

FARMING MADE EASY USING MACHINE LEARNING

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ABSTRACT:

Agriculture is the primary mainstay of the economy in our country. In recent years because of uncertain trends in climate and other fluctuations in the price trends, the price of the crop has varied to a larger level. Farmers remain oblivious of these uncertainties, which spoils the crops and causes massive loss. They are unaware of the crop type which would benefit them most. Due to their limited knowledge of different crop diseases and their specific remedies, crops get damaged. This system is handy, easy-to-use. It provides accurate results in predicting the price of the crop. This framework utilizes Machine Learning's Decision Tree Regression Algorithm to predict crop price. The attributes considered for prediction are rainfall, wholesale price index, month, and year. Consequently, the system gives an advance forecast to the farmers' which grows the speed of profit to them and consequently the country's economy. This system also incorporates other modules like weather forecast, crop recommendation, fertilizer recommendation, and shop, chat portal, and guide are also implemented.

Keywords: *crop, forecast, ML.*

1. INTRODUCTION:

India being a rural nation, its economy transcendentally relies upon agricultural yield development and unified agroindustry items. It is currently quickly advancing towards a specialized turn of events. India now is rapidly progressing towards technical development. Smart farming is changing the face of agriculture in India. Technology can provide a solution to most challenges farmers face. It can help them predict weather more accurately, decrease waste, boost output and increase their profit margins. In the status quo, the farmers and the consumers find it difficult in the real world to determine the accurate prices of crops without having prior knowledge of the fluctuating trend prices or weather conditions. Accordingly, innovation will end up being helpful to agriculture. The paper aims to predict crop prices in advance. This work is based on finding proper regional datasets that help us in achieving high accuracy and better performance. Our system, Agro-Genius, is using Machine Learning to build the Price Predicting Model.

In the past few years, a lot of fluctuation in the prices of the crop has been seen. This has increased the rate of crop damage produced each year. The main aim of this prediction system is to ensure that the farmers get a better idea about their yield and deal with the value risk.

Weather is also highly unpredictable these days. It also affects the crop production. The proposed system will also forecast the weather helping the farmer make correct decisions regarding field ploughing, field harvesting etc. Similarly, fertilizers play an important role. Fertilizers load the soil with the required nutrients that the crops eliminate from the soil. Crop yields and production will be fundamentally decreased if fertilizers are not used. That is the reason fertilizers are utilized to enhance the soil's supplement stocks with minerals that can be immediately assimilated and utilized by crops. Our system will provide fertilizer consumption based on different crops and provide a portal to buy the fertilizers and seeds from the user's location. They can even get the exact location along with the address of the fertilizer and seed shop. The provided fertilizers will get more profit to the farmers on the growing system suggested crop. It will also show the best suited crop based on cultivation date and month and location details, thereby maximizing the yield.

It will provide multilingual and region specific guide books for the farmers. Any farmer who is new to this field and who wishes to gain information from his ancestors but having the same methods documented will be highly beneficial. We have also provided maps for the farmers to gain knowledge. Our system will provide two different types of maps for the farmer to gain the knowledge about how the land and where they should start their farming. Irrigation maps show the irrigated-non irrigated area over the country. Agriculture land view map will provide an overview of agricultural land present in various states of India and help farmers to analyze the non Agricultural land which can further be improved. Maps make the farmers easy to understand they have to just hover on the state they are thinking of starting their farming and they will get the information about that state and they can decide whether they should change the place or should start farming. If the farmers are new in this field it is the best thing for them as the most important thing in farming is to firstly choose the land and place of farming.

Moving in the same direction, our system will incorporate a chat application which helps in information sharing. Often farmers have certain queries which cannot be solved due to their limited knowledge, hence we are building a platform where information can be exchanged. Language can pose as a barrier to the users. Since the majority of non- English speaking farm workers in India are native Hindispeakers, we anticipate that once these resources are developed they might be translated to other languages as well. Hence, to make the website user friendly, we have provided language translation.

Farmers should know about their location, date of cultivation of their crop. Our system is a web application, which is developed based on machine learning concepts. The proposed system applies machine learning and prediction algorithms like Naive Bayes, Decision Trees and K-Nearest Neighbour to identify the most accurate model and then process it. This in turn will help predict the price of the crop.

2. LITERATURE SURVEY

The following papers focused on predicting crop price using Machine Learning and providing results. In April 2019, the exploration targets foreseeing both the cost and benefit of the given harvest before planting. The preparing datasets so acquired give enough bits of knowledge to foresee the suitable cost and request in the business sectors[1]. The authors have predicted the most profitable crops and its expected price during harvesting time according to the location, by predicting different historical raw datasets using different machine learning algorithms. The work shown by Nishiba [2] is the expected utilization of data mining procedures in foreseeing the harvest yield dependent on the input parameters average rainfall and area of the field. The easy-to-use website page created for anticipating crop yield can be utilized by any client by giving the normal precipitation and region of that place. Different Data Mining techniques are applied to different datasets. This paper can also include certain modules [11] which can help farmers to make certain decisions based on the harvested area or current trends in the market. The system can be extended by visualizing the crop details in a map with details, which will help farmers to view the nearby district cultivation details. Proposed system can be enhanced by providing a graphical visualization of predicted prices for better understanding.

This system is proposed to provide help to the farmers for expecting the best amount for their crops and for predicting the best price for the crops. This also helps the farmers to check previous prices of different commodities. The system can predict crops using [9] Random forest, Polynomial Regression and Decision Tree algorithms. The best crop and its required fertilizers make the farmer more confident about the crop and its yield and also our system will do marketing work [4] by estimating total value of the crop based on current market price. The idea of the system can be extended by adding some extra features to the system like providing a nearby shop location portal for purchasing seeds and fertilizers.

These papers aim at predicting the price and forecast through web application and it runs on efficient machine learning algorithms like using an Autoregressive Integrated Moving Average (ARIMA) model, Traditional ARIMA [6], Support Vector Regression Algorithm[8], and technologies having a general easy to use interface to the clients. The training datasets [7] acquired give sufficient bits of knowledge to foreseeing the appropriate price [10] and request in the markets. The results are displayed as web applications in order that poor farmers can access easily. Models can be improved by integrating this with other departments like horticulture, sericulture, and others towards the agricultural development of our country. Different agriculture departments have various problems in the current time. Incorporating them will not only increase the scope but also help the farmers new to this part of the spectrum.

Their work may be expanded by building a framework for suggesting agriculture produce and dispersion for farmers. Utilizing this framework, We ought to get the same accuracy indeed when an information autonomous framework is utilized. Further, can be enhanced by making an android application for the same.

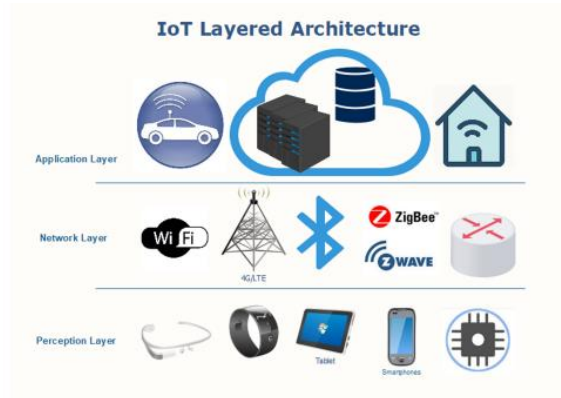
EXICITING SYSTEM:

We have used Python for basic programming in all modules. Flask is used for hosting. Socket Programming is used for a chat application. Chart.js is used for visualizing the maps. JavaScript is used for validation purposes.

For Weather Forecast [12] and fertilizer shop location, we have used APIs. Using the self-made dataset and concept of linear regression in machine learning we have implemented a Crop recommendation model so that a farmer can learn about the best suited crop for a particular region. In Fertilizer Recommendation we have used a dataset for predicting which fertilizer should be used for the disease present on crops. Socket programming is used for farmers interaction using provided chat application [3]. Google API is used for providing a multilingual website for ease to read.

PROPOSED SYSTEM:

Agriculture is the primary mainstay of the economy in our country. In recent years because of uncertain trends in climate and other fluctuations in the price trends, the price of the crop has varied to a larger level. Farmers remain oblivious of these uncertainties, which spoils the crops and causes massive loss. They are unaware of the crop type which would benefit them most. Due to their limited knowledge of different crop diseases and their specific remedies, crops get damaged. This system is handy, easy-to-use. It provides accurate results in predicting the price of the crop. This framework utilizes Machine Learning's Decision Tree Regression Algorithm to predict crop price. The attributes considered for prediction are rainfall, wholesale price index, month, and year. Consequently, the system gives an advance forecast to the farmers' which grows the speed of profit to them and consequently the country's economy. This system also incorporates other modules like weather forecast, crop recommendation, fertilizer recommendation, and shop, chat portal, and guide are also implemented.



3. METHODOLOGY

MODULES:

- 1) New Farmer Signup:

Using this module farmers can signup with application

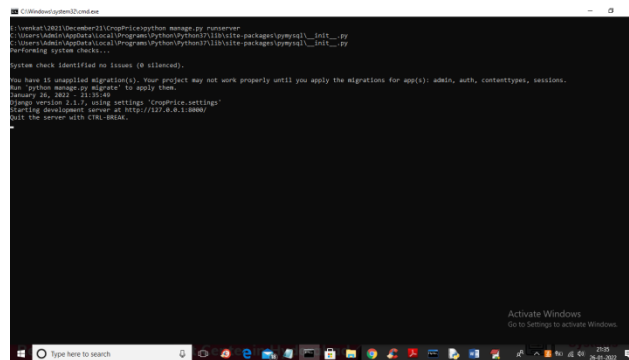
- 2) Farmer Login:

Farmer can login to application by using username and password given at signup time and then farmer can select crop name to get its predicted prices in different market. Farmer can view all schemes details launched from the government

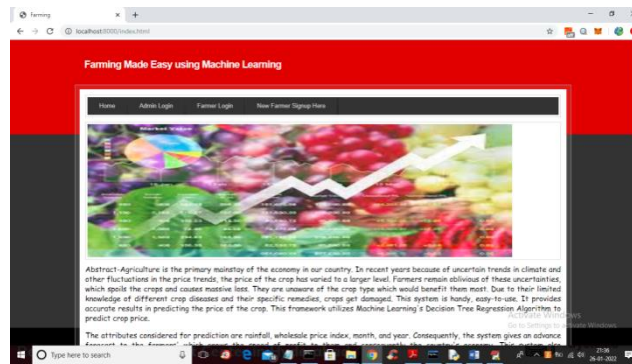
- 3) Admin Login:

Admin can login to application by using ‘admin’ as username and password and then can add new schemes details

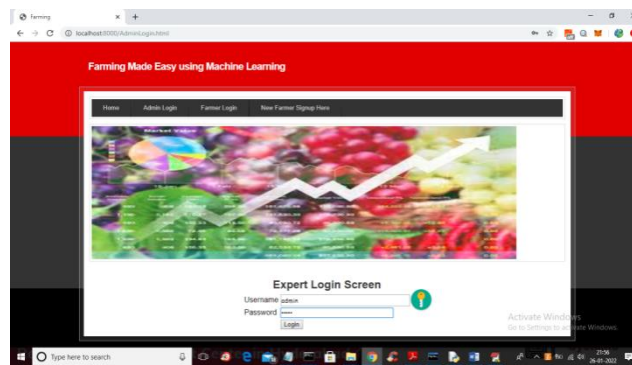
OPERATION:



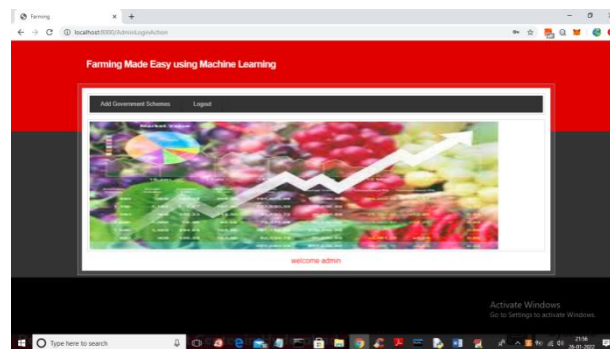
In above screen server started and now open browser and enter URL



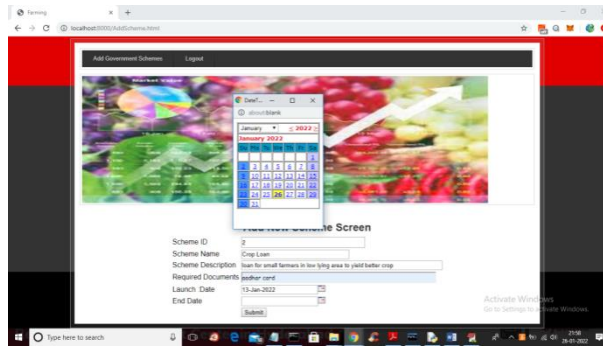
In above screen click on ‘Admin Login’ link to get below login screen



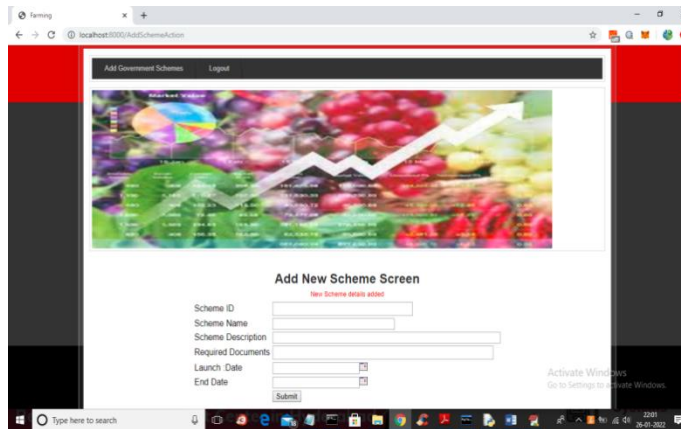
In above screen admin is login and after login will get below screen



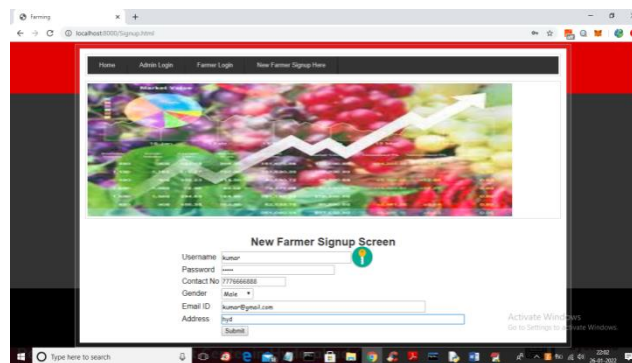
In above screen click on ‘Add Government Schemes’ link to add new schemes



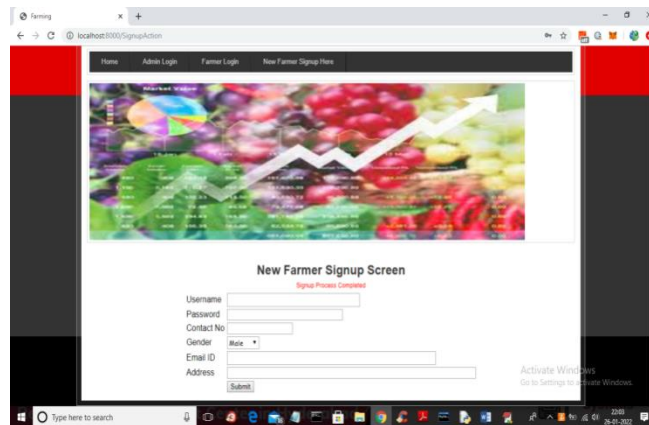
In above screen admin will add schemes details with start and end date and then click on ‘Submit’ button to save schemes details



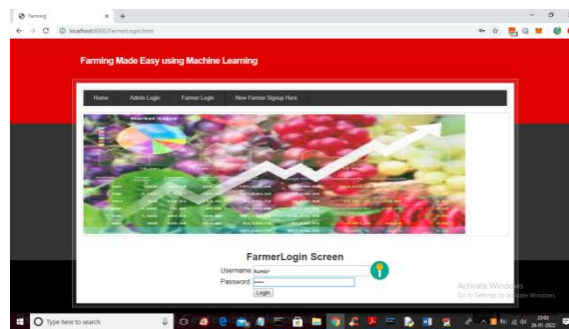
In above screen in red colour text we can see scheme details added and now logout and signup new farmer



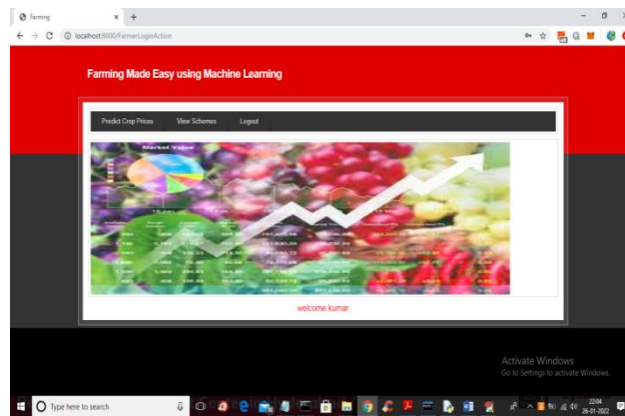
In above screen farmer is signup and click on ‘Submit’ button to complete signup process



In above screen signup is completed and now click on 'Farmer Login' link to get below screen



In above screen farmer is login and click on 'Login' button to get below screen



In above screen farmer can click on 'View Schemes' link to get all schemes details

District Market	Crop Name	Original Price	Predicted Price
Rajnigumam	Bhndi	1000 0	1128 5633333333338
Arbani	Bhndi	5700 0	3501 0000000000007
Ambala	Bhndi	4000 0	4022 0000000000008
Kurukshetra	Bhndi	4000 0	3810 7690476160496
Mahendraganj-Naraul	Bhndi	2000 0	2021 4687770562788
Chota	Bhndi	4000 0	4022 0000000000008
Bangalore	Bhndi	2300 0	2256 0720634620635
Bangalore	Bhndi	5200 0000000000005	5143 7819180476211
Dewangan	Bhndi	800 0000000000001	800 83333333333342
Emekulam	Bhndi	4000 0	3810 7690476160496
Emekulam	Bhndi	2400 0	2256 0720634620635
Emekulam	Bhndi	2800 0	2562 619647616047
Emekulam	Bhndi	4800 0	4576 4500000000011
Kasargod	Bhndi	5000 0	5057 0000000000006
Kollam	Bhndi	2800 0	2563 6000000000003
Kottayam	Bhndi	2900 0	2903 3000000000005
Kottayam	Bhndi	3600 0	3522 6
Kottayam	Bhndi	3600 0	3501 5699999999995
Kottayam	Bhndi	4200 0	4116 0000000000007
Kozhikode/Calicut	Bhndi	2600 0	2593 6000000000003
Panaji	Bhndi	4000 0	4028 0000000000008

In above screen first column represents ‘district market name’ and second column represents ‘Crop Name’ and third column represents ‘Original Crop Price’ and fourth column represents “predicted prices’ using Machine learning algorithms and now scroll down above screen to view machine learning algorithms predicted accuracy

Bilaspur	Bhndi	14200 0	13910 1319999999999
Bijnor	Bhndi	12000 0	12225 9999999999993
Bulandshahar	Bhndi	25000 0	2434 6190476160463
Bulandshahar	Bhndi	5000 0	5083 0000000000006
Deoria	Bhndi	2025 0	2021 4687770562788
Dibruah	Bhndi	1300 0	1280 9999999999997
Fatehabad	Bhndi	2200 0	2256 0720634620635
Fatehpur	Bhndi	2300 0	2385 6190476160473
Firozabad	Bhndi	1400 0	1349 9999999999999
Firozabad	Bhndi	2970 0000000000005	3372 6666666666667
Manpur	Bhndi	2050 0	2021 4687770562788
Manasa	Bhndi	2140 0	2086 606533098241
Meerut	Bhndi	2150 0	2115 5049999999997
Mirzapur	Bhndi	2000 0	1989 1319666666666
Muzaffarnagar	Bhndi	1200 0	1243 9999999999977
Muzaffarnagar	Bhndi	1000 0	1057 5000000000010
Sant Kabir Nagar	Bhndi	2000 0	2037 0000000000018
Sudharth Nagar	Bhndi	2050 0	2040 7098464646502
Sultanpur	Bhndi	2350 0	2404 0000000000002
Varanasi	Bhndi	2140 0	2256 0720634620635
Maida	Bhndi	3400 0	3501 5699999999995
Random Forest Accuracy			0.98830853567634
Decision Tree Accuracy			0.9897962833406897
KNN Accuracy			0.988281918756577

In above screen in last 3 lines we can see Random forest, KNN and decision tree prediction accuracy.

Similarly you can select any crop and get prediction prices

Note: some crop contains only 3 or 4 records so prediction may not be correct as to train we need minimum 50 to 100 records. Here bhndi and coriander crop contains more records

CONCLUSION

This project is undertaken using machine learning and evaluates the performance by using KNN, Naive Bayes, and Decision Tree algorithms. In our proposed model among all the three algorithm Decision Tree gives the better yield prediction as compared to other algorithms

As most extreme sorts of harvests will be secured under this system, farmers may become more acquainted with the yield which may never have been developed. The work exhibited the expected utilization of machine learning methods in foreseeing the harvest cost dependent on the given attributes. The created web application is easy to understand and the testing accuracy is over 90%.

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