A Review on Machine Learning Algorithm Used For Crop Monitoring System in Agriculture

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Abstract - *In this paper, we explore the concept of the crop monitoring system .The various machine learning techniques are applied on data sensed from environment through sensors. The data sensed is related to humidity, temperature, sunlight and wind speed which are responsible for causing diseases in crop field. The results obtain by this algorithms are useful for farmers to take decision about disease condition in advance for further implantation in crop monitoring system.*

Key Words: **Internet of Things, Machine Learning, Artificial Neural Network, Sensors, Prediction Analytics**

1.INTRODUCTION

After successful survey, we proposed a system which handle crop growth. The Internet of Things is interconnection between computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. Proposed system helps to take decision by prediction and its analysis on data sensed and collected from agriculture sector using machine learning algorithms .The data sensed from crop yield by sensor for various parameter humidity , temperature, wind-speed, sunlight etc are stored in storage through IoT platforms, which will further use for prediction of various factor which are directly impact on crop growth after prediction decision taken will be convey to the end user for further action which will gain profit of end user. Also proposed system is compare with existing system with respect to accuracy.

Crop monitoring system aiming at optimizing profitability, productivity and sustainability, comprises a set of technologies including sensors, information systems, and informed management, etc. Expert systems are expected to aid farmers in plant management or environment control, but they are mostly based on the offline and static information, deviated from the actual situation. Parallel management, achieved by virtual/artificial agricultural system, computational experiment and parallel execution, provides a generic framework of solution for online decision support. We present the three steps toward the parallel management of plant

1.Growth description (the crop model)

2.Prediction

3.prescription.

After successful survey following sections are explained which are as follows

Section 2 describes Literature survey, Section 3 describes Proposed system, Section 4 describes Acknowledgment.

2. LITERATURE SURVEY

The authors Thomas Truong; Anh Dinh; Khan Wahid ,explain in this paper that the device is explain which give real time environmental data to cloud storage and a machine learning algorithm to predict environmental condition for fungal detection and prevention.

In machine learning algorithm using support vector machine regression (SVMr)was developed to process a raw data and predict result. SVM give result but it is less accurate than other algorithms[1].

The authors Mengzhen Kang; Fei-Yue Wang, explain in this paper that the concept of Knowledge Data Driven Model (KDDM)is used for new generation of smart agriculture which break the bottleneck of model application from laboratory environment to real world [2].

The authors Yun Shi, Zhen Wang, XianfengWang, Shanwen Zhang,explain in this paper introduce the concept of Internet of things (IoT). plant diseases and insect pests causes significant reduction in quality as well as quantity of agricultural product so plant disease and insects pests forecasting is of great significance and quite necessary. By using machine learning algorithm the main objective is to achieve the disease and insect pests monitoring information and collection of IoT.[9].

The authors Carlos Cambra,Sandra Sendra,Jaime Lloret, Laura Garcia, explain in this paper present the design of a smart IoT communication system manager used as a low cost irrigation controller. It shows how IoT, aerial images and SOA can be applied to large and smart farming system. Data is processed in smart cloud service based on the Drools Guvnor.[4]

The authors Dr N. Suma, Sandra Rhea Samson, S. Saranya, G. Shanmugapriya, R.Subhashri, explain in this project includes various features like GPS based remote controlled monitoring, moisture and temperature sensing,

intruders scaring,security,leaf wetness and proper irrigation facilities. It makes use of wireless sensor networks for noting the soil properties and environmental factors continuously.[5]

The authors Xin Zhao, Haikun Wei, Chi Zhang, Kanjian Zhang, explain in this paper proposed a short-term wind speed for-casting model with samples selection by a new active learning algorithm. Active learning is used in sample selection for machine learning. In this study active learning was useful for applications characterized by a large number of training sample in wind speed prediction [6]

The authors Giritharan Ravichandran, Koteeshwari R S, explain in this paper Artificial Neural Network is used which is one of the most effective tool in modeling and prediction. Feed forward Back Propagation Network is used together to implement the Artificial Neural Network. The proposed system is made as an Android Application, where the user could feed the inputs and obtain the desirable application.[7]

The authors Harshal Waghmare, Radha Kokare, explain in this paper support vector machine and decision support system is used to identification of plant disease through the leaf texture analysis and pattern recognition. Decision Support Systems (DSS) for agriculture is based on the technology that can be useful for farmers and help to increase the agricultural productivity .by this paper we come to know that the DSS is time saving, enhance effectiveness, increase decision maker satisfaction[8]

The authors Hemantkumar Wani,Nilima Ashtankar, explain in this paper machine learning algorithm is fitted for the prediction of diseases using naïve Bayes kernel algorithm. Naive Bayes kernel model where we are understanding correlation pattern between real time data and existing data set. Naïve Bayes kernel algorithm is for the classification of data sensed from the sensors.[3]

The authors Snehal S. Dahikar,Prof. Dr. Sandeep V. Rode,Prof. Pramod Deshmukh,explain in this India farming is the main Occupation. Above 70% business are depends on farming. In these paper Artificial Neural Network technology was used. The intelligent system has brought artificial neural network(ANN) to become a new technology which provides assorted solution for the complex problem in agriculture researches. This project only presented the most commonly used type of ANN ,which is the feed forward back propagation network. Here the ANN is used for the proper crop for particular soil and also suggesting proper fertilizer for that crop.[10]

3.PROPOSED SYSTEM

In Proposed system data is sensed through sensors then ANN Machine learning algorithm is used for data prediction. Sensed data is compare with data set which are stored on past experience, and result is produced.

As per the predicted result farmer will take decision from this system for profit gain
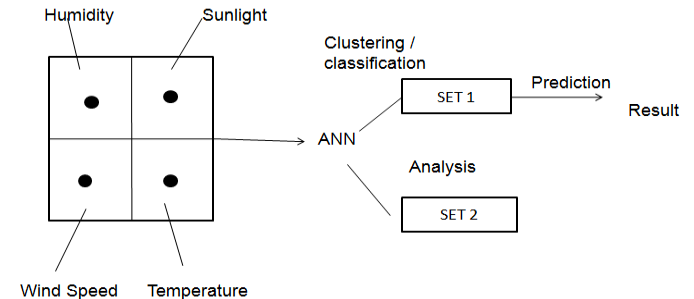

Figure 1

As shown in above scenario sensors are deployed in farm which are use to sensed the data related to humidity, temperature, sunlight and wind speed. Artificial neural network algorithm is applied on sensed data to classify and to form cluster. Clusters are then analyses with predefined data set to generate the output. The predicted result shows the whatever diseases can be cause due to particular crop condition.

3.1 TECHNIQUE

Artificial neural networks are most powerful learning models. They can have wide range of complex functions which represents multidimensional input-output maps.ANN is also an information processing paradigm that is motivated by way biological nervous system, such as brain.ANN is generally presented as system of interconnected "neurons" which send message to each other. Various types of artificial neural networks are available that are Perceptron, Multi-Layered Perceptron (MLP), Recurrent Neural Networks, Self Organizing Maps. In proposed system the MLP technique is used for data prediction. Artificial Neural Network are typically difficult to configure and slow to train, but once prepared are very fast in application.

Advantages :-

1. A neural network can perform tasks which linear program cannot.

2. It works even in the presence of noise with good quality output. When any element of neural network fails, it can continue without any problem by their parallel programming nature.

Disadvantages :-

1. Requires a shit load of training and cases.

2. Often abused in cases where simpler solution like linear regression would be best.

4.ARCHITECTURE DESIGN

Acquiring data (Humidity, Temperature, Wind speed, Sunlight) from sensor nodes. Data transfer using IoT devices. Perform data prediction using Artificial Neural Network algorithm. Prediction about crop growth and diseases using machine learning. Decision communicated to mobile user.
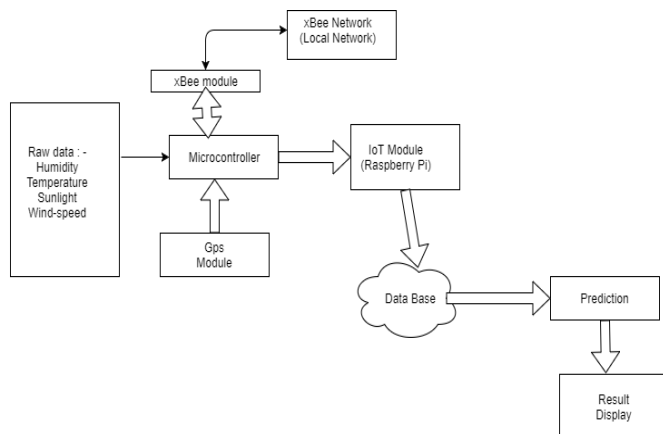

Figure 2

Component of architecture design

Sensors:-

Sensors are used to sensed raw data related to humidity temperature, Wind speed, Sun-light.

Micro Controller:-

Micro controller is used to passed data from sensor to the IoT module.

xBee Module:-

xBee module is used to create connection when we are using local network.

IoT Module:-

IoT module Raspberry Pi is used to transfer data to the database.

Prediction:-

Here Data prediction Artificial Neural Network technique is used for classification of data stored on database and generate result.

Result Display:-

Here to display the result to end user by using android application.

5. CONCLUSIONS

The proposed system provide agriculture solution using Artificial Neural Network Machine learning algorithm which is used for performing data prediction on data sensed by sensors. Due to use of IoT devices system provide automated solution for data prediction. The produced result will be helpful for farmer to take accurate decision for profit gain.

The system will give all prior knowledge in advance to the farmer for taking proper decision. The proposed system will be used to improve the detection of diseases and predict how the disease will spread in crop field. Same proposed system can be extended to provide the pesticides for predicted diseases.

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