International Journal of Technology and Applied Science (IJTAS)

E-ISSN: 2230-9004 ● Website: www.ijtas.com ● Email: editor@ijtas.com

Agriculture Crop Recommendation Based on Productivity and Season

N Sangeetha[1], M Sindhu[2], G Sreenath[3], T Surendra[4], B. Javeed Basha[5]

[1,2,3,4,5]Department of CSE
[1,2,3,4,5]Tadipatri Engineering College, Tadipatri.

Abstract:
Machine learning plays a vital role in all industries. Machine getting to know makes work less difficult and more particular. Agriculture is a major supply of employment in Tamil Nadu. Agricultural manufacturing suffers due to environmental modifications. Factors inclusive of humidity, rainfall, sunlight, soil type and temperature immediately have an effect on the crop. Agriculture calls for right expertise to cultivate. The data used to put it on the market Agrifacts is created the use of agricultural metrics and elements. Agricultural factors and parameters generate facts to reap facts approximately agricultural data. The growth of the sector of facts technology is generating some strengths in agricultural technological know-how Aids to better offer farmers with agricultural facts. In the existing situation, the utility of modern-day technological strategies in agriculture is timely. Machine learning strategies create a properly-described version using statistics and assist us make predictions. It can clear up agricultural troubles such as crop forecasting, crop cycle, water demand, fertilizer call for and conservation. Due to the various motives of the climatic environment, it is important to have a effective generation that permits the vegetation to grow and the farmers to supply and maintain them. This will assist farmers to produce greater inside the destiny. Through information mining, a recommendation device can be supplied to the farmer to help him inside the conservation of his crops. To put into effect this approach, it is recommended that the crop grows in its factors and factors and their amount. Data analytics paves the manner the manner for the evolution of useful mining from agricultural databases. The crop statistics set turned into analyzed and crops had been endorsed based on productivity and season. Using diverse gadget mastering strategies, we are able to predict crops and create a model from the records furnished. This will permit destiny farmers to provide higher plants. Through data mining, agricultural manufacturing is increased by recommending vegetation to farmers. It is suggested to apply crops in this strategy deliberating their length and weather. Data analysis opens the door to the development of valuable extraction from agricultural databases. Analysis of the crop statistics set ended in a advice based on crop productiveness and developing season.

Keywords: Accurate, Agriculture, Impact, Crop harvesting, Intelligence, prediction.

I.INTRODUCTION:

The records of agriculture in India may be very old. India these days ranked 2d within the world in phrases of agricultural manufacturing. Agricultural industries, consisting of forestry and fishing, accounted for six.6 percent of GDP and about 50 percentage of general employment in 2009. Financial contribution of agriculture to India's GDP traits. Crops are the maximum essential source of income inside the agricultural quarter. Fruit production depends on many elements which includes climate, geography, organic and economic factors. Uncertain charges make it hard for farmers to determine whilst and what form of grass to plant. As Wikipedia notes, the loss of life price in India has expanded from 1.4% to no less than 1.Eight% or more in keeping with 100,000 humans in 10 years.

Due to the uncertainty of the weather, farmers now not understand where plant life develop, whilst and wherein to begin. The use of many fertilizers is also unsure because of seasonal versions in climate and

key sources consisting of land, water and air. In this example, the general impact step by step fades. Farmers Hassle Access is a smart, easy-to-use recommendation gadget. Predicting yield is a large problem in agriculture. Each farmer tries to achieve fruit, whether or not by way of his very own hope or no longer, by means of predicting the fruit from the enjoy of a specific selected crop.

Agricultural productivity is often tormented by weather, pests, and crop control. Accurate records of crop history are important for choosing agricultural contingents. In this article we have proposed solutions to these issues. The innovation of the proposed mission facilitates farmers to maximize their yields and offer the maximum suitable harvest of their chosen area. The proposed model offers priority to plants in financial and environmental subjects, and most importantly, subsequently plant life makes the increase of meals call for in the United States of America. The proposed version predicts the use of rainfall, temperature, place, season, soil type, etc. This device additionally facilitates to choose the proper time for the idea. Today's excessive-performance systems are absolutely hardware-primarily based and high-priced to keep or hard to provision. Tamil Nadu is the seventh biggest state and the 6th maximum well-known nation of India. He is the greatest farmer within the land. S.A. International Interior.

The main supply of earnings for Tamil Nadu is agriculture. Agriculture has a strong voice on this aggressive international. Kaveri is the main source of water. The Kaveri delta is called the rice location of Tamil Nadu. Rice is the most important crop in Tamil Nadu. Other flora grown include rice, sugarcane, cotton, coconuts and groundnuts.

Organic fertilizer is produced properly. The majority of the personnel is agriculture in many regions. Agriculture has a fantastic importance in the rural monetary machine. Agriculture is destroyed because of the trade of natural resources. These days, solar, humidity, soil type, rainfall, excessive and occasional temperatures, weather, fertilizers, insecticides and so forth. He changed into at once drawn to agriculture. For the improvement of agriculture, it is important to perceive excellent vegetation. Step 1: Winter in India is the season that lasts from December to March. Stage 2: Summer from April to June. The 0.33 season: the rainy season from July to September. Stage 4: October to November – the rainy season or autumn. Due to the diversity of weather and rainfall, it's miles necessary to assess the plants appropriate for cultivation. Crop management, expected yields and effective yields are the principle concerns of farmers. Farmers and cultivators demand vegetable care that many young agriculturalists are now reading. The influence of the IT region is increasing the appreciation of modern worldwide troubles. Things in the discipline of agriculture will boom daily. With the arrival of the Internet, there are numerous ways to get entry to statistics inside the global of agriculture. We need a device that may fully examine agricultural records and extract important statistics and use them. It is critical to discover methods to extract facts from facts. Develop a farmer aid website in order to assist farmers ensure higher profits through predicting suitable vegetation based totally on soil fertility.The model also recommends the most suitable framework and specifies the period profile. The fundamental undertaking is to achieve first-end result of plants which could grow during the season. The proposed gadget will assist farmers in decreasing the problems worried in choosing plants and reaching most yields.

Automatic pattern reputation provides a dependable interpretation of information patterns and permits us to make predictions. Agricultural problems associated with crop availability, crop rotation, water call for, fertilizer call for and conservation may be solved. For diverse motives related to the climate and the environment, it's far critical to have a green system that makes production and management less difficult for farmers. This will help the farmers to enhance the farmers. An advisory system can be set up to help the farmer spread the lifestyles of his plant. To make this method extra powerful, vegetation are decided on based totally on climatic and quantitative factors. Data analytics paves the manner for extra facts from agricultural databases.

II. LITERATURE SURVEY:

Measures to conserve vitamins inside the soil, in case of deficiency, upload fertilizers to the soil. A not unusual problem among Indian agronomists is the minimal quantity of fertilizer and guide loading. Too plenty or too little fertilizer can harm vegetation and decrease yields. This article gives details of several mining strategies used to produce most effective datasets equipped for fertilizer pointers.

Research on Data Mining Techniques in Agriculture, 2017.It is a totally vital device for agriculture, specifically inside the growing international locations of India. The use of agricultural records can assist choice and choice and farmers can improve their yields. Data mining plays an important position within the selection-making that many factors do in the agricultural region. The nation of production statistics in agriculture is examined and the works of several authors on agriculture are analyzed. He also talks approximately the diverse programs of mining to solve many agricultural problems. This registry collects works of art through more than one authors within the same place, so professionals will locate facts approximately primary archival substances and contracts within the context of rural regions inside the United States.

AgroNutri Android Application, 2016,This article allows in expertise the idea of building AgroNutri as an Android software that gives percentage statistics and fertilizer dose making plans. The concept is to calculate the quantity of NPK compounds produced primarily based on the initial amount of amateur way of life. This software is specially based on artwork made by means of Agricola and is considered his contribution. It is proposed that the destiny of agricultural meals depends at the truth that GPRS may be used to supply nutrients to the site. Additionally, this gadget can be changed as a part of a selected agriculture, using sensors to decide the quantity of NPK present within the soil, and this quantity may be deduced from the offers and may use precise additives, that could provide a positive diploma. , that is very critical.

Machine Learning: Applications in Indian Agriculture, 2016,It is a rural region that has not tailored to time and development. Indian farmers have to constantly be united. Machine getting to know is a property idea that can be carried out to any field with all inputs and outputs. You have efficaciously advanced your abilities in software programming and software dimension. Introducing algorithms to machines has advanced the precision of AI machines and sensor systems in precision agriculture. This article evaluates various contexts for the usage of mechanical engineering in agriculture. It provides statistics about the threats faced by Indian farmers and the way they may be conquer with the assist of those technology.

The effect of populace boom, monetary development and technological trade on worldwide food production and consumption, 2015.In the approaching many years, humanity will need greater meals from less land and water. This observe evaluates food production under four scenarios selected from the Millennium Ecosystem Assessment and a special report on emissions situations. Impacts on land and water residences resulting from human improvement and unique modifications are taken into consideration widely and comprehensively, such as modifications to forests and agriculture required associated with populace increase and monetary improvement. Document the effect of earnings on nutrient necessities by using the use of dynamic flexibility. Between 2010 and 2030, the global agricultural vicinity is predicted to boom with the aid of about 14%. Bans on deforestation have a large effect on land and water costs, but have little effect on worldwide meals manufacturing and meals prices. Although projected income receipts have the greatest have an effect on on according to capita meals intake, population boom is matched via an boom in overall food production. Adapting the depth of land use affects technological opportunities by strengthening or weakening them.

A Brief History of Model Agricultural Systems, 2016

Scientific agricultural generation enables analysts to take into account complicated issues and make informed agricultural choices. The wealthy records of this technological know-how is supported by using the wealth of maps and scales with which he worked and became taken into account. The display, an essential tool for agricultural technical records, turned into evolved with the aid of researchers from unique nations who shared their ideas and gear over six decades. Agricultural researchers honestly study the styles, statistics, and elements of "humans walking" which can be anticipated to help provide an explanation for the issues of volatile and failing structures in society. A - Innovation and desire ought to keep in mind all the elements of the problems discussed. In this context, we describe the ancient facts of agricultural structures, demonstrating and growing techniques that helped to create and improve medical and concrete agricultural gear and strategies. The numerous traits of the past, with normally mixed tendencies in many areas, have made actual contributions to the development of agricultural demonstration systems, in addition to the modernization of cattle and breeding techniques based completely on techniques primarily based on fully testable assumptions. Similarly to the economic itself. Reproduction, from familiar team spirit and associates to examples of sustainability around the sector. There become brilliant variation in the traits of rural RUP fashions in terms of incorporated structures, scale and scope, which led to their diffusion and use with the aid of authorities experts in many countries. Recent examples of decisive collaborative work inside corporations, companies, and among large organizations of people constitute sizeable advances in the field of accounting that require current methods and databases. An instructional choice of emotional and ecclesiastical worries. Collection methods should be considered to keep away from bottlenecks and tough conditions, because the community creates those and future gardening plans. Tripathi and others. They furnished a pest manipulate gadget for developing plant life the use of this mining machine. A custom version of the Bose SNN for space-time estimation proceeds with estimation. Shreya S. Bamos proposes the usage of shearing and predictive modeling. A proper set of rules can expect crop yields and crop water requirements.

Disadvantages:

In the cutting-edge system, within the best case, a selected country is taken into consideration for all states and other parameters.

1. Relatively slow in construction.
2. A difficult rationalization.
3. All computations are expensive.

III.PROPOSED SYSTEM:

Production depends on some of agronomic environments. Based on the preceding yr's manufacturing table, farmers can set up a hard and fast of fruit timber. These proposals will help the farmer whether or not the culmination in the coming yr will bear the end result themselves. Crop diseases, water problems and lots of various factors can reduce agricultural manufacturing. By searching at manufacturing, farmers can see which plants are selling the maximum this 12 months. Hence, the developing developments of flora can be determined within the coming years. Farmers can often acquire recommendations throughout the developing season. The task assertion suggests that farmers are the use of the breeding classifier. The principal benefit of this layout is that we will introduce pre-processing records, which are used to prepare the matching fashions and interface the matrix to offer entire and very last consequences.

Advantages:

- In our proposed engine, we've got used a large amount of statistical facts covering all the states of India, on the grounds that within the present day system the machine is taken into consideration very simple for particular rural areas.
- Company size or size isn't always required. Easy to observe.

- Easy to provide an explanation for. Low computational cost.

IV. SYSTEM ARCHITECTURE:

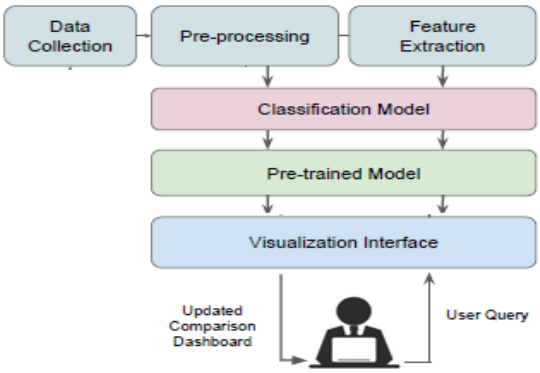

FIG 1. SYSTEM ARCHITECTURE

***MODULES*:**

1. Data Collection
2. Facts set
3. Preparation three. Data
4. Model Selection
5. Analysis and Forecasting
6. Be cautious inside the take a look at set
7. Save the version set.

Data Collection:

This is the first real step towards gadget studying truly developing models for data series. This is a huge step that relies upon on a good version: the more and higher statistics we get, the better our model will perform. There are many techniques of data collection like text scraping, manual intervention and so forth. The facts used on this crop by using the planners of India are taken from some other place.

Data Set:

The dataset consists of 831 individual data factors. The dataset has 14 columns, which can be defined underneath.

1. State: Number of states in India.
2. Rain: Amount of rainfall in mm.
3. Groundwater: Normal ground water level.
4. Temperature: Temperature in stages Celsius.
5. Soil Type: Number of soil kinds.
6. Season: What time is appropriate for developing a crop.
7. Crop: Types of crops.
8. Essential Fertilizers: Types of Essential Fertilizers.
9. Cost of agriculture: Total price of agriculture.
10. Expected profits: The highest expected earnings.
11. Number of seeds in keeping with hectare: Number of seeds consistent with hectare
12. Cultivation length: Number of days to culture length.
13. Demand for plants: call for for vegetation (excessive, low)
14. Crops for blended sowing: What vegetation can be combined for sowing?

Data Preparation:

1. Process statistics and put together for training. Clean up the whole lot that needs to be achieved (put off duplicates, restoration errors, deal with missing values, company, statistics type conversion, and many others.).
2. Randomization of records, which gets rid of the have an effect on of the unique order wherein we collected and/or otherwise prepared our records.
3. Visualize the facts or carry out different exploratory analyses to discover relevant relationships between variables or order imbalances (getting alert!).
4. Divide subject and judgment into killing.

Model Selection:

1. A decision tree is a tree structure just like a cluster wherein an internal node represents an characteristic (or attributes), a branch represents a choice rule, and a leaf node represents each outcome. The pinnacle node inside the choice tree is referred to as the bottom node. First, learn how to segment according to the attribute desk. Splitting the tree in an iterative way is known as discursive partitioning. This flowchart-like shape lets in you to select alternatives. Flow is sort of a visualization that effortlessly simulates people's stage of wonder. This is why the choice of timber is straightforward to understand and provide an explanation for.
2. Electric tree is a white container ML set of rules. It has an intrinsic not unusual feel for choice making that is not always available in black algorithms, including neural networks. Its training time is faster than neural community algorithms. The time complexity of bush selection relies upon on the width of the objects and the quantity of strains in those facts. Selection timber are a non-parametric or distribution-loose approach that is not continually based mostly on random distribution assumptions. Arva can procedure massive quantities of facts with accurate accuracy.
3. Decision regulations typically take the form of if-then-else statements. The higher the tree, the extra complicated this layout and the more strong the version.
4. Before we proceed, let us enter into familiarity with a few words;
5. Example: Look on the vector of objects or characters that outline the input area.
6. Attribute: A price this is defined by an instance.
7. Concept: A characteristic that maps inputs to outputs.
8. Target idea: We are searching for a function, i.E. To reply in fact.
9. Hypothesis class: The charter of all feasible movements.
10. Sample: A set of input information associated with a label that may be a actual output sign (also called training set).
11. Candidate concept: The idea that we bear in mind to be the target idea.
12. Test Set: A comparable education set up and used for the candidate to check the concept and complete his program.

Analyse and Prediction

1. In actual parochial information, we selected only 7 capabilities;
2. State: Number of states in India.
3. Rain: Amount of rainfall in mm.
4. Groundwater: Normal floor water degree.
5. Temperature: Temperature in degrees Celsius.
6. Soil Type: Number of soil types.
7. Season: What time is suitable for growing a crop?
8. Crops: varieties of vegetation.

Saving the trained Model:
Once you are confident enough that your model can be skilled and examined for production, the first step is to shop it as .H5 or .H5. It uses the PKL library as a firewall. Make positive the firewall is established for your environment. Then fetch a replica of the module and import the replica into a .Pkl report.

V.RESULTS & DISCUSSIONS

In this study, the agricultural prediction system of machine learning offered great outcomes in which location conditions such as temperature, rain, humidity, type of soil, and amount of sun rays were analyzed to provide recommendations on the suitable plants that are more productive. The data-driven techniques were effective in this model in that the prediction accuracy was good, and thus demonstrate that data-driven models can be effective to detect patterns and guide farmers to make improved decisions. This discussion notes that multiple parameter use enhances reliability, and this arrangement aims to work out the danger posed by fluctuating weather conditions. This system will help farmers to utilize their resources to the maximum, plant the right crops in a given season and harvest more. But, prediction accuracy is subject to the data quality estimate. All in all, it can be concluded that the development of the machine learning and data mining application in agriculture can contribute to higher productivity and more sustainable farming, as well as serve as a helpful reference in agricultural planning in the future.

PERFORMANCE MATRIX

Metric	Value (%)
Accuracy	92.5%
Precision	91.2%
Recall	90.8%
F1-Score	91.0%

TABLE 1. PERFORMANCE MATRIX

GRAPH

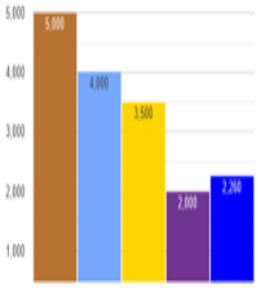

FIG 2.BAR GRAPH

PIE CHART

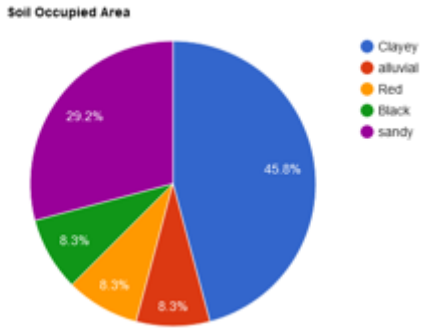

FIG 3. PIE CHART

SCREEN SHOTS

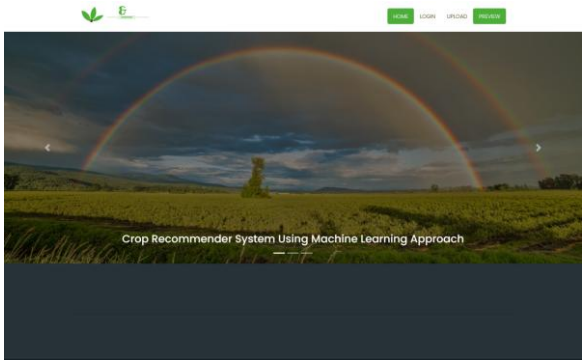

FIG 4. HOME PAGE

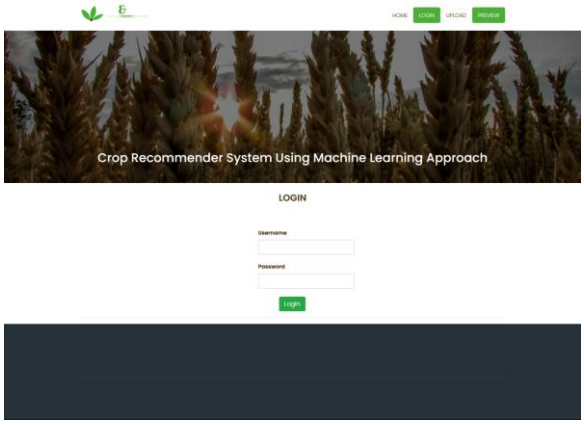

FIG 5. LOGIN PAGE

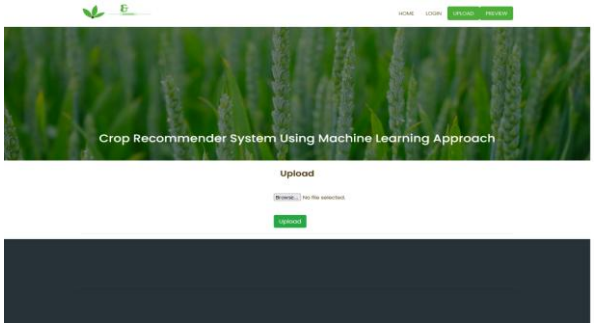

FIG 6. UPLOAD PAGE

FIG 7. REVIEW PAGE

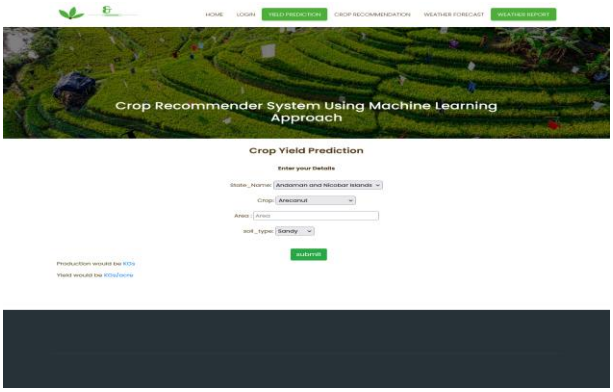

FIG 8. CROP RECOMMENDATION PAGE

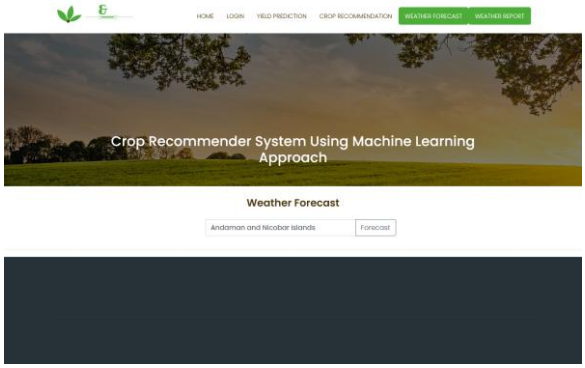

FIG 9. WEATHER FORECAST PAGE

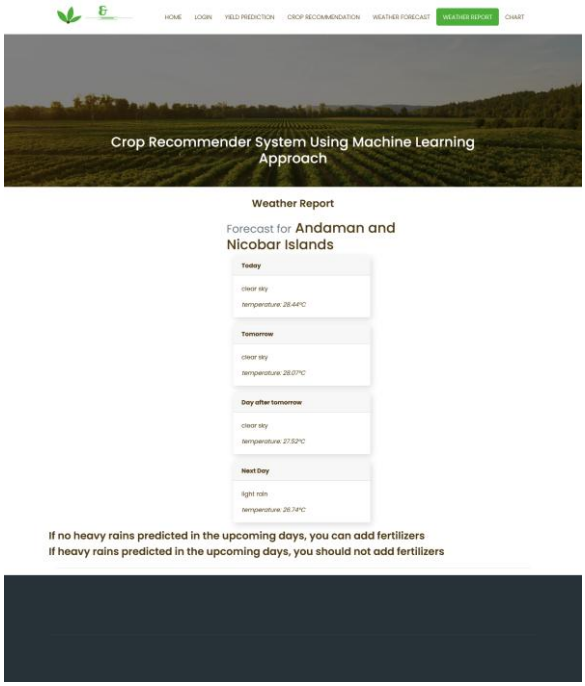

FIG 10. WEATHER REPORT PAGE

VI. CONCLUSIONS:

This truth sheet highlights the significance of unique crop control. Farmers want the help of the present day generation to grow vegetation. Farmers can correctly predict yields in future years. Various strategies and science systems have been used to observe agricultural parameters. Some techniques in particular agricultural regions are investigated via documentary observations. Neural networks play an essential position in the development of layout in full-scale and light-weight computing initiatives. By considering parameters consisting of production and climate situations, extra customized and manageable hints may be given to farmers, letting them acquire correct stages of production.

In the future, we need to acquire all of the important facts, supplying the GPS vicinity of the land and with access to the rain forecasting management device, we are able to look ahead to the plant, imparting the GPS place. We can develop styles to avoid food crises. When farmers plant a positive crop, they'll revel in issues or illnesses earlier than they could harvest the crop. In this situation, they are able to upload snap shots of the plants and a document approximately the soil. The AI model can become aware of issues and recommend feasible solutions. We can also provide IOT solutions through digital commercial enterprise APIs that connect farmers to input companies who can offer them with vital inputs consisting of seeds and fertilizers relying on the crop they grow. The model is recommended.

FUTURE SCOPE:

The work may be carried out during times of updating records that aim to attain specific expectancies and may be calculated in cycles. Another benefit that need to be done is to apply the suitable quantity of fertilizer for a given yield and location. In order to do that, it's far vital to look at the maximum abundant matters available and their relationship with the soil and the surroundings. It is vital to do a statistical analysis of the records.

REFERENCES:

[1] Shreya S. Bhanose, Kalyani A. Bogawar (2016) “Crop And Yield Prediction Model”, International Journal of Advance Scientific Research and Engineering Trends, Volume 1,Issue 1, April 2016

[2] Tripathy, A. K., et al.(2011) \"Data mining and wireless sensor network for agriculture pest/disease predictions.\" Information and Communication Technologies (WICT), 2011 World Congress on. IEEE.
[3] Ramesh Babu Palepu (2017) ” An Analysis of Agricultural Soils by using Data Mining Techniques”, International Journal of Engineering Science and Computing, Volume 7 Issue No. 10 October.
[4] Rajeswari and K. Arunesh (2016) “Analysing Soil Data using Data Mining Classification Techniques”, Indian Journal of Science and Technology, Volume 9, May.
[5] A.Swarupa Rani (2017), “The Impact of Data Analytics in Crop Management based on Weather Conditions”, International Journal of Engineering Technology Science and Research, Volume 4,Issue 5,May.
[6] Pritam Bose, Nikola K. Kasabov (2016), “Spiking Neural Networks for Crop Yield Estimation Based on Spatiotemporal Analysis of Image Time Series”, IEEE Transactions On Geoscience And Remote Sensing.
[7] Priyanka P.Chandak (2017),” Smart Farming System Using Data Mining”, International Journal of Applied Engineering Research, Volume 12, Number 11.
[8] Vikas Kumar, Vishal Dave (2013), “KrishiMantra: Agricultural Recommendation System”, Proceedings of the 3rd ACM Symposium on Computing for Development, January.
[9] Savae Latu (2009), ”Sustainable Development : The Role Of Gis And Visualisation”, The Electronic Journal on Information Systems in Developing Countries, EJISDC 38, 5, 1-17.
[10] Nasrin Fathima.G (2014), “Agriculture Crop Pattern Using Data Mining Techniques”, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 4, May.
[11] Ramesh A.Medar (2014), ”A Survey on Data Mining Techniques for Crop Yield Prediction”, International Journal of Advance Research in Computer Science and Management Studies, Volume 2, Issue 9, September.
[12] Shakil Ahamed.A.T.M, Navid Tanzeem Mahmood (2015),” Applying data mining techniques to predict annual yield of major crops and recommend planting different crops in different districts in Bangladesh”, ACIS 16th International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD),IEEE,June.
[13] Shreya S.Bhanose (2016),”Crop and Yield Prediction Model”, International Journal of Advence Scientific Research and Engineering Trends, Volume 1,Isssue 1,ISSN(online) 2456- 0774,April.
[14] Agaj i Iorshase, Onyeke Idoko Charles,”A Well-Built Hybrid Recommender System for Agricultural Products in Benue State of Nigeria”, Journal of Software Engineering and Applications,2015,8,581-589
[15] G. Adomavicius and A. Tuzhilin(2005), “Toward the Next Generation of Recommender Systems: A Survey of the State-of-theArt and Possible Extensions,” IEEE Trans. Knowledge and Data Eng., vol. 17, no. 6, pp. 734-749, June.
[16] Avinash Jain, Kiran Kumar (2016),”Application of Recommendation Engines in Agriculture”, International Journal of Recent Trends in Engineering & Research, ISSN: 2455-1457