

# Auto-Expert Precision System: A Live Detection and Prevention with Smart Solution for Leaf Disease

<sup>1</sup>Prajakta Pathade, <sup>2</sup>Pooja Shinde, <sup>3</sup>Dakshini Khode, <sup>4</sup>Aarti Ahire

IT (Information Technology) Engineering

**Guided by: Prof. Dr. V. R. Sonawane**

Department of Information Technology,  
NDMVPS's KBTCE, Nasik, India.

**Abstract:** Many time's farmer throws their produce on road due to lower rates available in the market. This mostly happens due to excessive produce of same types of crops. Currently there is no mechanism for farmers to know about how many other farmers have planted the same crop. The proposed system will enable all the farmers to upload their choice and crop related atmospheric and soil data to the cloud. A proposed android application will fetch the above data from the cloud. The android application will also fetch the data from cloud database where information regarding crop and corresponding atmospheric condition, fertilizers, pesticides, water supply amount, preventive measures for climatic changes is been stored. The android application of farmers will carry out analysis and generate the optimal list of crops to be selected and planted.

**Keywords:** Geo-location, pH Sensor, Aurdino Board, Android Mobile, Moisture Analyzer, Android API.

## I. INTRODUCTION

The very common problem that is existing among the farmers are they don't select the correct crop based on their soil requirements. Because of this they face serious problems in productivity. This problem of the farmers has been addressed. Precision farming is a modern farming technique that uses research data of soil characteristics, soil types, crop yield data collection and suggests the farmers the right crop based on their site specific parameters. This reduces the wrong choice of a crop and builds up the productivity. As agriculture is a prime occupation in India from ages and thus plays a vital role in an Indian economy. India is an agricultural country with second highest land area of more than 1.4 million square kilometers under cultivation.

India tends to possess a huge potential to be in the field of agriculture. Agriculture promotes poverty and rural development. Agriculture is one of the India's biggest economic sector and employed 52.1% of total work force in 2009-10. Number of farmers in India is 23.4 Cr. in 2001. According to the research in 2011, India had a large agricultural sector, on average, for about 10% of export earnings and 16% of GDP. To this date in India, agriculture is being neglected which has led to losing hope of the farmers in agriculture which had led to increase in the number of farmer suicides. There is none of the universal system available to assist farmers in agriculture. India's population has been increasing at 1.6% per annum, which means that the growth in agricultural production must also increase at this minimum rate to ensure that there are no supply bottlenecks. Solutions are obvious India must invest in the agriculture sector, in RD, in irrigation, intermediary-less sales of produce and elective information centers to provide answers to farmer's queries. In India agriculture is carried out from many years and thus we have a very huge collection of agricultural previous data which can be used for the recommendation for the betterment of farmers. Data mining algorithms and techniques can be used for recommending single crop and pattern of crops for crop rotation. However to gain valid and optimized results, the system needs to be in continuous learning which can be done by including current datasets in the system.

## II. LITERATURE SURVEY

### 1. Crop Recommendation system for Precision Agriculture:

**Year:** 2016

**Author:** S. Pudamalar, C.Kavya

**Description:** Data Mining is the practice of examining and deriving purposeful information from the data. Data Mining has its application in various fields like, medicine, finance, retail, agriculture etc. In agriculture Data mining is used for analyzing of various biotic factors and abiotic factors. In India agriculture plays a predominant role in employment and economy. Mostly, the common problem that is existing among the Indian farmers are those, they don't choose the right crop based on their soil requirements. Due to this they face a serious setback in productivity. This problem of the farmers has been addressed through precision agriculture. Precision agriculture is a modern farming technique that uses research data of soil characteristics, soil types, crop yield data collection and suggests the farmers the right crop based on their site- specific parameters. This reduces the wrong choice on a crop and increase in productivity. Thus, this problem is solved by proposing a recommendation system through an ensemble model with majority voting technique using Random tree, CHAID, K-Nearest Neighbor and Naïve Bayes as learners to recommend a crop for the site specific parameters with high accuracy and efficiency.

**Advantages:** Farmers can plant right crop increasing his yield and increasing the overall productivity of the nation.

**Disadvantages:** Improved data set with large number of attribute and also implement yield prediction.

### 2. Crop Recommendation and Fertilizer Purchase System:-

**Year:** 2016

**Author:** Mansi Shinde, Sonali Ghorpade

**Description:** India is known as an agricultural country, where the recommendations are given by traditional methods. At present, recommendations for farmers are based on communication between farmers and experts and different experts have variety of recommendations. Recommendation can be provided to farmers using past agricultural activities' data. The application provides the recommendations to farmers for identification of appropriate fertilizer and crop. This system can be used by farmer's android based mobile devices. To increase the crop yield this application can be used by the farmers. Along with it, the recommended fertilizers can be purchased from the site. Advice regarding frequently purchased fertilizers will be given to the farmer.

**Advantages:** Available in multiple languages. Convenient for buying fertilizer after suggestion.

**Disadvantages:** Bridging the current system for windows as well as android OS.

### 3. Web based Recommendation System:

**Year:** 2015

**Author:** Kiran Shinde, Ameyoke.

**Description:** Data mining technique and algorithm can be used for recommendation single crop and pattern of crops for crop rotation.

**Advantage:** Provide recommendation for crops and crop rotation identification of appropriate fertilizer.

**Disadvantage:** India being an agricultural country is still using traditional ways of recommendations for agriculture. Currently recommendations for farmers are based on mere one to one interaction between farmers and experts and different experts have different recommendations. Recommendation can be provided to farmers using past agricultural activities with help of data mining concepts and the market trend can be merged with it to provide optimized results from recommender. The paper proposes the use of Data Mining to provide recommendations to farmers for crops, crop rotation and identification of appropriate fertilizer. The System can be used by farmers on web as well on android based mobile devices

### 4. Fertilizer planning and simple recommendation system:

**Year:** 2013

**Author:** CliveR.Rahn, Nidalshaban

**Description:** Fertilizer planning is essential to obtain the best balance of economic and environmental benefits. The information presented to the focus group suggests wide implementation of fertilizer planning systems, but only one of the systems was described in supporting factsheets. The roles of determinations of soil supply of N to inform such planning were less well implemented. The first conclusion of this paper is that these systems should be described, the description have to include the information readily available to the growers. The second is to identify the characteristics of planning systems that achieve higher rates of implementation.

**Advantages:** 1) Best balance of economic and environment benefits.2) Effective use of fertilizer

**Disadvantage:** Lacking in use of model to improve understanding.

### 5. Krishi mantra: Agricultural Recommendation System

**Year:** 2013

**Author:** Vikas Kumar, Vishal Dave

**Description:** With the evolution of Web 2.0, ICT has become the primary need of human beings. There is a gap between the farmers and the knowledge of agricultural experts. ICT can fill the gap between farmers and the experts. In this they had proposed a semantic web based architecture to generate agricultural recommendations, using spatial data and agricultural knowledge bases. Our knowledge base acts as a domain expert and will send recommendations to the farmers based on climate conditions and geographic data. They have shown practical results as a part of implementation of their proposed system. A farmer fires and sends a query to the query engine, in order to get required information regarding a specie crop. Query may be related to crop knowledge base, GIS data or both. The result of the query is displayed on a mobile device.

**Advantage:** Gap is filled between the farmer and expert.

**Disadvantage:** Same crop is planted in many areas

### 6. Wireless monitoring of Soil Moisture, Temperature and Humidity Using Zigbee in Agriculture.

**Year:** 2014

**Author:** Prof. C.H. Chavan, Mr. P.V. Karande

**Description:** The main objective of the present paper is to develop a smart wireless sensor network (WSN) for an agricultural environment. Monitoring agricultural environment for various factors such as soil moisture, temperature and humidity along with other factors can be of significance. A traditional approach to measure these factors in an agricultural environment meant individuals manually taking measurements and checking them at various times. This paper investigates a remote monitoring system using Zigbee. These nodes send data wirelessly to a central server, which collects the data, stores it and will allow it to be analyzed then displayed as needed and can also be sent to the client mobile.

**Advantage:** Investigates a remote monitoring system using zigbee. Data is allowed to be analyzed whenever needed.

**Disadvantage:** Traffic at central location.

## III. PROPOSED SYSTEM

In our system the sensor motes have several external sensors namely leaf wetness, soil moisture, soil pH, atmospheric pressure sensors attached to it. Also the value of soil pH sensor is detected and intimates the farmer about the soil pH. Obtaining the soil pH value the

farmer selects the necessary fertilizer and crop for farming. Our system will maintain two different cloud database one for agriculture department and other for farmer department. Using this system the environmental factors controlled and monitored correctly there will be improvement in the productivity. The purpose is used to plan and grow an agricultural system based on arduino method. The arduino chip was used with sensors to measure some of the ecological factors such as the soil moisture, humidity and temperature. The data is sent to the farmer through the medium of message from the cloud based on requirements that are used by weed detection algorithm

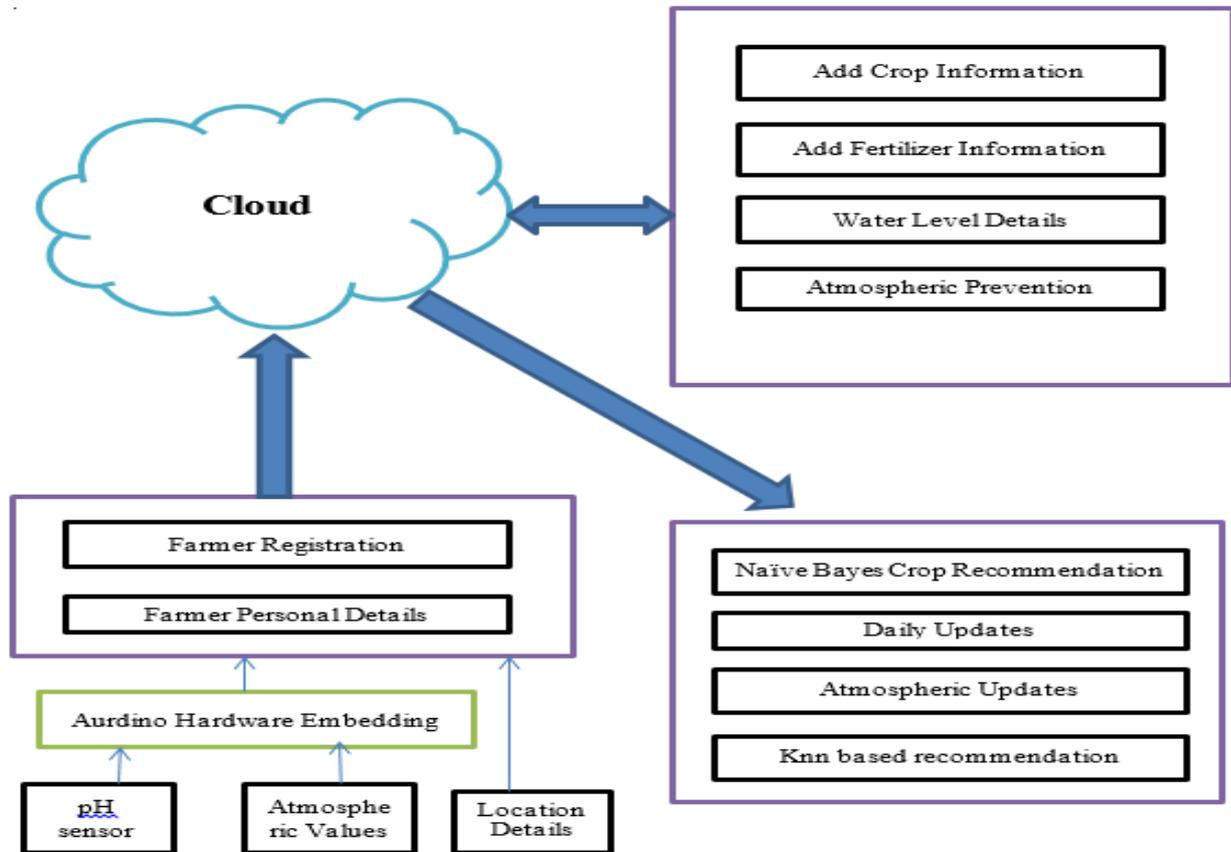


Fig. 1 Proposed System

### 3.1 Naive Bayes

It is a technique for constructing classifier models which assign class labels to problem instances which are represented as vectors of feature values, where the class labels are drawn from some finite set. It's not only a single algorithm for training such classifiers, but a set of algorithms based on a common principle. Every single naive Bayes classifiers consider that the value of a particular feature is independent of the value of any other feature, given the class variable. The Learners then predict the class label for every training data set. The class label which is predicted by the majority of the models is considered through the majority voting technique and then later the class label of the training data set is been decided.

### 3.2 KNN (k-nearest neighbor)

It is supervised learning method. In KNN data are represented in a vector space. It is used for clustering. The target function may be either discrete valued or real valued. For a given object E, get the top k dataset objects which are "nearest" to E by selecting distance measure. Then assign the class C to object E that represents the most objects after inspecting the class of these k objects. So for unknown tuple KNN looks for pattern space for the k tuples which are closest to that tuple. These k tuples becomes the nearest neighbors of unknown tuple.

## IV. CONCLUSION

Our system will help farmers in sowing the right seed based on soil requirements to increase productivity and acquire profit out of such a technique. We also proposed the use of data mining techniques to provide recommendations to farmers for crops, crop rotation and identification of appropriate fertilizer. Thus the farmers can plant the right crop increasing his yield and also increasing the overall productivity of the nation.

## REFERENCES

- [1] S.Pudumalar, E.Ramanujam\*, R.Harine Rajashree, C.Kavya, T.Kiruthika, J.Nisha (2016), Crop Recommendation System for Precision Agriculture

- [2] Mansi Shinde, KimayaEkbote, Sonali Ghorpade,Sanket Pawar, Shubhada Mone (2016) Crop Recommendation and Fertilizer Purchase System
- [3] Kiran Shinde, Jerrin Andrei, Amey Oke (2015) Web Based Recommendation System for Farmers
- [4] Clive R. Rahn, Mark Plunkett, Nidal Shaban, Hildegard Garming, Javier Brañas, Micheline Verhaeghe(2013) Fertiliser planning and simple recommendation systems
- [5] Vikas Kumar,Vishal Dave,Rahul Bhadauriya,Sanjay Chaudhary (2013) KrishiMantra: Agricultural recommendation system
- [6] Wireless Monitoring of Soil Moisture, Temperature & Humidity Using Zigbee in Agriculture (2014) Prof C. H. Chavan, Mr.P. V.Karande
- [7] Anshal Savla, Parul Dhawan, Himtanaya Bhadada, Nivedita Israni, Alisha Mandholia , Sanya Bhardwaj (2015), Survey of classification algorithms for formulating yield prediction accuracy in precision agriculture', Innovations in Information, Embedded and Communication systems (ICIIECS).
- [8] Aakunuri Manjula, Dr.G .Narsimha (2015), XCYPF: A Flexible and Extensible Framework for Agricultural Crop Yield Prediction , Conference on Intelligent Systems and Control (ISCO)
- [9] Yash Sanghvi, Harsh Gupta, Harmish Doshi, Divya Koli, Amogh Ansh Divya Koli, Umang Gupta (2015), Comparison of Self Organizing Maps and Sammons Mapping on agricultural datasets for precision agriculture, International Conference on Innovations in Information ,Embedded and Communication systems (ICIIECS).
- [10]Rakesh Kumar, M.P. Singh, Prabhat Kumar and J.P. Singh (2015), Crop Selection Method to Maximize Crop Yield Rate using Machine Learning Technique, International Conference on Smart Technologies and Management for Computing, Communication, Controls, Energy and Materials (ICSTM).
- [11]Bhuvana, Dr.C.Yamini (2015), Survey on Classification Algorithms in Data mining. International Conference on Recent Advances in Engineering Science and Management
- [12] A.T.M Shakil Ahamed, Navid Tanzeem Mahmood, Nazmul Hossain, Mohammad Tanzir Kabir, Kallal Das, Faridur Rahman, Rashedur M Rahman (2015) , Applying Data Mining Techniques to Predict Annual Yield of Major Crops and Recommend Planting Different Crops in Different Districts in Bangladesh , (SNPD) IEEE/ACIS International Conference.
- [13]Liyang Yang (2011), Classifiers selection for ensemble learning based on accuracy and diversity Published by Elsevier Ltd. Selection and/or peerreview under responsibility of [CEIS].
- [14]Tapas Ranjan Baitharua, Subhendu Kumar Panib (2016), Analysis of Data Mining Techniques for Healthcare Decision Support System Using Liver Disorder Dataset International Conference on Computational Modeling and Security (CMS).
- [15]Aymen E Khedr, Mona Kadry, Ghada Walid (2015), Proposed Framework for Implementing Data Mining Techniques to Enhance Decisions in Agriculture Sector Applied Case on Food Security Information Center Ministry of Agriculture, Egypt, International Conference on Communications, management, and Information technology (ICCMIT').
- [16]Monali Paul, Santosh K. Vishwakarma, Ashok Verma (2015), Analysis of Soil Behaviour and Prediction of Crop Yield using Data Mining Approach, International Conference on Computational Intelligence and Communication Networks.
- [17]Roshani Ade, P.R.Deshmukh (2014) Efficient Knowledge Transformation System Using Pair of Classifiers for Prediction of Students Career Choice, International Conference on Information and Communication Technologies (ICICT).