IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

HARVEST FORECASTING USING MACHINE LEARNING

[1].S. SARANYA DEVI, Assistant Professor, CSE, Kuppam Engineering College, Kuppam, Andhra Pradesh.

[2].NALLAGGARI GANESH, Department of CSE, Kuppam Engineering College, Kuppam, Andhra Pradesh.

[3].PATIL CHANDRIKA, Department of CSE, Kuppam Engineering College, Kuppam, Andhra Pradesh.

[4].N. PURUSHOTHAM, Department of CSE, Kuppam Engineering College, Kuppam, Andhra Pradesh.

[5].M. BALAJI, Department of CSE, Kuppam Engineering College, Kuppam, Andhra Pradesh.

ABSTRACT

This paper proposes a machine learning-based harvest forecasting system to assist farmers in selecting the most valuable crops and predicting the yield of a chosen crop. The system utilizes GPS to identify the user's location and soil type as inputs. Five machine learning algorithms, including Support Vector Machine (SVM), Artificial Neural Network (ANN), Random Forest (RF), Multivariate Linear Regression (MLR), and k-Nearest Neighbors (KNN), are used to predict crop yields. The Random Forest algorithm achieved the highest accuracy of 95%. The system also suggests the optimal time to apply fertilizers to crops.

Keywords: Decision timber, random forests, crop choice, yield forecasting.

INTRODUCTION

Access to timely and valuable information can significantly enhance farmer's abilities and productivity. The proposed system gathers data from various sources, applies data mining and cleansing techniques, and subject the collected data to machine learning and dynamic evaluation for efficient crop optimization. The system uses various classifier algorithms to improve the model's accuracy and efficiency.

PROBLEM STATEMENT:

The existing system lacks an integrated approach for crop recommendation and yield prediction. Farmers often rely on their experience and knowledge, leading to inconsistent results. The proposed system aims to address these challenges by providing a data-driven, machine learning-based solution for crop recommendation and yield prediction.

OBJECTIVE

• Gathering data from numerous resources.

• Data mining and cleansing techniques are used to convert stay records into method records.

• Collected records is subjected to system learning and dynamic evaluation for efficient crop optimization of the gadget.

• Using classifier numbers makes the model greater correct and efficient.

• The given skill facilitates in making effective selection.

• Internet utility development for person registration and information series.

LITERATURE SURVEY

1) BIOT: Block chain-based Internet of Things for agriculture.

Author: Umakeshwari S., Sriram S., Krutika N., Prashant DJ.

A key promise barrier for the agriculture industry is that it removes the want for a third birthday celebration to create a accept as true with inside the consumer-supplier dating, or any source-destination courting for that depend. In a block chain era environment, transactions are made peer-to-peer without the need for intermediaries. In addition to imparting gear for peer-to-peer transactions, it could create a block chain of "clever contracts" that may enforce the details of any understanding. The circumstances are met. Each time esteem

changes hands, whether it's real item, efforts, or money, it is able to be documented, developing an everlasting history of the product or transaction from supply to vacation spot. The block might be a brilliant assist in this area. By placing all of the statistics about the agricultural sports inside the block, an obvious and reliable gadget can be created. Farmers can get actual-time facts about seed first-class, weather, answer, soil moisture, and call for and promote charge in a single platform. The reason of this plan is to replace the sensor records in the block. He directed the creation of a clever contract on the ethereal block chain to make the purchase and sale of land and crops easier.

2) Analysis of the boom and volatility of rice by using vicinity, creation, yield and cost in India. Author: Jane A.

Concern for agricultural improvement in India is a sustainable business. This paper analyses rice location, manufacturing and yield information for 41 years (1970-seventy one to 2011-12) to apprehend the issue of volatility in rice production in India. The evaluation shows that the compound annual boom fee of rice manufacturing and yield throughout India has been nice, but regularly declined over time. Recent a long time (2000-01 to 2011-12) have visible a plateau in the spot, creation and pay of rice across India. Potential reasons for extended instability are the small percentage of irrigation to the total cultivated area, using low-best seeds, fertilizers and other agricultural inputs. During the put up-reformation period (1990-91 to 2016-17), volatility in paddy fees increased throughout extraordinary states, while volatility in paddy yields reduced.

3) An example of predicting crop yields

Author: Manjula E., Jodildaswamy S.

Metal mining is a growing area of research in yield evaluation. Crop prediction is the maximum critical aspect in agriculture. Every farmer desires to realize what kind of crop he can expect. Previously, yield predictions were based at the enjoy of farmers around a particular location and crop. Predicting yield is an important assignment that ought to be solved from available statistics. Data mining strategies are the nice option for this purpose. Various information mining strategies are utilized and assessed in agribusiness to expect crop yields in the future 12 months. This have a look at affords a technique and device for predicting crop yields given the beyond. This is achieved by means of making use of the rules of association mining to agricultural records. The goal of this studies is to broaden a predictive version that can be used to are expecting future crop yields. This paper gives a short evaluation of crop yield forecasting using agency rule-primarily based mining strategies for a specific area, i.e., Tamil Nadu area in India. The experimental effects display that the proposed characteristic effectively reviews plants and end result.

4) Analysis of Agricultural Data in Estimation of Yield: A Basic Survey Author: Sagar P.M., Kaveri N.K.

Agriculture may be very crucial to human lifestyles as it offers the needs. It is common knowledge that a large a part of the population in India (≥fifty five %) is engaged in agriculture. There are barriers to increasing crop production in India due to differences in climatic situations. To acquire the favoured harvest yield, there was chaos. Factors along with climate, geographical situations, economic and political situations have an instantaneous effect at the manufacturing and efficiency of yields. The prediction of crop yield is one of the highest. essential factors in agricultural technology. To improve yields, farmers need information approximately crops before planting seeds of their fields. The utilization of innovation in farming has filled lately and records examination is one design that is yielding inside the agribusiness area for control and crop safety. Recent tendencies in agriculture have found out the significance of big facts. An important challenge in the utilization of tremendous information in horticulture is to choose the effect and effectiveness of large records evaluation. Efforts at the moment are being made to recognize how large statistics analytics may be used to improve productivity in agriculture. Agricultural related data analysis allows in crop yield forecasting, crop health monitoring and other such activities. There are many studies inside the literature on applications of facts analytics inside the agricultural zone. The present study presents perception into the diverse information mining techniques used to predict yield. This work also highlights massive shortcomings within the area of research objectives.

5) Big Data in Smart Agriculture – Overview. Agricultural structures:Authors: Wolfert S., Ge L., Verdo S., Bogardt M.J.

Brilliant farming is a product that underlines using statistics and conversation technologies in the cyber-bodily management of the farm cycle. New technologies inclusive of the Web of Things and distributed computing are supposed to accept advantage of this improvement as more prominent robots and engineered knowledge are brought into agribusiness. We are surrounded by using the phenomenon of

"big information" - massive quantities of different types of records that can be accrued, analyzed and used to make selections. The objective of this evaluation is to gain a public information of the art of big information programs for captive agriculture and to identify the related socio-monetary demanding situations. Based on the structural approach, a conceptual analysis framework has been advanced that also can be used for future research on this subject matter. The assessment shows that the scope of huge data in clever agriculture extends beyond number one manufacturing; All this affects the fee chain. Big information is used to expect agricultural operations, make actual-time operational decisions, and redecorate business approaches to exchange business fashions. Therefore, many authors advocate that massive information will cause most important changes within the roles and relationships between the extraordinary gamers inside the current meals deliver network. The stakeholder panorama indicates an thrilling sport between powerful tech groups, undertaking capitalists, and regularly smaller startups and new players. Additionally, there are numerous government companies that post open information which are challenge to person privateness ensures. The destiny of clever agriculture emerges as a continuum of two extreme situations: 1) closed, non-public structures wherein the farmer is a part of a more complete food supply chain or 2) open, cooperative systems wherein the farmer and the individual. Stakeholders manipulate commercial enterprise picks. I am bendy. Network companions and networks are bendy for technologies which include meals manufacturing. The further development of facts and alertness infrastructures (rosters and alerts) and their organizational implementation will play a key function in the fight among those missions. From a socio-financial attitude, the authors suggest prioritizing studies on organizational problems related to governance troubles and offer suitable enterprise fashions for facts sharing in diverse deliver chain conditions.

EXISTING SYSTEM

Broad work has been done and numerous ML calculations had been utilized in the rural quarter. The greatest undertaking for agribusiness is to development horticultural efficiency and proposition higher fees and fine to the final client. It has been observed that at least 50% of agricultural products are consumed and do no longer attain the final destination. The proposed model suggests methods to reduce losses of agricultural merchandise. St. One of the latest works offered with the aid of Bhavani et al is a crop yield prediction model using the KNN set of rules with the aid of developing grapes. Ibilum KNN is proved to be tons higher than SVM or ahead. Nishant and others. It predicts crop yield in a selected year the use of advanced regression strategies such as Net, Kernel Ridge and Lasso algorithms. Stacking worked on the exactness of relapse calculations.

Disadvantages:

A lack of information about weather change is a first-rate trouble facing the rural quarter. Each subculture has its own favourable climatic characteristics. This trouble can be solved by using certain techniques of agriculture. Subtlety farming now not handiest preserves crop yields, but additionally increases production yields. Existing crop yield advice systems are hardware-based totally, high-priced to keep, or difficult to get admission to. Although many solutions were proposed nowadays, there are still clear challenges in growing person-friendly product advice packages.

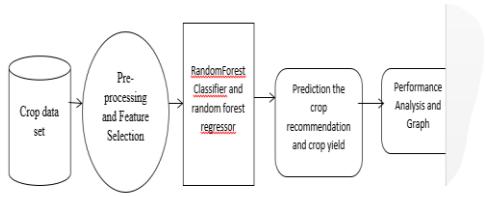
PROPOSED SYSTEM:

The proposed system is a PC-based solution that helps farmers increase efficiency and productivity by providing crop decision-making and yield prediction based on environmental conditions and economic factors. The system integrates agriculture and municipalities, contributing to the improvement of the agricultural sector through increased yield and resource development.

Advantages:

The proposed version predicts crop yield for a given nearby dataset. Integration of agriculture and municipalities will even make a contribution. Improvement in agriculture quarter through increase and yield. Development of applicable resources. Historical statistics is crucial in predicting occasions. The proposed system uses tips for appropriate timing of fertilizer software. Add methods to the proposed machine to increase yield. Real-time evaluation of yield, crop, choice of useful parameters, presenting earnings and increasing yield.

SYSTEM ARCHITECTURE:



SYSTEM REQUIREMENTS

Hardware Requirements:

System: Pentium i3 Processor.

Hard Disk: 500 GB.

Monitor : 15'' LED

Input Devices: Keyboard, Mouse

Ram: 4 GB

Software Requirements:

Operating system: Windows 10.

Coding Language: Python

Web Framework: Flask

MODULES

1. Information Assortment

2. Dataset

3. Preparation of the Data:

4. Model Choice

5. Dissect and Forecast

6. Accuracy on the test set

7. Saving the Prepared Model

MODULES DESCSRIPTION

1. Information Assortment:

Gathering information is the essential genuine move toward most certainly growing an AI form. This is fundamental: Our version will perform better the higher the version and the better the information we obtain. Information series can be created using a variety of methods, including guide intervention, text scraping, and others. We kept the records in a record, the report name is crop yield. Csv.

2. Dataset:

There are 94375 particular data of interest in the dataset. Each of the six columns in the dataset is described below. Name of State: For regulatory purposes, India is an association of States and Association Domains. It is involved 29 States. The season summer, or pre-storm season, from spring to May; * From June to September, the monsoon, also known as the rainy season or kharif crops; * Post-rainstorm, or harvest time season, from October to November. These seasons go before and follow winter, which runs from December to February.

The rabi crops are sown throughout the year, around the middle of November. Name of the yield: How big is the area? They assembled.

3. Data Preparation of the Data:

We will trade the measurements. Missing realities by utilizing taking out and erasing a few sections. Let's begin by compiling a list of the column names that we intend to save or store. Then we erase every one of the sections other than those we need to hold. At long last, we drop or eliminate lines with lacking qualities from the dataset.

4. Model Choice:

When constructing a system learning model, information sets are required: one to carry out and one to check. But now we best have one. Hence it can be divided into two parts in the ratio of eighty: 20. Let the writer also break up the facts into columns and label the columns.

5. Dissect and Forecast:

In the real facts set, we decided on only 4 capabilities.

6. Accuracy on the test set:

We achieved an exactness of zero.87% on the investigate set.

7. Saving the Prepared Model:

When you are adequately sure to take your planned and analyzed model into creation, stage one is to save it.

.H5 or. It makes use of the PKL library as a firewall.

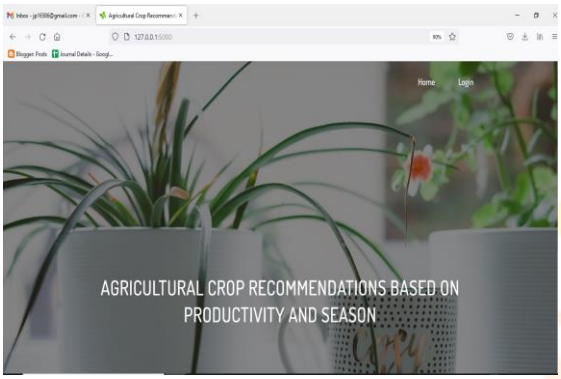
Make sure the firewall is installed to your surroundings.

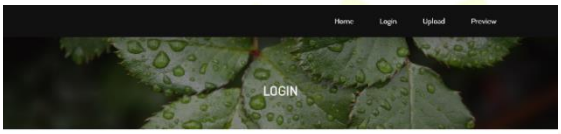
Then fetch a replica of the module and import the copy into a .Pkl document.

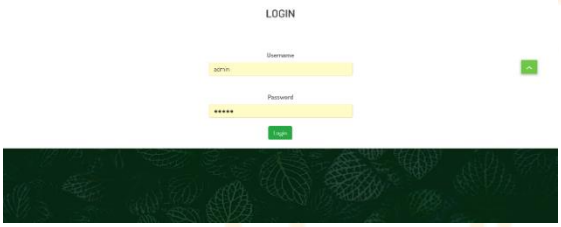
RESULT AND ANALYSIS

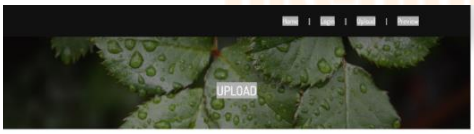
Between SVM and Decision Tree Classifier algorithms, SVM gave the very last accuracy of forty four.67%, whilst here it's miles 86.Ninety two. The SVM did not improve as the information set improved, but the version endured to carry out worse. Since there is lots of noise inside the information (i.E. The target lessons overlap) [1] there can be situations wherein 2 or extra inputs are similar, the SVM does now not work as anticipated. Random Forest Regressor predicts returns with ninety two.02% accuracy.

SCREENSHOTS









CONCLUSION

This study discusses the importance of data-driven decision-making in agriculture, providing farmers with valuable insights and recommendations to maximize productivity. By considering parameters such as production and climate, farmers can receive more personalized and relevant advice for increasing yields. The proposed system integrates machine learning techniques and environmental factors to offer crop recommendations and yield predictions, contributing to the improvement of the agricultural sector.

REFERENCES

[1] Umamaheswari S, Sreeram S, Kritika N, Prasanth DJ, "BIoT: Blockchain-based IoT for Agriculture", 11th International Conference on Advanced Computing (ICoAC), 2019 Dec 18 (pp. 324-327). IEEE.

[2] Jain A. "Analysis of growth and instability in the area, production, yield, and price of rice in India", Journal of Social Change and Development, 2018;2:46-66

[3] Manjula E, Djodiltachoumy S, "A model for prediction of crop yield" International Journal of Computational Intelligence and Informatics, 2017 Mar;6(4):2349-6363.

[4] Sagar BM, Cauvery NK., "Agriculture Data Analytics in Crop Yield Estimation: A Critical Review", Indonesian Journal of Electrical Engineering and Computer Science, 2018 Dec;12(3):1087-93.

[5] Wolfert S, Ge L, Verdouw C, Bogaardt MJ, "Big data in smart farming– a review. Agricultural Systems", 2017 May 1;153:69-80.

[6] Jones JW, Antle JM, Basso B, Boote KJ, Conant RT, Foster I, Godfray HC, Herrero M, Howitt RE, Janssen S, Keating BA, "Toward a new generation of agricultural system data, models, and knowledge products: State of agricultural systems science. Agricultural systems", 2017 Jul 1;155:269-88.

[7] Johnson LK, Bloom JD, Dunning RD, Gunter CC, Boyette MD, Creamer NG, "Farmer harvest decisions and vegetable loss in primary production. Agricultural Systems", 2019 Nov 1;176:102672.

[8] Kumar R, Singh MP, Kumar P, Singh JP, "Crop Selection Method to maximize crop yield rate using a machine learning technique", International conference on smart technologies and management for computing, communication, controls, energy, and materials (ICSTM), 2015 May 6 (pp. 138-145). IEEE.

[9] Sriram Rakshith.K, Dr.Deepak.G, Rajesh M, Sudharshan K S, Vasanth S, Harish Kumar N, "A Survey on Crop Prediction using Machine Learning Approach", In International Journal for Research in Applied Science & Engineering Technology (IJRASET), April 2019, pp(3231-3234)

[10] Veenadhari S, Misra B, Singh CD, "Machine learning approach for forecasting crop yield based on climatic parameters", In 2014 International Conference on Computer Communication and Informatics, 2014 Jan 3 (pp. 1-5). IEEE.

[11] Ghadge R, Kulkarni J, More P, Nene S, Priya RL, "Prediction of crop yield using machine learning", Int. Res. J. Eng. Technol. (IRJET), 2018 Feb;5.

[12] Priya P, Muthaiah U, Balamurugan M, "Predicting yield of the crop using machine learning algorithm", International Journal of Engineering Sciences & Research Technology, 2018 Apr;7(1):1-7.

[13] S. Pavani, Augusta Sophy Beulet P., "Heuristic Prediction of Crop Yield Using Machine Learning Technique", International Journal of Engineering and Advanced Technology (IJEAT), December 2019, pp (135-138)

[14] https://web.dev/progressive-web-apps/

[15] https://www.wikipedia.org/

[16] Plewis I, “Analyzing Indian farmer suicide rates”, Proceedings of the National Academy of Sciences, 2018 Jan 9;115(2): E117.

[17] Nishant, Potnuru Sai, Pinapa Sai Venkat, Bollu Lakshmi Avinash, and B. Jabber. "Crop Yield Prediction based on Indian Agriculture using Machine Learning." In 2020 International Conference for Emerging Technology (INCET), pp. 1-4. IEEE, 2020.

[18] Kale, Shivani S., and Preeti S. Patil. "A Machine Learning Approach to Predict Crop Yield and Success Rate." In 2019 IEEE Pune Section International Conference (PuneCon), pp. 1-5. IEEE, 2019.

[19] Kumar, Y. Jeevan Nagendra, V. Spandana, V. S. Vaishnavi, K. Neha, and V. G. R. R. Devi. "Supervised Machine learning Approach for Crop Yield Prediction in Agriculture Sector." In 2020 5th International Conference on Communication and Electronics Systems (ICCES), pp. 736-741. IEEE, 2020.

[20] Nigam, Aruvansh, Saksham Garg, Archit Agrawal, and Parul Agrawal. "Crop yield prediction using machine learning algorithms." In 2019 Fifth International Conference on Image Information Processing (ICIIP), pp. 125-130. IEEE, 2019.

[21] Bang, Shivam, Rajat Bishnoi, Ankit Singh Chauhan, Akshay Kumar Dixit, and Indu Chawla. "Fuzzy logic based crop yield prediction using temperature and rainfall parameters predicted through ARMA, SARIMA, and ARMAX models." In 2019 Twelfth International Conference on Contemporary Computing (IC3), pp. 1-6. IEEE, 2019.