

# Preventive Disease Detection for Farming (PDDF)

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## ABSTRACT

In India around more than fifty percent of population depend on the resources from agriculture sector. Crop production quality and quantity can be enhanced using accuracy in agriculture. One of the major products in India is Grape production has economic importance. Grapes have big production in our Maharashtra. But from last some years quality of grapes has been degraded because of diseases on grapes. To overcome the diseases farmers spray huge amount of pesticides, chemicals, because of that production cost get increased automatically. Also farmers are unable to identify the diseases. In Existing System, the diseases are detected by the Image processing method only after grapes affected by disease. But it is more time consuming and has adverse effect on vineyard. For increasing productivity and quality of crops, Farmers requires real time automatic disease monitoring system for Plants. So our proposed work is to develop a Real time monitoring System using HMM with help of small sensor devices embedded with wireless technology. It is possible to remotely monitor parameters which will identify the chances of disease on grapes in its early stage and gives an alert message through android interface or SMS to the Farmer with the Expert suggestions via an App. This system will be helpful and profitable for farmers to protect the Farm.

**Keywords:** Wireless sensor network, Vineyard, Hidden Markov model, etc.

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## I. INTRODUCTION

In India, Grapes production has economic importance. At each Stage of Grapes Development we have observe the different diseases. Many farmers those are doing grape farming, they don't have that much knowledge about each and every disease, hence they cannot understand and satisfy the protocols of super market related to the uses of pesticides and fungicides. Because of that grapes are rejected in residue analysis test and the farmers cannot get more profit on investment. Many of farmer's uses image processing system and also make inspection for identification and detection of grapes diseases. This type of system requires continuous observation by specialist, which is costly and not much more accurate.

Hence Farmers and Experts needs a real time system to continuously observe the vineyard and giving daily updates to the farmers, which is less costly and exact strategy to identify diseases infected on grapes.

In our proposed System is classified as a mobile app and web application , we use small Sensors devices are placed in vineyard coupled with wireless technology and it remotely monitors the parameters captured by sensor devices such as temperature, Humidity, Moisture. So our objective is to design and develop a Real time System that can take farm filed parameters and process them, then by using WSN it can be transmitted to remote place. According to parameters that received by end user, decision making can be done. Also Farmers get all required information about the Farm.

We can easily collect the sensor data, manage various cloud services and recommendation about whether forecast data, etc. Now days the precision agriculture is fast growing area of smart agriculture. This system gives solution for increasing quality of the vineyard.

## II. METHODOLOGY

### A. HMM

Here we used methods for the data analysis is Hidden Markov Model. A hidden Markov Model is the statistical model in which the states are hidden from the user. In basic Markov model states are noticeable to spectator, yet in HMM states are undetectable to client, be that as it may, just the watching states are unmistakable. HMM consists of two stochastic processes. The first stochastic process is states and its transition probabilities called as a Markov chain. And the second stochastic process is emission observation which depends on a probability distribution. With the help of HMM we develop our own model which will fulfill all the necessary conditions for accurate classification of diseases [1].

The algorithm works as follows,

1. Take input from temperature, humidity and moisture sensors.
2. Convert it into digital format using inbuilt analog to digital convertor placed on Arduino board.
3. Transfer data to server using Zig-Bee wireless communication protocol and store in database.
4. Find Euclidean distance at each point.
5. Find the state transition probability at each point. After calculating E.D. we need to calculate the probability of each state.

### III. PROPOSED SYSTEM

In our project we implement real time system. Which having master as well as farmer dashboard includes all farmers' data as well as actual vineyard data sensed by sensor. Also it store master database regarding different sensors with expert suggestion and required prescription information.

In proposed approach temperature, humidity, Soil sensor and moisture sensors are put in vineyard, first all sensors collect data from environment around the crop. All Sensors are connected to the raspberry pi board then pass to cloud for further processing. The framework of the proposed approach as shown in Figure.

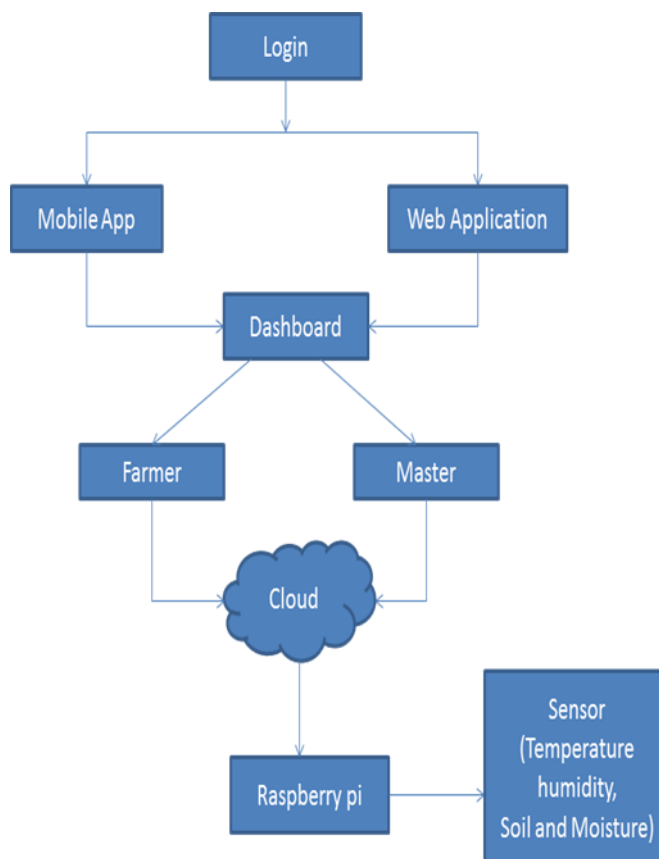


Fig. 1 Proposed System Architecture

The proposed system divided into sub modules they are as follow:

- Module 1(Farmer): Farmer having separate dashboard. This contains weather prediction, expert suggestion, and diseases precaution like tab.
- Module 2(Master): Master also having separate dashboard. This contains farmer registration, master records, expert suggestion and diseases precaution etc

After this, remotely monitor parameters like as moisture, temperature, Humidity given to Hidden Markov model algorithm and will detect diseases which will identify the diseases in its upcoming stage. The remote measurement and controlling of different parameters along with disease detection over the cloud can structured in this system. The end user of proposed approach is Farmer to access the web Application we provide Android Interface. Web Application is connected to central server (cloud) for real time updating of information. Farmers get all detail information of his farm plot wise. This system gives alert messages via SMS and Android Interface with Expert suggestions, etc to farmer at continuous interval for that we can use Internet/GSM/GPRS.

### IV. RESULT AND DETECTION

The data collected from various modules are grouped and classified and stored on the cloud. Our aim is to maintain the record of each vineyard .This is decided as per the vineyard sensor parameters give prediction of diseases through alert messages with expert suggestion to farmer.

## V. CONCLUSIONS

This is a real time system designed for early and accurate detection of diseases by using machine learning and IOT to suggest pesticides and precaution to protect the crop from those diseases and reduce the manual disease detection efforts. Due to this, it helps farmers to improve the quality of farming and increases the production of Farm. these all are provided on single touch. This will be helpful to farmers to increase their profits, and protect the vineyards from affecting the diseases and for better management.

## VI. FUTURE SCOPE

Our future work includes implementation of more IOT and machine learning techniques for providing smart environment to farmer. Our future work for better results, we will use more number of sensors to cover the large area of vineyard.

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