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AGRICULTURAL CROP RECOMMENDATIONS BASED ON PRODUCTIVITY AND SEASON

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ABSTRACT:

Farming is the backbone of India's socioeconomic material resources. As a result of farmers' inability to accurately assess land suitability for crop production using conventional, non-scientific methods, a major problem has emerged in a country where almost 58% of the population works in agriculture. Despite careful consideration of soil type, planting time, and location, farmers did not always choose the best crops. A lot of farmers are committing suicide by giving up on farming and heading to cities in search of better economic opportunities. Our research has provided a method to help farmers choose plants by considering factors including planting time, soil, and location, which might alleviate this problem.

Keywords: Crop, Agriculture, farmer, wrong crop.

II INTRODUCTION

Nearly 58% of our nation's population relies on farming as a source of income [1]. The 2016–17 economic survey found that farmers in 17 states had an average monthly income of only Rs.1700/–, leading to farmer suicides and the conversion of farmland to non-farm uses. Furthermore, almost half of all farmers would prefer that their children and grandchildren live in urban areas rather than continue the family business. The reason being, farmers often choose the incorrect crop for their soil type, plant it in the wrong season, and make other similar mistakes when it comes to choosing plants [2]. The farmer may not have had much experience making this decision, since he or she may have inherited the property. Less yield is an inevitable consequence of choosing the wrong plant. After that, it becomes very difficult for the family to subsist if they rely only on these incomes. Prospective researchers are discouraged from collaborating on conducting national studies due to the lack of readily available and accurate information. We have the means to implement a system that will help us anticipate plant sustainability issues and provide solutions based on AI models that are well-informed on critical financial and environmental factors.The proposed method takes into account both the customer's location relative to the state and environmental factors like rainfall and temperature, as well as soil type, pH value, and vitamin and mineral concentration, in order to recommend the best crop. Furthermore, if the farmer chooses the correct crop, they will also get a return projection. The objective is to create a long-term model that accurately predicts how long plants will survive in a given environment, taking into account the specific soil type and weather conditions [4].

Second, to protect the farmer from financial ruin, suggest the finest local flora.

Third, using data from the previous year, provide a study of the income of several plants [5].

The suggested system is powered by AI, which is one of the many uses of AI. AI enables systems to learn and adapt instantly, even when not explicitly specified by a developer. After then, the program's accuracy will be improved without any human intervention [6]. Many researchers are devoting their time and energy to this area in the hopes of providing farmers with the information they need to choose the best plant for their needs by taking into account a variety of aspects, including physical, ecological, and economical ones. It is believed that a Synthetic Neural Network can choose the plant with the highest production rate [1]. Prior to culture, the plants were evaluated using algorithms such as K Nearest Neighbours Regression and Choice Tree Learning-ID3 (Iterative Dichotomiser 3). [9] The arbitrary woodland formula and BigML were used for the analysis of crop characteristics. [10] In order to protect plants from the effects of water stress, AI algorithms were used, which led to the development of a set of decision criteria used for plant state prediction. Predicting plant costs using machine learning approaches and providing real-time suggestions via smart systems were also used. This position has included researching various AI algorithms applications in agricultural production systems. Suggestions on plant management were provided by further AI-enabled technologies. Improved agricultural yields are possible with the use of deep-understanding approaches. A dependable return projection technique is explored in this research using real-time monthly weather. In order to implement the aforementioned method of projection, a non-parametric analytical design and non-parametric regression methods were used.

II LITERATURE SURVEY

1) Choosing the Right Plants A technique that makes the most of the crop return price by using an AI approach The economic development and food security of agro-based nations are greatly impacted by agricultural planning. A major consideration in agricultural planning is the selection of plants. Factors like manufacturing cost, market value,

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and official policies all have a role. In order to get the agricultural sector ready, several researchers have looked at data approaches and artificial intelligence techniques for predicting crop output prices, weather conditions, soil types, and plant classifications. If limited land resources allow for more than one plant to be planted simultaneously, then the choice of crop becomes more complex. In order to solve the problem of plant selection, maximise the use of the internet yield price of crops throughout the year, and achieve optimum national economic growth, this study proposed a method called the Plant Option Approach (CSM). Crops' web yield rates may be increased by the suggested method.

2) Chemical Prediction and Efficient Plant Return for Agricultural Economic Climate Improvement with the Use of Exploring Data There is risk in the agricultural sector. Climate, geography, biology, politics, and finances are all factors that affect crop yields. It is possible to quantify the risks posed by these factors by using appropriate mathematical or statistical methods. In reality, precise information on the characteristics of crop yield history is crucial modelling input that aids farmers and government organisations in making decisions regarding the establishment of suitable policies. Technological developments in computing and data storage have really made available enormous amounts of data. The challenge has been in de-expertizing this raw data, which has prompted the development of new techniques like data mining that can connect the dots between data comprehension and the plant return estimate. In order to determine whether meaningful connections may be found, this study set out to assess these novel information mining techniques by applying them to the many variables that make up the data source.

Dirt Characteristic Forecasting and Category Methods for Analysing Dirt

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Data Technological developments like information mining and automation have benefited agricultural research. There is a plethora of domain-specific information mining software and off-the-shelf data mining systems available today, and data mining is in widespread usage; yet, the application of data mining to agricultural soil datasets is still underdeveloped. The massive amounts of data that are now often gathered alongside crops need to be assessed and used to their maximum potential. The goal of this study is to apply data mining techniques to assess a soil dataset. Soil categorization using multiple publicly accessible methods is its main focus. Another important goal is to use the regression approach and the use of the automated soil sample categorization to predict untested qualities.

Fourthly, Intelligent Farming using Machine Learning In India's economic landscape, farming is a key player. However, a structural shift is causing a crisis in India's agricultural industry right now. The only way out of this jam is to bring in more farmers and make farming a lucrative business so they can keep making crops. This term paper is an effort in that direction; it will use AI to assist farmers make better decisions about their farms. utilising supervised maker figuring out formulae, this research focuses on crop prediction utilising weather scenarios and plant yield from historical data. Along with that, an online app has been developed.

III Existing system

Approximately 58% of our nation's population relies on agriculture as a primary source of income. The average monthly income of a farmer in 17 states is Rs.1700/-, according to the 2016-17 economic survey. This leads to farmer suicides and the conversion of agricultural land for non-agricultural use. Furthermore, almost half of all farmers (48%) want to leave farming to their children and grandchildren and instead live in urban areas. Why is this? Well, it's because farmers often choose the incorrect plants for the soil, don't water them enough, let them grow for too long, etc. The farmer may not have had much experience making the decision since the land might have been purchased from someone else. Choosing the wrong crop will always result in lower yields. It will be very difficult to get by if everyone in the family relies on this income. A forest-based random formula was stored in the previous system. yet the exact recommended harvest is impossible to predict.

IV PROPOSED SYSTEM

With the use of machine learning, the proposed system aims to improve the accuracy of yield price by advising farmers on the best crops to plant depending on factors such as soil type, sowing season, climate, physical, ecological, and economic factors, and perennially popular plants. This new development allows the systems to learn and adapt on the fly, even when the programmer hasn't explicitly set them up. Eliminating human intervention will improve the program's accuracy. In order to help farmers pick the best crops by taking into account all of the relevant aspects, including physical, environmental, and economical ones, several scientists are doing research into plant selection guidelines. system. The aforementioned projection tool was being used using a non-parametric analytical version in conjunction with nonparametric regression methodologies. This task involves directly feeding the system a plethora of datasets obtained from official government websites and Kaggle. Various versions of the equipment are trained using the dataset that was retained after the pre-processing stage to get the highest potential accuracy.

V MODULES DESCRIPTION:

Person: A person may register their initials. For future communications, he needed a valid user email and cellphone

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upon registration. The administrator may activate the user the moment a client registers. The client will be able to access our system after the administrator has triggered the person. Our dataset columns may be used as a basis for customers to provide their datasets. Data must be expressed as integers or floats in order for algorithms to run. We have a ph here. For the purpose of screening, there is a repository dataset of weather issues. Using our Django application, users may also contribute new data to an existing dataset. Users may initiate the data cleansing process by clicking the "Data Preparations" button on the websites. It is guaranteed that the cleaned-up data and its necessary graphics will be shown.

If the administrator wants to log on, he may use his credentials. Customers who have signed up may be enabled by the admin. Once he activates, our system will only allow the user to log in. In the browser, the administrator may see the aggregate statistics. The ROC contour, confusion matrix, and accuracy of the algorithms are all under his purview as well. The following is also a bar graph showing the comparative accuracy. The administrator will be able to see the websites' overall accuracy after all algorithm execution is complete.

Preprocessing of Data: Information objects (also referred to as records, factors, vectors, patterns, occurrences, instances, samples, monitoring, or entities) make up what is known as a dataset. Data objects are described by a number of characteristics that record the commonalities between things, such the mass of a physical item or the time when an event occurred, among others. Variables, attributes, regions, features, and measures are common names for functions. This forecast's data pre treatment takes use of methods including collecting characteristics for prediction at several levels, removing missing details, adjusting default values as needed, and eliminating sound from the data.

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The dataset is subjected to five artificial intelligence classifiers, including Logistic Regression (LR) with pipe, Assistance Vector Maker (SVM), Decision Tree (DT), and Random Woodland (RF), after which the cleaned information is divided into 60% training and 40% test, according to the split requirement. In order to find out how accurate the classifiers were, the complexity matrix was used. The best classifier might be the one that achieves the most precision.

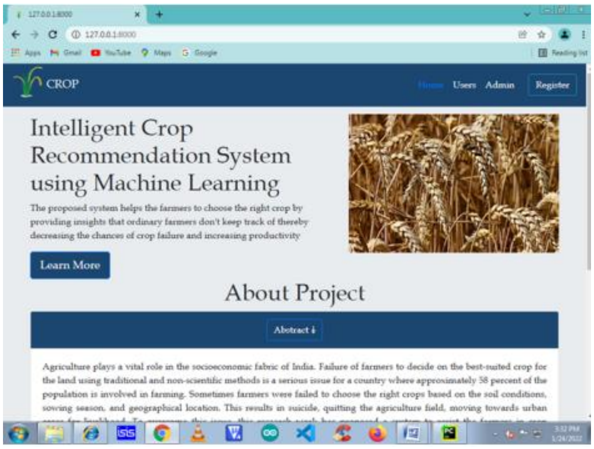

Fig.1. Home page.

Fig.2. Crop grow materials.

Fig.3. Dataset.

	N	P	K	temperature	humidity	ph	rainfall	CEC	label
0	90	42	43	20.879744	82.002744	6.502985	202.935536	44	rice
1	85	58	41	21.770462	80.319644	7.038096	226.655537	42	rice
2	60	55	44	23.004459	82.320763	7.840207	263.964248	33	rice
3	74	35	40	26.491096	80.158363	6.980401	242.864034	32	rice
4	78	42	42	20.130175	81.604873	7.628473	262.717340	35	rice
5	69	37	42	23.058049	83.370118	7.073454	251.055000	31	rice
6	69	55	38	22.708838	82.639414	5.700806	271.324860	30	rice
7	94	53	40	20.277744	82.894086	5.718627	241.974195	25	rice

Fig.4. Crop recommendation.

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Intelligent Crop Recommendation System using Machine Learning System

Crop_sustainability.csv

	N	Phosphorous	Potassium	Ph	Soil_Moisture	CEC	SEASON	Suitable_Label
0	90	42	43	6.502985	5.5	44	Kharif	rice,muskmelon,mango
1	85	58	41	7.038096	5.5	42	Kharif	maize,grapes,blackgram
2	60	55	44	7.840207	5.5	33	Kharif	chickpea,kidneybeans
3	74	35	40	6.980401	5.5	32	Whole Year	pigeonpeas,apple,coffee
4	78	42	42	7.628473	5.5	35	Whole Year	banana,mothbeans,mungbean
5	69	37	42	7.073454	5.5	31	Whole Year	lentil,pomegranate,watermelon

Fig.5. Crop sustainability.

Intelligent Crop Recommendation System using Machine Learning System

Machine learning Regression algorithm Results

S.NO	Algorithm	accuracy	precission	f1_score	recall
1	Decision Tree	0.9045454545454545	0.937277063620877	0.8751313911311567	0.9045454545454545
2	Naive Bayes	0.990909090909091	0.9920454545454546	0.9905627705627705	0.990909090909091
3	SVM	0.9772727272727273	0.979335833126204	0.9775966215937418	0.9772727272727273
4	Logistic Regression	0.9568181818181818	0.9575712165514796	0.9574690596647709	0.9568181818181818
5	Random Forest	0.9886363636363636	0.9899064171122994	0.9889789612516886	0.9886363636363636

Fig.6. ML based algorithm results.

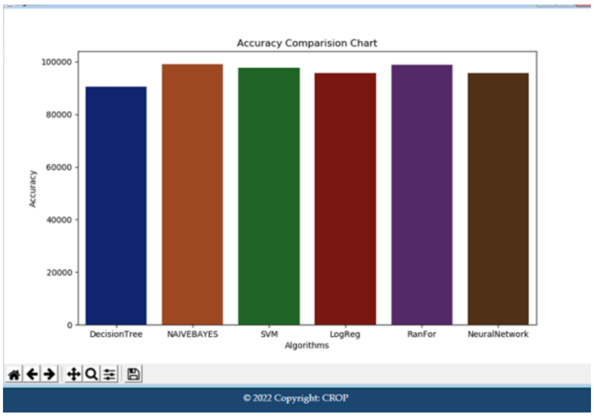

Fig.7. Output results.

V CONCLUSION

In order to reduce the likelihood of plant failure and increase efficiency, the proposed method aids farmers in selecting the optimum plant by providing insights that typical farmers overlook. Furthermore, it prevents them from incurring losses. It is the intention of the developers to eventually integrate a web interface with a mobile app so that millions of farmers throughout the country may get plant growing recommendations.

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