To Develop an Application for Farmer's of Systematic Farming by Using Machine Learning

Prof. Abhale B. A.[1], Malik Pankaj[2], Malik Rahul[3], Rothe Rahul[4], Gaikwad Sanjay[5], Bagul Gautam[6]

[1]Professor, Information Technology Department, SND College of Engineering and Research Center, Babhulgaon

[2,3,4,5]Student, Information Technology Department, SND College of Engineering and Research Center, Babhulgaon

Abstract

The foundation of the social and economic development of our nation is agriculture. However, the bulk of farmers continue to struggle for access to better agricultural facilities. With the support of various government policies, the government also assists farmers with their benefits. The use of the internet and smartphones for smart farming is well known among today's farmers. Growing numbers of educated people are working in agriculture, and they have started using cell phones in rural areas. This Crop Guidance and Farmer's Friend application's primary goal is to help farmers increase their production while also keeping them informed about the most recent agricultural-based data utilised for smart farming. The suggested system is intended to monitor local weather factors like temperature, humidity, and environmental changes. Farmers' time and effort are reduced by this application, which also helps them obtain the current market price for various harvests, fertilisers, and vegetables without having to go to the market. Through this application, the data (value, climate, and most recent rural technology) will be sent to the farmers. This app offers farmers a lot of assistance and keeps them informed. It provides a means of support for practically the whole population, boosting national GDP and creating jobs

Keywords: Weather detection, Government Scheme, Crop Prediction, Market Price.

Introduction

Agriculture is India's primary industry, and those who work in it typically come from lower socioeconomic classes. The farming community is unaware of the new methods and personnel who have joined the agriculture departments, which would help the world advance in the agricultural industry. Despite their efforts, farmers nowadays being taken advantage of by agents. Here, we've created a brand-new idea for knowledgeable, enthusiastic farmers who are utilising the most recent agricultural technology. The services we offer include building websites. The website will assist farmers in accessing innovative farming methods and comparing the competitive landscape for various goods.

In that there are four main sections such as Weather detection, Government Scheme, crop Prediction, Market Price.

In that there two panels one is admin panel and another is user panel admin panel work is update market price update newly goverments schemes update new diseases on crop on daily basis and user can see market price, weather, Government Scheme, crop prediction.

Literature Survey –

[1] 1–7 (2020) 4. P. M. R.Vidhya, Predicting yield of crop using ml algorithm, IEEE, 9, pp. 1–13 (2020).

[2] M. Dr Anitha Govindraj, Crop price prediction using machine learning, IEEE, 6, pp. 14–20 (2020).

[3] C. B. W. W. S. Ghionea, Algorithms to predict the moisture content of the grain, IEEE, 1, pp. 1–7 (2020).

[4] V. R. V. S. S. T. Sooraj Krishna, Sreevijay, Farmer friend, IEEE, 10, pp. 9–19 (2021).

[5] S. K. M. G. S. Prince Samuel S., K. Malarvizhi, Machine learning and internet of things based agriculture, IEEE, 2, pp. 3–11 (2020).
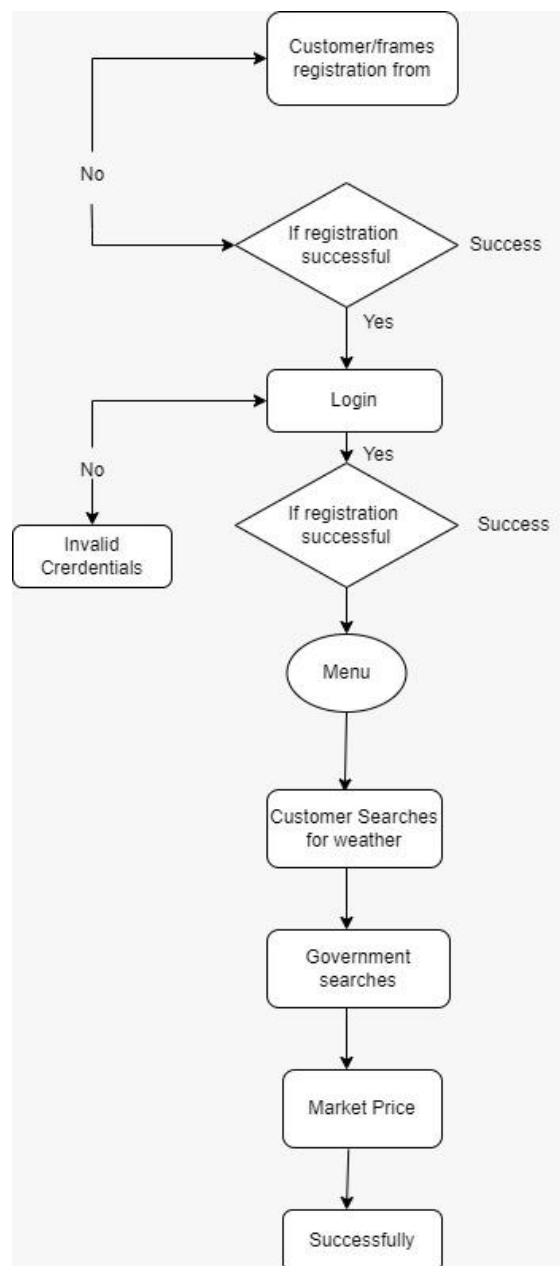
Algorithm / Methodology / Proposed System

Fig 1.1 Proposed System

Working:

Farmers have their own account with Register and Login option. Using the farmers open their own account Farmers login their account Add city which user want to check the weather User can see the information about the government schemes User have to add the district, crop name to add the pest name

User have to select the district and crop name to check the information about the pesticides. User have to select the district name then user will able to get info about which crop is useful in which seasons User can get the information about the pesticides.

User will able to see the market price in last 15 - 30 days We follow the divide and conquer theory, so divide the overall problem into more manageable parts and develop each part or module separately Home It contains the login register options Sign Up User can register either as customer or Admin. As a vendor you can see the information about weather ,pest etc Sign In Register user can login either as customer or Admin. About Us It shows information about the developers of the farmer's-portal Dashboard It shows information of the User or Admin Also Admin can create or delete account

Algorithm:

Linear Regression:

Linear regression is a quiet and simple statistical regression method used for predictive analysis and shows the relationship between the continuous variables. Linear regression shows the linear relationship between the independent variable (X-axis) and the dependent variable (Y-axis), consequently called linear regression. If there is a single input variable (x), such linear regression is called simple linear regression. And if there is more than one input variable, such linear regression is called multiple linear regression. The linear regression model gives a sloped straight line describing the relationship within the variables.

The above graph presents the linear relationship between the dependent variable and independent variables. When the value of x (independent variable) increases, the value of y (dependent variable) is
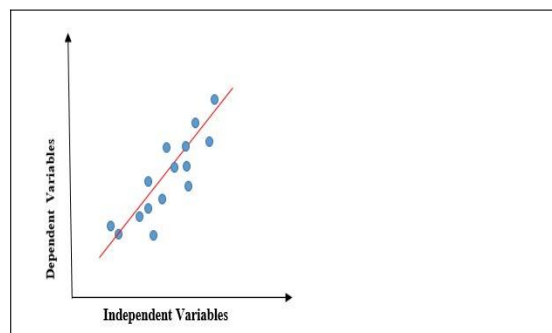

Fig 1.2 Linear Regression

likewise increasing. The red line is referred to as the best fit straight line. Based on the given data points, we try to plot a line that models the points the best. To calculate best-fit line linear regression uses a traditional slope-intercept form. $y = mx + b \Rightarrow y = a_0 + a_1x$ y = Dependent Variable. x = Independent Variable. a_0 = intercept of the line. a_1 = Linear regression coefficient.

Positive Linear Relationship

If the dependent variable expands on the Y-axis and the independent variable progress on X-axis, then such a relationship is termed a Positive linear relationship.

Negative Linear Relationship

If the dependent variable decreases on the Y-axis and the independent variable increases on the X-axis, such a relationship is called a negative linear

Gradient descent

Gradient descent is a method of updating a0 and a1 to minimize the cost function (MSE). A regression model uses gradient descent to update the coefficients of the line (a0, a1 => xi, b) by reducing the cost function by a random selection of coefficient values and then iteratively update the values to reach the minimum cost function. Imagine a pit in the shape of U. You are standing at the topmost point in the pit, and your objective is to reach the bottom of the pit. There is a treasure, and you can only take a discrete number of steps to reach the bottom. If you decide to take one footstep at a time, you would eventually get to the bottom of the pit but, this would take a longer time. If you choose to take longer steps each time, you may get to sooner but, there is a chance that you could

overshoot the bottom of the pit and not near the bottom. In the gradient descent algorithm, the number of steps you take is the learning rate, and this decides how fast the algorithm converges to the minima.
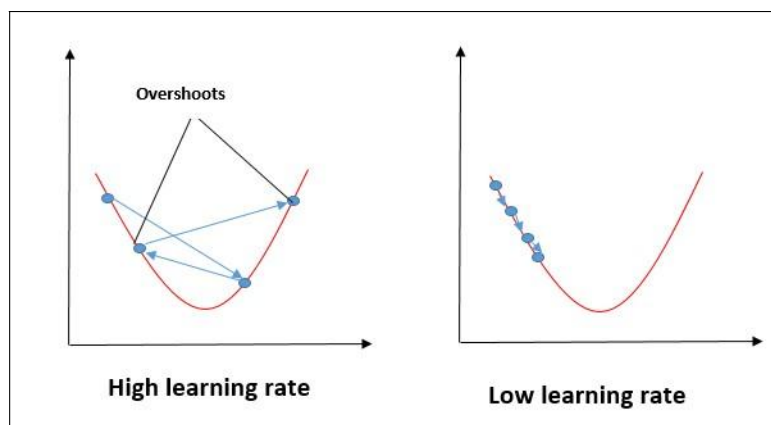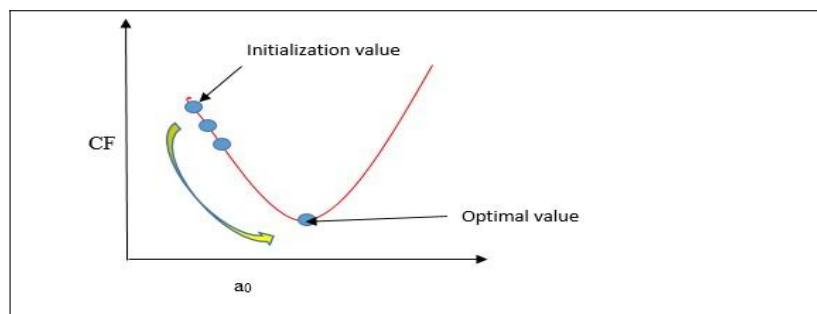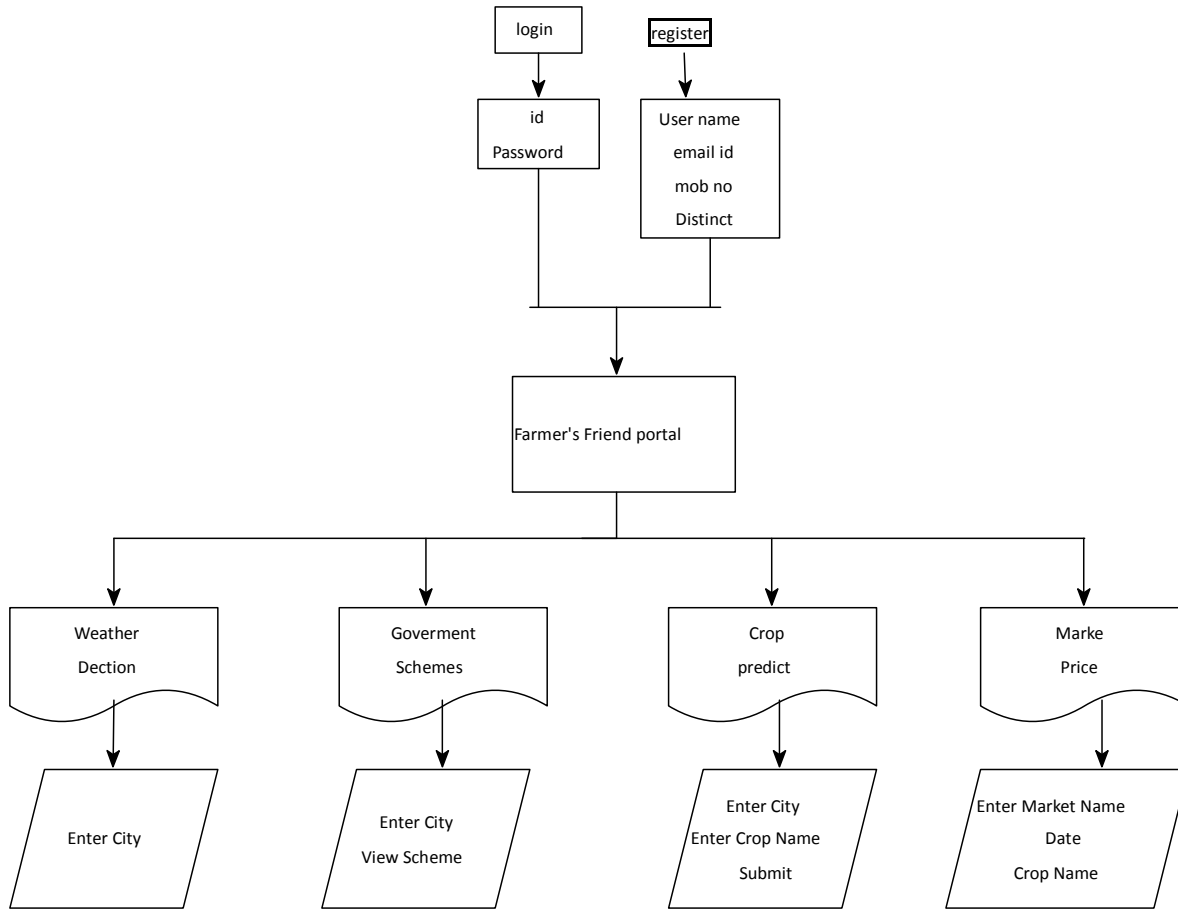
Overall Architecture:

Fig 1.3 Detail Flow of the System

1) **Weather Detection**

   Predicting current weather conditions in order to provide end users with information that will help them make the right decisions and plan the growth of their crops.

2) **Crop Prediction**

   Predicting crop area wise which means which crop will taken in which state

3) **Government Scheme**

   Predicting current weather conditions in order to provide end users with information that will enable them to plan the growth of their crops and take the appropriate action.

4) **Market Price**

   User can see crop market price on daily basis
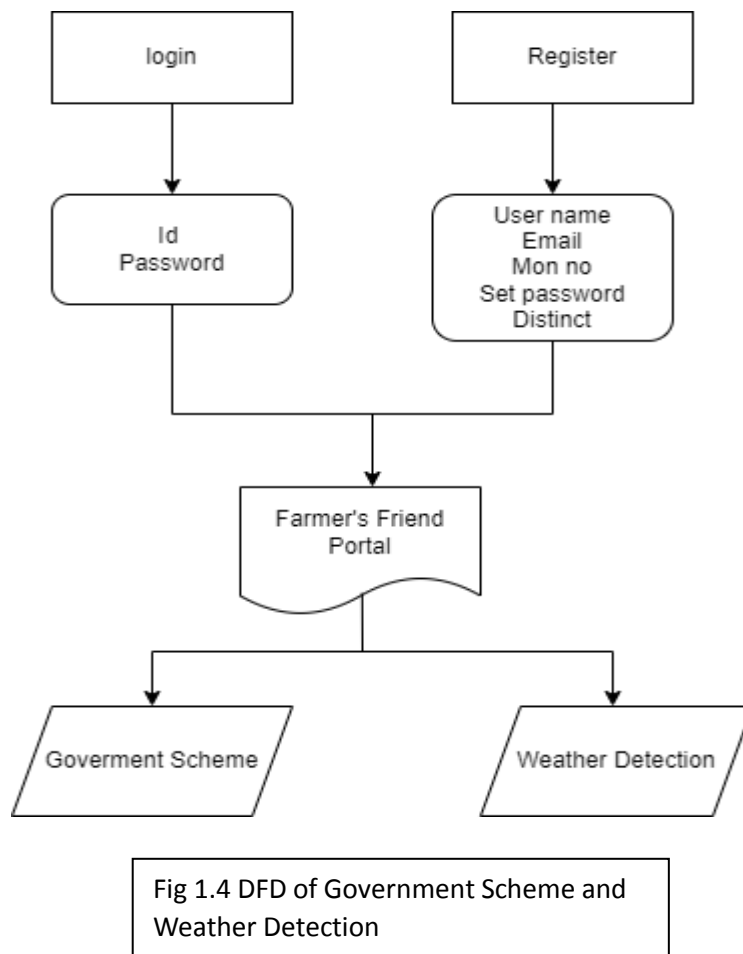
Data Flow Diagram:

Fig 1.4 DFD of Government Scheme and Weather Detection

System Details:

Machine learning is an important support tool for crop expectations, including support options for plant development and what to do during the plant development phase. The following algorithms are applied to the various features:

1) Decision Tree The decision tree creates characterization or fallback models within the level of a tree structure. It divides the dataset into a moderate subset and gradually evolves a decision tree. It deals with all kinds of downright and mathematical information.

2) Naive Bayes Naive Bayes is used to construct classifiers: models that assign to drawback cases and labels described as vectors of entity values wherever the class labels are drawn from a finite set. It takes into consideration that the worth of a particular feature is insignificant to the real worth of alternative characteristics given class variables.

3) Support Vector Machine SVM makes use of a subset of training factors in the decision function (referred to as guide vectors), so it's also memory efficient.

4) Random Forest Algorithm The Clustered Random Forest (CRF) methodology is used to identify intruders into the network by dividing the entire network into character systems so that glowing comments can be made on communications initiated within the network. It examines every node in the network and creates log files that are given as input for the proposed technique. Gini Index $= 1 - 2 \sum_{ii=1}^{nn} (PPii)$

Fig 1.5 DFD of Crop prediction and market price
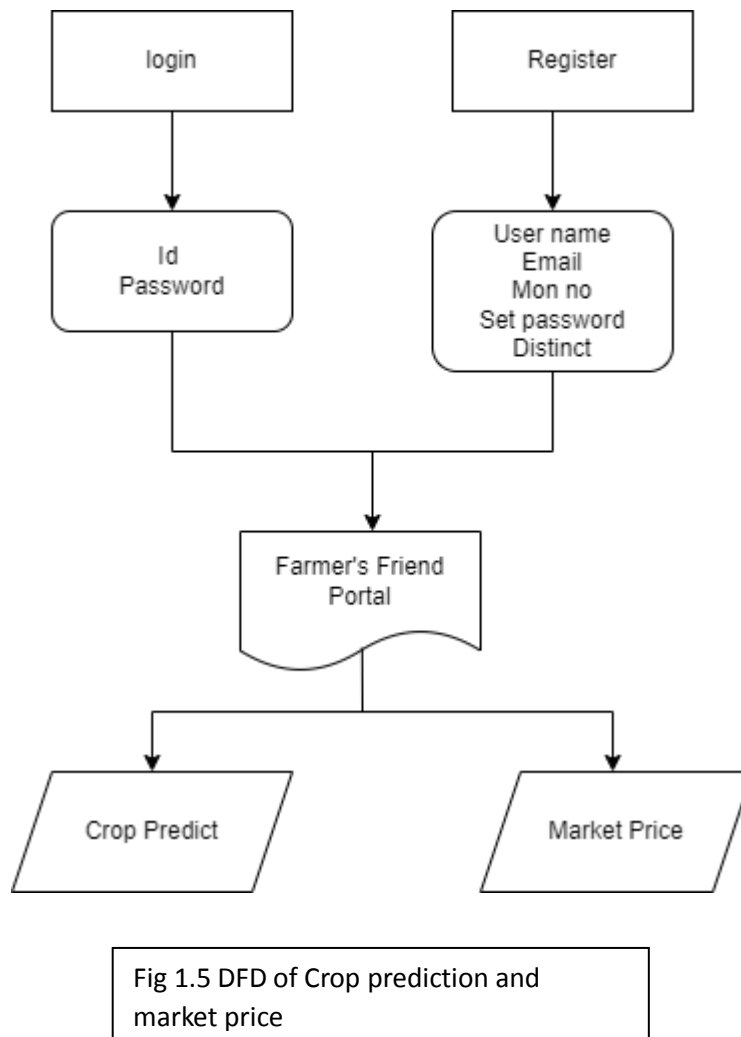
Conclusion

The comparative study of different machine learning algorithms helps us understand which is best suited for the prediction of crops and fertilisers which will increase the yield. Hence Crop Guidance and Farmers Friend make farming easier by providing proper guidance to the farmers about irrigation, fertilisers, weather conditions, soil quality, and suggesting alternative crops and seeds.

The project would operate as a special interface of programmes and compensation, assisting farmers in learning more about market information. Due to this they will always be aware of current farming techniques and fashions. However, new users may occasionally experience stress related to their use this approach is more efficient, safe overall.

References

1. 1–7 (2020) 4. P. M. R.Vidhya, Predicting yield of crop using ml algorithm, IEEE, 9, pp. 1–13 (2020).
2. M. Dr Anitha Govindraj, Crop price prediction using machine learning, IEEE, 6, pp. 14–20 (2020).
3. C. B. W. W. S. Ghionea, Algorithms to predict the moisture content of the grain, IEEE, 1, pp. 1–7 (2020).
4. V. R. V. S. S. T. Sooraj Krishna, Sreevijay, Farmer friend, IEEE, 10, pp. 9–19 (2021).
5. S. K. M. G. S. Prince Samuel S., K. Malarvizhi, Machine learning and internet of things based agriculture, IEEE, 2, pp. 3–11 (2020).