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Crops Yeilds Selection System Using DHT11 Sensor & KNN Algorithm

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ABSTRACT: Data mining is the act of examining and sorting through big data sets to discover pertinent information. Data mining is used in a number of sectors, including banking, retail, pharmaceuticals, and other businesses. Agriculture uses data mining to examine the different biotic and abiotic elements that have an impact on crops. Agriculture is India's largest industry and the sector that provides the bulk of job opportunities. The choice of the appropriate crop for their region is one of the most frequent problems faced by Indian farmers. They are consequently noticing a precipitous drop in productivity. Precision agriculture has provided a solution to this issue for farmers. Precision agriculture employs research data on soil qualities, soil type, and crop production statistics to assist farmers in selecting the best crop to produce based on site-specific requirements. Growing in popularity is precision farming.

1. INTRODUCTION

1.1 Project Description

One of the oldest countries in the world that still produces agriculture is India. Globalization has, however, caused a considerable shift in the agriculture sector in recent years. There has various factors to impact on the agricultural situation in India. In order to aid in people's health restoration, several new applied sciences have been established. There is a one technique is precision agriculture. In India, precision agriculture is starting to take off. The process of farming in a "site-specific" way is known as precision agriculture. We now have the advantage of more productive input and output, as well as the capacity to choose better agricultural practises. Despite the great advancements brought about by precision agriculture, there are still many difficulties to be overcome. The optimal inputs for a certain agricultural region can be suggested using a variety of ways. The systems recommend crops, fertilisers, and even farming practices[1].

Crop suggestion is one of a large variety of tasks covered by precision agriculture. When proposing crops, a variety of criteria must be taken into account. These features may be found using precision agriculture in a site-specific manner, which can subsequently be applied to solve crop selection issues. Despite the fact that the "site-specific" method has improved the results, it is still important to keep an eye on how these systems are doing. However, the outcomes of precision farming approaches might not always be exact. However, it is essential that the recommendations made in the field of agriculture be correct and precise because a mistake might cause serious material and financial losses[2]. Numerous studies are being conducted in an effort to create a crop forecasting model that is both precise and effective. The article goes over the requirements and preparation necessary to create a software model for precision farming. It goes into great length on precision farming's foundations. This study looks at the specifications and preparation needed to create a software model for precision farming. You will discover the fundamentals of precision farming in this chapter. The study assesses crop production forecasting capabilities of categorization algorithms specifically in precision agriculture. It serves as a model for how Precision Agriculture (PA) ideas might be applied to modest-sized agricultural businesses. Using MaOpen farms at the level of a single farmer and crop may allow farmers to exert some control over the irregular character of their produce. One of the techniques used in this sort of study is ensemble, which is discussed below. A system that builds an efficient and accurate model utilising the voting process is suggested among the several machine learning techniques currently being used in this field[2] as a consequence of this study. In supervised machine learning, training sets that have been observed are available. A classifier is a programme that executes classification, often in the form of a visible achievement. Unsupervised machine learning entails giving the software a massive amount of data. A computer software will identify the patterns and their connections. A machine learning approach called unsupervised learning may be used to find hidden patterns in the data.

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Computer science and statistics are used with machine learning to increase the predictive accuracy. Machine learning is used by data scientists, data analysts, as well as others who want to utilise raw data to anticipate investigate data patterns.. In agriculture there will be vast amount of data and also it increases day by day, in order to find the accurate prediction of crop prediction, techniques for machine learning can be performed.

Precision Agriculture

Precision farming, which employs a systems approach, offers a new way to strike a balance between production and environmental concerns. Precision farming is based on propelled data innovation. Coordinating rural practices to meet site-particular prerequisites, depicting and displaying variety in soils and plant species are additionally incorporated into precision farming. The primary point of accuracy cultivating is to increment monetary returns and at decreasing the vitality input and the natural effect of farming[3].

1.2 Objectives

- To implement the concept of machine learning to predict the crops
- To use trained data set to predict authentic result
- To guide farmers in selecting the best crop to growTo reduce the crop loss burden of farmers

II. LITERATURE SURVEY

2.1Existing System and Proposed System

2.1.1 Existing System

In the present system farmers have to carry soil to laboratory to get it tested and seek opinion of experts in choosing the crops to be cultivated.

Limitations

- Not reliable
- Less yield
- Farmers may run into crop loss

2.1.2 Proposed System

This application finds very useful in the field of agriculture, using this application farmers could be guided regarding the crop to be reared based on the nature of soil. It helps farmers to get rid of crop loss and financial crisis.

Advantages of proposed system

- To implement machine learning concept to predict the crops
- Choosing right crop according to soil parameter is the need of the hour hence farmers will be guided for this purpose

2.2 Feasibility Study

A feasibility study is a project analysis that determines whether or not the proposed project is technically and financially viable. In a feasibility study, we examine the project to ascertain whether it can be successfully completed with all reasonable costs and technical assistance.

The main objective of a feasibility study is to analyses every test for economic, operational, and functional viability in order to reduce the proposed project's cost. A feasibility study is a decision-making tool for projects that will provide you an idea of how to carry out the work using this feasibility report[5].

Additionally, it offers all of the technical, financial, and other resources that we need to complete our assignment and propose our idea. Feasibility study also used for identifying the scope of our project.

Feasibility study is over all examination of project strength and weakness of project and required cost to develop our project and also it will provide the problems available in the existing system and what features we need to include in the existing system to overcome from the problem of existing system.

Well-designed feasibility study is that which provides the required resources and all the documentation details and cost estimation and detailed history of our project is a feasibility study.

2.2.1 Operational feasibility

The proposed system is an effort to make use of web applications and internet services to design a well generalized web site which act as communication media between users and the order system and law.

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Since users have rights to make complaint against the crime after being verified as a authenticated users .only the register users can make a complaint over online regarding crime and miss guidance and even for providing illegal information on web sites which may create problems to the accessed users.

One more benefits of using web sites is that any complaint regarding crime and illegal work complaints should be made online only by using provided facilities on web sites which avoids the waste of time . There is no need to visit particular stations frequently to complaint against crime. Complaints given by users will be handled by the authorized officials and they provide solution to their problems[4].

Operational feasibility monitors all these progress to provide good service to the public/users so they can access the useful information through web sites and design their own applications and users are allowed to download the useful information they can upload their works and ideas on web sites they can also give feedback to the accessed websites.

2.2.2 Technical Feasibility

The technology feasibility defines as below.

- **Data storage**

The MySQL database, which is great for distributed applications, contains all the information. The suggested system has an advantage in that it can perform database transactions without the need for any additional drivers or features. This system is based on the client-server concept, therefore users and clients do not need any additional programmes or software to use it effectively. No additional software is needed for transactions between the user and the system; all truncations are performed using only the MySQL database.

- **Web server**

Web server provides service to clients by accepting client request and those request will be served by the server and server will examine the requested client request and perform the operation by using Apache web server which also provide service at 3306 available port, web server has to perform operation to provide service to client instantly, it provides excellent service on Linux platform which provides a multiple user operating system.

Web server is a communication between the client and server where client request to server to provide the service requested by client server accept the http request from client and process it and fetch the required information and send back to the client. Web server provides excellent service to the PHP programs[6].

- **Messaging**

In developed system SMS are sent through GMS modem, and to communicate with this modem Attention Commands(AT)are used and each and every commands are alphanumeric code with previously defined meaning and parameters will be taken by the command.

- **Server Scripting**

In the proposed system python language used to make server side scripting and python language supports object oriented language as well as procedural language and it is compatible language and also it supports various data types and also it supports to for each loop concept which is very useful to provide navigation through arrays of various types[4].

2.2.3 Feasibility in Economic Terms:

This type of feasibility study is used to know by economical terms that the organization has on the project developed. Newly developed system finds that the needed application is capable of creating profits in the organization. The profit here includes the cost of software development, cost in hardware products used and required software cost. It also deals with the maintenance cost profits in the organization. Its main aspects are to know the development of project within the user budget. The newly build system has assumed set of views about the development price and maintenance price of this system is very less.

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III.METHODOLOGY

3.1 Methodologies

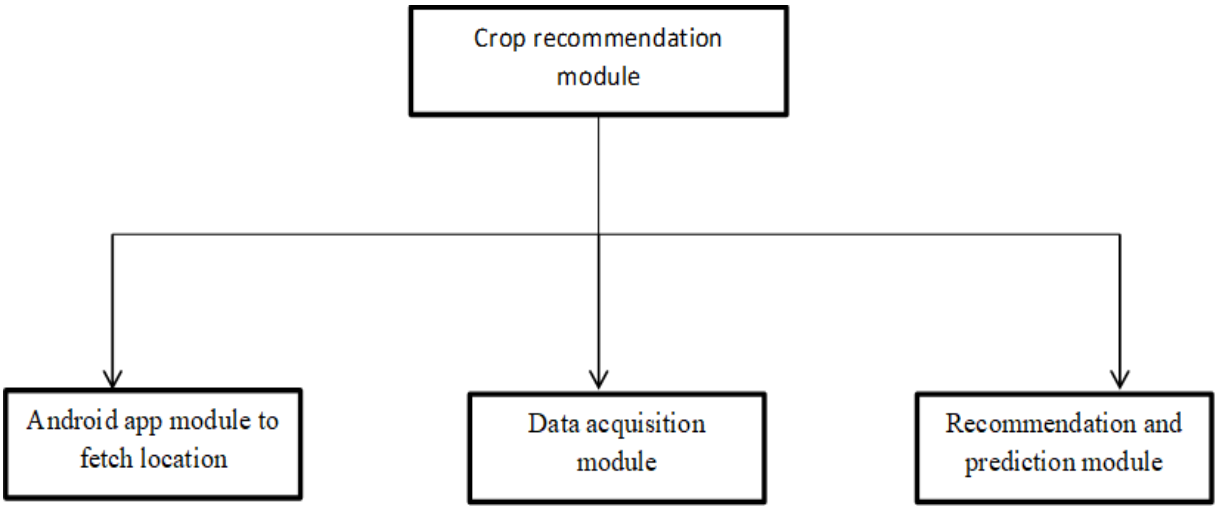

Figure 3.1.1Design methodology of proposed system

• A GPS-enabled Android app is used to determine location.

• The rest soil grid website receives coordinate values and responds with the soil properties for that specific area.

- For the sake of this example, we've used one of these soil parameters[7].
- **3.2 Screenshots**
-

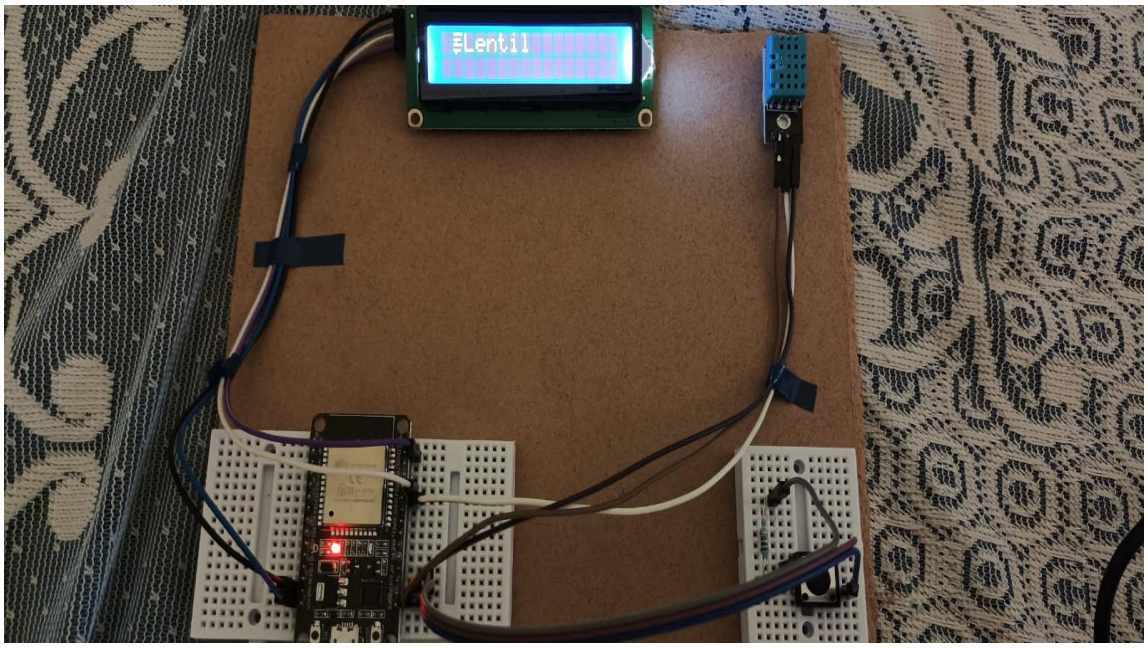

Figure 3.2.1 :IoT prototype displaying result

Above image shows various elements being connected to implement the proposed project,initially it connects to users hotspot and shows the message wifi connected,after gettting that message user has to press push button to get the result from flask server,it sends an http request to server.

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3.3 Pin configuration of ESP32 Kit

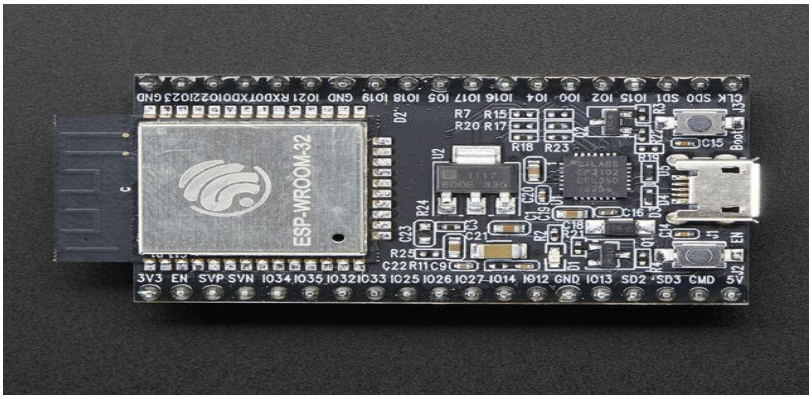

Figure 3.3.1: ESP32 microcontroller

The ESP3 is one of the microcontrollers that supports both Bluetooth 4.0 (BLE) and Bluetooth Classic. It is integrated with 802.llb/g/n Wi-Fi and dual mode Bluetooth (BT). Due to its low cost and low power consumption, the system is more advantageous for project implementation. This ESP32 microcontroller was devised, invented, and developed by ESP Ressif Systems and a Shanghai-based Chinese firm. TSMC produces it using their 40 nm technology. It occasionally links its own network. Through USB, it offers a power source of around 5V. The ESP32 supports Wi-fi Direct and is an excellent alternative for peer-to-peer connections without the requirement for an access point[9].

3. Summary of existing approach

SNO	AUTHOR	TITLE	MDETHODOLOGY USED	RESULT
01	M.V.R. Vivek	System for Recommending Crops in Precision Agriculture	1. Unstable tree 2. CHAID 3. KNN 4. Simple Bayes 5. Using WEKA	1.Data preprocessing 2.Handling missing values and values outside of the range 3.Addition of features 4. Collective
02	Pradeepa Bandara	A Study on Different Data Mining Methods for Predicting Crop Yield	1. Attribute choice 2. Regression using Multiple Linear Models 3. Using an ID3 decision tree 4. SVM 5. Neural Networks 6. C4.5 8. K-means and KNN	1.choosing an agricultural land 2.choosing a crop that has already been planted 3. Attribute Choice
03	Dhruv Piyush Parikh	RSF: A Recommendation System for Farmers	1.Detection of location 2. Data storage and analysis 3. Detecting similar locations 4. Module for generating recommendations.	1. Crop cropion rate, crop growing season, and physiographic and thermal data 2. A database of seasonal crops 3. Recognizing similar locations 4. Producing the assortment of crops 5. The similarity of the

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				crops grown in an area
04	Rohit Kumar Rajak	employing data mining as a decision support system for agriculture	1. System based on subscriptions 2. ANN 3. An Android programme 4. Personalized	1.One Android application with a login module 2. Previous harvests that the system is aware of 3. A system for user feedback[12]4.Maintenance of crop.
05	Kamatchi	Application of Big Data Analysis in Agricultural Intelligence Decision Systems	1. A comparison engine 2. Technical knowledge 3. Information engineering 4. The module for acquiring knowledge 5. Knowledge foundation for the recommendation engine	1. Vast crop database 2.Hadoop-processed second 3. Technical expertise 4. Previous encounters 5. HDFS feature selection 6. Using Hadoop and artificial neural networks is the future's focus.
06	Dhruvi Gosai	Utilizing Data Mining to Predict Crop Yield	1. J48 2. LAD tree 3. LWL 4. IBK algorithm	1.WEKA tool 2. LAD tree accuracy was the lowest. 3. Tree pruning can reduce errors. 4. Higher accuracy was noted with IBK[14]
07	Vijay S. Rajpurohit	Crop Recommendation System for Precision Agriculture: A Data Mining-Based Decision Support System	1. A comparison engine 2. Technical knowledge 3. Information engineering 4. The module for acquiring knowledge 5.KNN 6.SVM	1. A data classification algorithm 2. Crop is recommended 3. A huge database of plants 4. Recognizing similar locations 5. Data preprocessing

Table 3: Summary of the recent existing approaches

IV. RESULTS

The proposed research project contains two areas, namely IoT and machine learning. The IoT module includes components like an esp32 board, a dht 11 sensor to gather characteristics like temperature and humidity, and a push button to initiate requests to servers.

Python is used to develop the machine learning module, together with the libraries pandas, sklearn, and numpy. Pandas is used to analyse the data set, and the KNN classifier from the sklearn package is used to build the model.

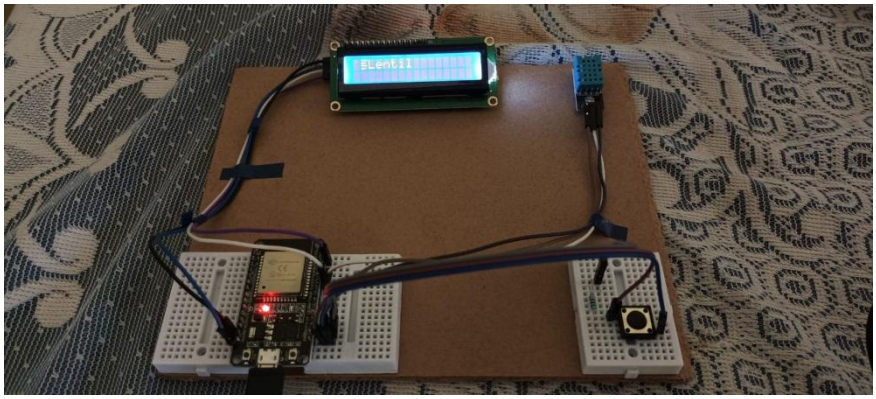

Fig 4: Above figure shows the prototype with result being displayed on LCD display

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V. CONCLUSION

The proposed project is an attempt to use the concept of machine learning in the recommendation of crops, we have tried to implement a KNN algorithm related to this, while also implementing the concept that we have collected reports from district agriculture department real-time soil analysis, normalized the raw data we implemented Knn, we should finally remove Knn's algorithm, the work has been tested for various geo location values and we are getting good results. This project finds useful in agricultural sector in choosing the right crop

VI. FUTURE WORK

It is capable of doing several additional duties for the system. It currently suggests a crop that may be produced with ease and makes use of relevant environmental conditions as inputs. However, the automation component may be included as an extra stage to act as a feedback response system. This may be changed to alter the humidity, water level, and other components based on the needs of the farmer. Although it now uses all environmental elements as inputs, a forecasting algorithm that uses two more factors in addition to the one being forecasted might be built. As a consequence, installing and maintaining the sensors will be less expensive initially. Before harvest, farmers may encounter problems or damaged crops, which might have an impact on their final score. The soil report and crop photos can then be uploaded. The AI model may then pinpoint the issues and offer ideas for potential solutions.
Additionally, we may offer IOT solutions through virtual agents or APIs that connect farmers with raw material suppliers so they can get the products they need, such seeds and fertiliser, based on the crop the model suggests.

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