficial in storing the grains effectively and in a much efficient manner thus will help and reduce the harvest wastage.

III. TECHNICAL DETAILS

(4.1) Background:

This problem of harvest wastage is existing in our system for the past 4 to 5 decades. After the green revolution the harvest increased rapidly but the number of storage warehouses remained almost the same. The storage

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pattern remained similar because of which most of the harvest is wasted because of improper storage technics. According to the government of India statistics the silos are only used to store the oil seeds but for the most staple diet there are no such storage system because the construction of storage warehouses is not that cost effective.

(4.2) Rationale:

The rationale behind taking this project is to solve the problem of the harvest storage with the help of the modern technology i.e. IoT. The farmer's production may be utilized in an efficient manner and to boost up India's economy.

(4.3) Challenges:

The basic problems that will be faced by this idea is the implementation of this project. As India is a very big country and ever year there is a large amount of harvest produced so just to manage it properly and to collect the data from every warehouse is a very tedious job.

(4.4) Work Plan

The work plan is divided into 3 phases:

	Description of Work	Timing
Phase One	Information gathering and research	3 months
Phase Two	Development of prototype model	6 months
Phase Three	Implementation and result monitoring	6 months

PHASE ONE:

This phase is divided among various sub phases: In the first sub-phase the surveying of the places would be done by the team. By this survey real-time data would be collected and the statistics would be gathered around the country. Second sub-phase includes the research of the real problem which is being faced by the warehouses and the PDS (Public Distribution System) of the country.

PHASE TWO:

This phase includes the application of the research conducted by the team and the real time simulation of the prototype. A small warehouse would be taken in control and the prototype will be tested.

The second phase is connecting all warehouses to a central system which will send an alert to the concerned government official about the degradation of the food grain. This would preserve the quality of the food grain.

The implementation of this idea is planned to be done as follows:

1. The food grains that were kept outside can be stored in the "SMART" containers.
2. This container will generate the reports regarding the state of food grain stored. This would include the quality of food grain and for how much time the grain would remain in the perfect condition.
3. This Central system will act as a heart of the whole food storage and distribution system (F.C.I.). It is able to collect real time data from all connected agricultural warehouses across the country from different states. Now with all data available it can give response for a better distribution or export of food available in stock before it gets wasted.

(4.5) Components Used

In smart containers storage

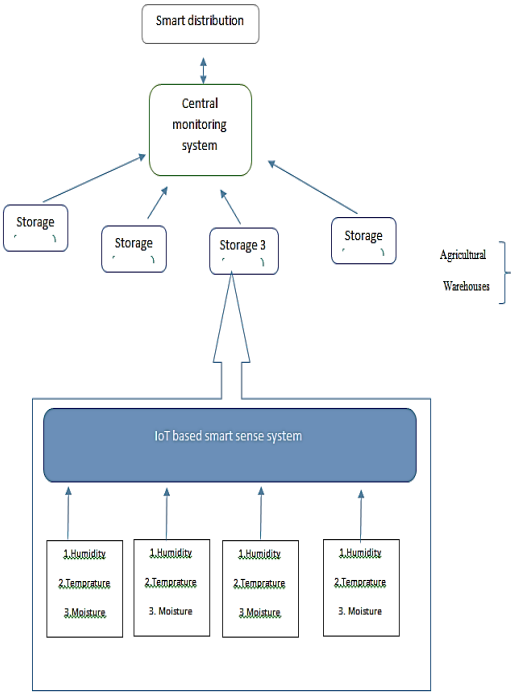
- Sensors
  - ➢ Temperature and humidity sensor ("dht11")
  - ➢ Moisture sensor for Arduino (Soil Hygrometer)
- Microcontroller
  - ➢ Arduino UNO R3
- Wires

  Male to male wires

  Male to female wires

IV. DIAGRAMS & STRUCTURE

(5.1) BLOCK DIAGR



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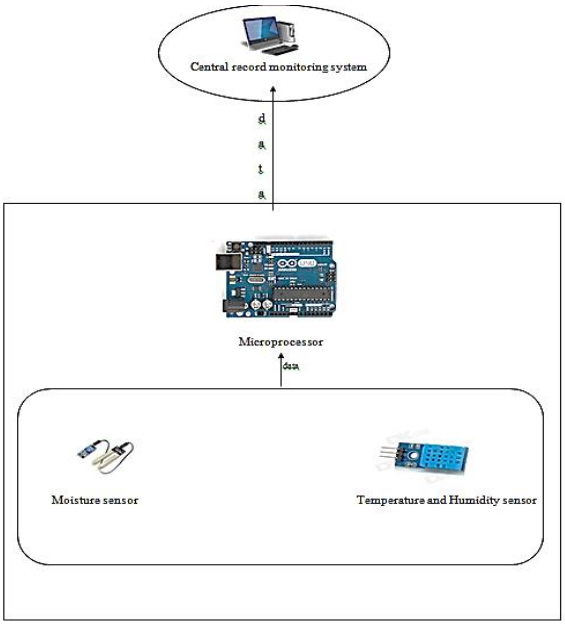
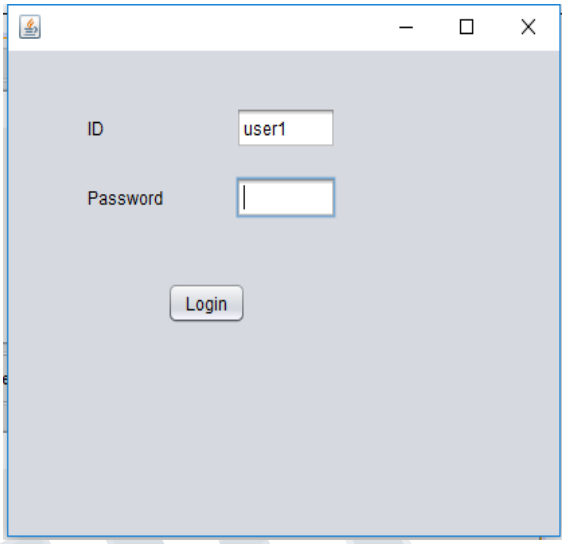
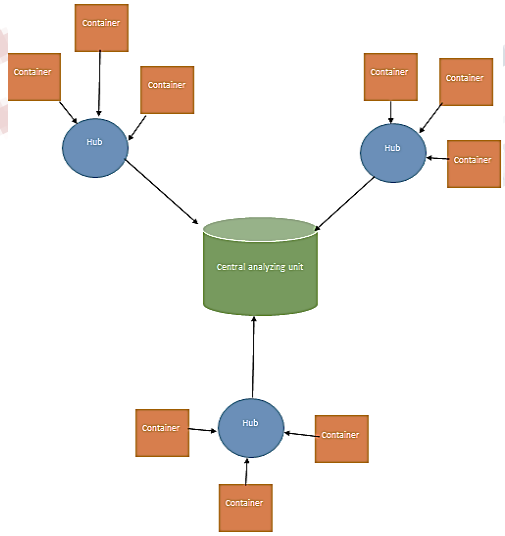
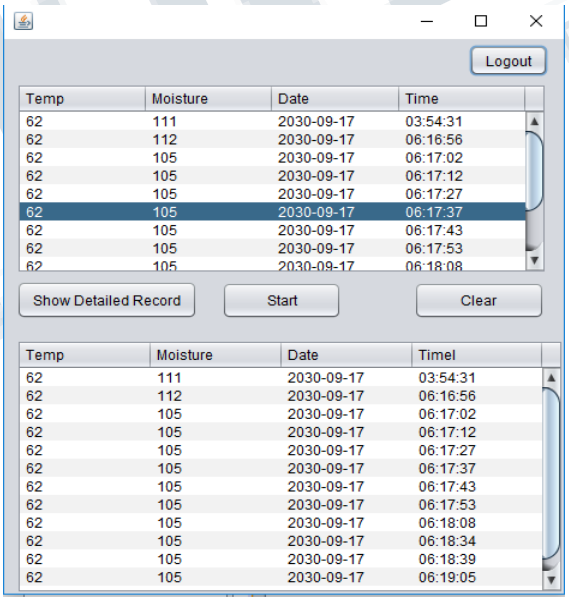
(5.2) IOT BASED DATA FLOW DIAGRAM





(5.3) SYSTEM ARCHITECTURE





SCREENSHOTS