Implementing Machine Learning For Smart Farming To Forecast Farmer's Interest in Hiring Equipment

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Abstract - agriculture is the backbone of Indian frugality. In this farming sector, there's a lot of fieldwork, similar as weeding, reaping, sowing etc. these operations preliminarily were done by traditional outfit's.Working with that outfit's was tedious and laborious, also traditional ways are time consuming. robotization in farming made husbandry easier and quick. There are variety of machines are available for nearly every task in farming. Beginning with preparing land to the harvesting of crop and farther process can be done by machines. The husbandry ministries that are used now days are premium and cannot be swung by utmost of planter with pastoral background. utmost of the growers in India enjoy veritably small pieces of land and retaining these premium machines may not be doable for them. piecemeal from this utmost of growers consider the traditional ways of husbandry as primary styles. Considering above mentioned factors there's need to develop such a system which will recommend and suggest essential accoutrements on rent to ameliorate husbandry.

In this forum, we proposed a two way decision support system using which growers will get needed accoutrements recommendations for hiring the accoutrements to ameliorate husbandry and on the other hand outfit proprietor will get analytics report about registered growers and their demand. In this forum we proposed decision tree algorithm to develop decision support system. In our proposed system there will be 3 druggies; admin, planter and outfit proprietor.

Key Words: Technological innovations; Smart Farming; Equipments Hiring; Equipment Recommendation; K-means Clustering; Decision Tree.

1. INTRODUCTION

The developing countries lag behind in ranch productivity owing to indecorous use of machines in colorful husbandry operations. On the other hand, robotization of husbandry operations contributes significantly to pastoral and agrarian growth in numerous developing countries. thus, growers must be encouraged to use machines in the field to increase effectiveness and the yield of their products. It's also necessary to put husbandry on robotization the current rate of agrarian product needed to feed the world population cannot be realized without robotization. Unfortunately, the use of ranch ministry, is still under consideration in utmost corridor of the world, including in some corridor of India. It's high time that both the government and the private sectors should put their head together to push the country towards mechanized husbandry. Experimenters are developing strategies to introduce the innovative system of mechanized husbandry to boost productivity and frugality. Mechanized husbandry has boosted their productivity besides strengthening the frugality of their separate countries.

Custom hiring center is a new conception in husbandry that intends to stimulate the relinquishment of bettered resource operation strategies. These resource sharing ways at a cheaper cost to individual growers are current in some specific corridor of the country. Un-der this innovative programme/ strategy, agrarian outfit and tools are participated with the husbandry community. Custom hiring centers enable indigent growers to gain the advantages of robotization via the application of expensive outfit. Some collaborative associations have taken the action to offer agricultural equipment services to the husbandry community.

As an option to maintaining own farmstead ministry, there's a need to encourage rental facilities for medium to small growers. growers have numerous benefits when leasing equipment, including timely crops and reduced charges from paying down payments on outfit. Because growers depend on complete outfit every day, its significance is pivotal to its overall performance. Lack of outfit means low returns and job security are in peril. The leasing system offers coproprietors the occasion to increase product snappily. Losing one day of labor may have considerable goods, since husbandry is so time-sensitive. Conventional loan operations and putting down a down payment on outfit purchases bear time that growers don't have. This is a quick and straightforward way to conduct everyday duties on the ranch. The parcel cost is mainly lower than conventional debt, making it more straightforward for lower and original directors to pay. Directors may negotiate more credit installations and make smaller payments throughleasing.

2. Literature Survey

In numerous experimenter's study regarding the custom hiring services and the agrarian resource productivity editorialized that the small and borderline growers, who couldn't buy the ministry due to the price considerations, clearly weren't in a position to avoid its use for some of the operations of civilization. The study revealed that 26.03% of the growers hired farm ministry up to 3 operations, 32.88% up to 6 operations and 41.09% growers for 7 or further ranch operations. The extent of hiring depended upon the acceptability or inadequacy of the draft and the stationary power source and other considerations with the planter.

(1988) Kaur editorialized that robotization helps in ready performance of the farmstead operations during the peak ages. The time therefore saved gave further time to the crop to mature, swung the planter more inflexibility in his husbandry operation and facilitates multiple cropping. The average ranch size in Punjab in 1980-81 was 3.7 hectares. This small size wasn't doable for the planter to conclude for premium ministry and hence the planter looked out for client hiring, wherever necessary. It was concluded that the growers with small and borderline effects, should go for custom hiring. The net returns from the Agro Service Centres which rendered custom hiring services with one tractor and one combine harvester were ‘83581.88, 80160.62, 4409.69 in 1984-85 and ‘91416.56, 86250.39 and 54293.94 in 1985-86 for South Western, Central and Semi-Hilly Zones, independently. Net returns from the Agro Service Centres performing all the operations were more as compared to those doing only thrashing in all the three zones.

(2000) Aggarwal and Yadav conducted a study in the three sections of Haryana State toascertain the trends in tractor deals and profitable analysis of application of ranch tractors. The study revealed that the average periodic use of ranch tractor in these sections was594.32 hours, out of which58.46 of time, was used for custom work and only41.54 for own work. Maximum periodic use of ranch tractor in the state was set up in tillage operation i.e. 20.92 for own work and13.49 for custom work. The operating costs of lower than 25 hp, 30 – 35 hp and further than 35 hp tractors were set up as ‘147.30, 157.51 and169.08 per hour, independently.

3. Algorithms

❖ K-Means Clustering:

K-Means Clustering is an Unsupervised Learning algorithm, which groups the unlabeled dataset into different clusters. Here K defines the number of pre-defined clusters that need to be created in the process, as if K=2, there will be two clusters, and for K=3, there will be three clusters, and so on.

The algorithm takes the unlabeled dataset as input, divides the dataset into k-number of clusters, and repeats the process until it does not find the best clusters. The value of k should be predetermined in this algorithm.

The k-means clustering algorithm mainly performs two tasks:
– Determines the best value for K center points or centroids by an iterative process.
– Assigns each data point to its closest k-center. Those datapoints which are near to the particular k-center, create a cluster.

❖ Decision Tree Algorithm:

A type of directed learning computation called a decision tree uses an information structure to solve a problem. The leaf hub is referred to in this instance as the class mark, while the internal hubs of the tree refer to the attributes. The full dataset is initially taken into account as the root, the distinct element esteems are liked, and the persistent qualities are first turned into discrete qualities before being used to construct the model. The characteristics are then requested as the inner hub or root using quantifiable methods.

A decision tree is one of the best modelling techniques used in machine learning. It is one of the predictive modelling approaches used in machine learning where, the data is continuously split according to the particular parameters, namely, decision nodes and leaves.

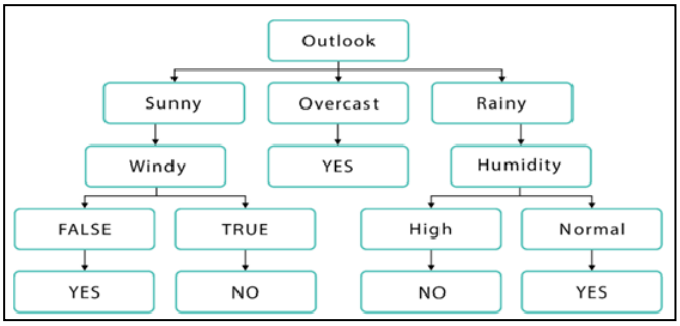

Fig -3.1: Decision Tree Example

4. System Architecture

In terms of the procedure, only users who have been granted authorization by the system director are permitted to rent or hire their outfit. The stoner who wants to hire outfit must submit the necessary information in the form of a 7 picture of the outfit, the distance for which it may be leased, and the figure per day for leasing the unit. As soon as the data is submitted by the stoner, it'll be crosschecked by the system’s director before being made accessible in the customer and hunt lists. The client is responsible for uploading all of the parcels that the customer wishes to have listed for hire or reimbursement.

The customer after opting the position through Google Charts longitude and latitude will be suitable to search for the outfit using pollutants. From the displayed list, the customer who wants to hire the outfit selects the product and clicks on it; it'll pop up showing all the details similar as cost of hiring, available for how numerous days. However, he'll have to elect the hiring dates from the day he wants to hire and till the day it'll be hired for, If it matches with the demand of the customer. Once the days are fixed for hiring, the system will display the total rent it'll bring. The customer also has to shoot a request to the admin for authentication. It'll be listed on the customer dashboard only after the admin approves the request. Along with this, the outfit will be removed from the main hunt list for other guests for the same outfit for the same dates. Only those druggies who are having an account in this system can pierce and modernize details of their own profile only. There are number of parameters used for the filtration of data similar as position, distance, cost per day, and number of days. Machine literacy is employed to determine the position, pricing information, and number of days the outfit is rented for. Hunt is done via a database in order to detect a machine matching the specifications set by the guests. The cost per day is fixed, which will be assessed after calculating the cost for the number of days specified using the timetable function to and from pollutants. The model was erected using machine literacy for data Interpretation and report production.

❖ Client Section:

Figure represents the methodical approach for renting outfit. The customer then can rent and hire the outfit. The customer formerly gets registered will upload the outfit details using the name, dates for displaying in the hunt list, cost per day, and image of the product. Once the details are filled the request will be submitted. When it gets approved by the admin, the product will be shown on the customer dashboard, and a communication will be entered by the customer.

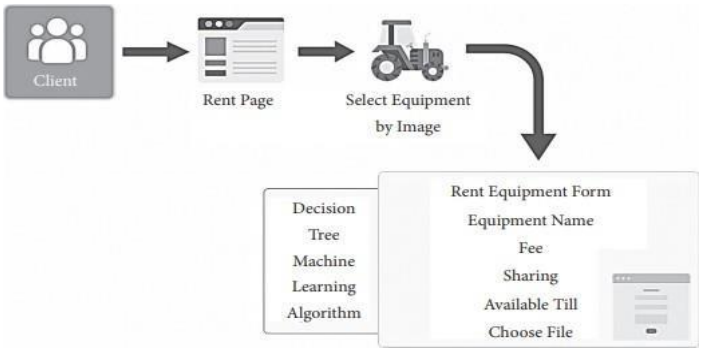

Fig -4.1: Systematic approach for renting equipment

❖ Location Prediction Approach:

This is the step where the system identifies the position using Google Charts ' longitude and latitude clicked by the druggies logged in to the system, searches the locales within the range named by the stoner, and displays the list of results.

❖ Distance and Cost Predication Approach:

The distance then's used for hunt and distance of customer who's hiring the rented outfit. It'll allow the customer to have a cost variation that depends on the distance from where the outfit is hired.

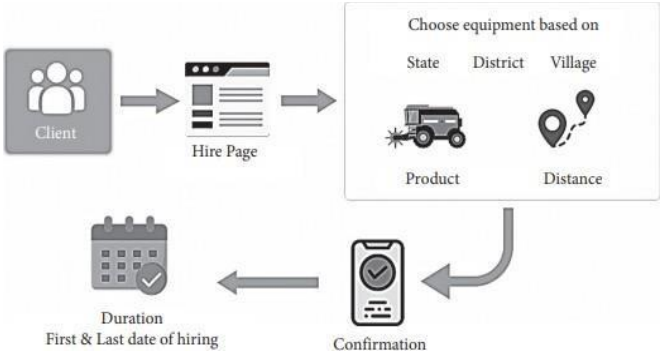

Fig -4.2: Distance and cost approach.

❖ Data Flow Diagram:

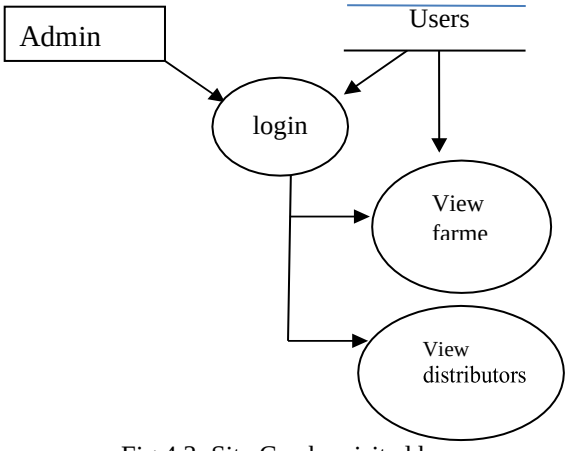

Fig 4.3: Site Can be visited by

Farming equipment Site can be handled by basically admin and the users will be mainly farmers and equipment distributer.
Farmer can get the recommendations as per the details uploaded by farmer using the decision tree algorithm. Algorithm will test the land type,soil type and the other description mentioned by the farmer and will recommend accordingly. Farmer can send the hiring request and it will be reflected to the owner, also there is criteria for the concession on the rent price according to the income for backward class farmers.
Equipment owner after log in can see the pending hiring request and can approve it. Owner can get the demand of equipments in the market using the algorithm applied known as K means clustering.

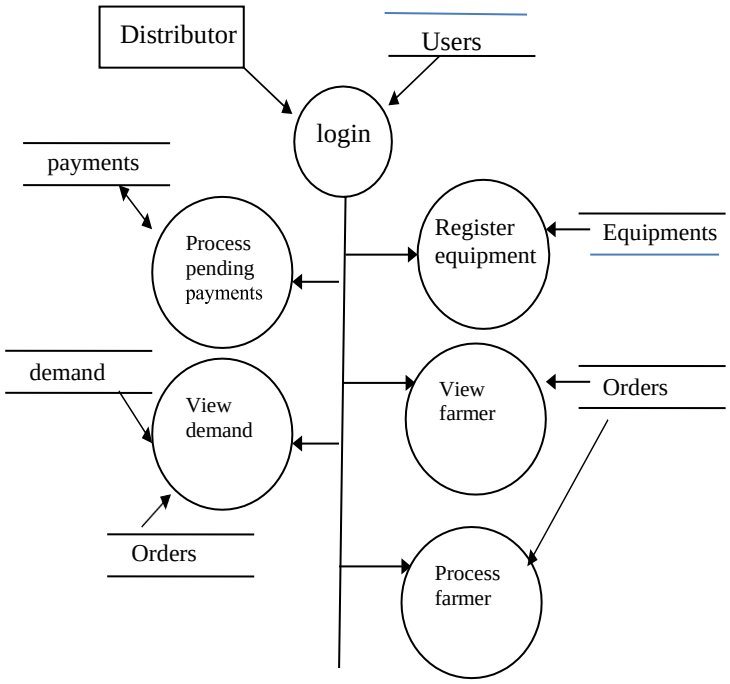

Fig -4.4: Distributor

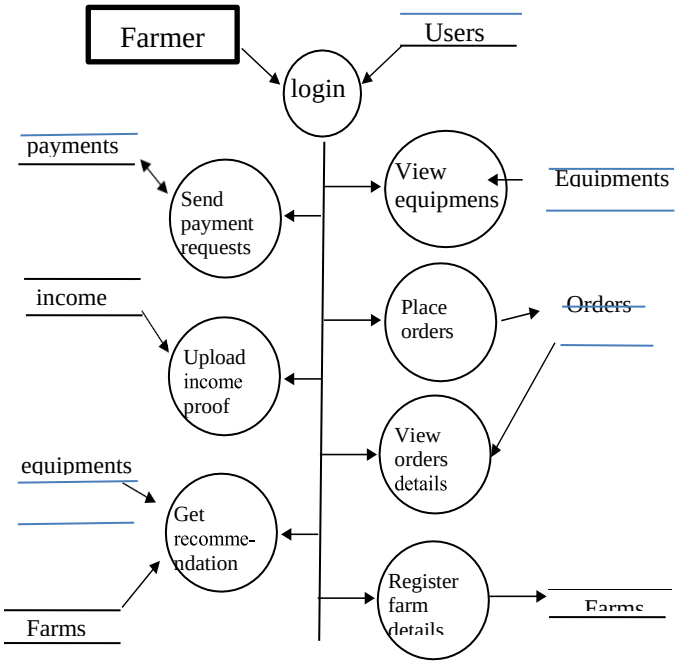

Fig -4.5: Farmer

5. Implementation

❖ Database Connectivity to JAVA Application:

To connect Java application with the MySQL database, we need to follow 5 following steps.

- Driver class: The driver class for the mysql database is com.mysql.jdbc.Driver.
- Connection URL: The connection URL for the mysql database is jdbc:mysql://localhost:8080/DataDeduplication where jdbc is the API, mysql is the database, localhost is the server name on which mysql is running, we may also use IP address, 8080 is the port number and Data Deduplication is the database name.
- Username: The default username for the mysql database is root.
- Password: It is the password given by the user at the time of installing the mysql database. In project, we are going to use root as the password.

To connect to MySQL from Java, we have used the JDBC driver from MySQL. The MySQL JDBC driver is called MySQL Connector/J. JDBC provides an abstraction layer between Java applications and database servers, so that an application's code does not need to be altered in order for it to communicate with multiple database formats. Rather than connecting to the database directly, the applications send requests to the JDBC API, which in turn communicates with the specified database through a driver that converts the API calls into the proper dialect for the database to understand.

❖ Implementation Stages:

In this project, we proposed farming equipment hiring in affordable cost for farmers.

Following are the implementation stages.

- Stage 1: In stage 1, the farmers, distributors will do registrations in our web application. Admin will be able to view farmer details and distributor details in his login.
- Stage 2: The distributor will register and manage his equipments. He will view pending orders placed by farmers. Process pending orders, view pending payment requests sent by farmers and process them. On the other hand farmers will register their farm details, view equipments and distributors. Place orders as per requirements and send demanded equipments. The farmer will upload his income proof and send it to admin. Admin will verify it and approve. Once the income certificate has been approved by admin, the farmer will be eligible for Economically Backward scheme. Distributor will register different prices for EBC farmers.
- Stage 3: In this stage, we have implemented recommendation and demand analysis modules. Farmers will register their farm details and on the basis of farmer's profile we have build the equipments recommendation using decision tree algorithm. For demand analysis we are calculating implicit as well as explicit equipment demands. Farmers will be able to send demanded equipments as enquiry to distributor. Our proposed model will find out most demanded equipments by using K means clustering algorithm. The distributors will be able to view most demanded equipments.

CONCLUSION

Farmers' physical labor and debt are reduced as a result of agrarian robotization, which emphasizes effective and effective use of colorful machines in husbandry operations with the purpose of reducing physical labor and debt. It's a revolutionary idea in husbandry to produce custom hiring centers, which are intended to make it easier for likeminded growers to embrace technology/ ministry for enhanced resource operation practices. the study in question examines the significance of tool renting and participating in the plant. Reimbursement and sharing outfit are two approaches that might be used to enable growers to adopt outfit at a cheaper cost than they would else have to pay for it.

This design developed smart tillage, a platform that enables growers to rent and lease outfit. The study also erected a machine literacy model. Decision trees are ideal for machine literacy and tool and outfit hiring. It also tries to ameliorate growers' quality of life by dwindling labor- ferocious tasks.

This thesis focuses on smart husbandry via outfit sharing and leasing. The proposed tasks employing colorful machine literacy ways were developed as a result of exploratory and largely experimental work; unborn work is anticipated to include new trials as affiliated system and affect optimization.

FUTURE SCOPE

The online administration frame for Agri- Equipment reimbursement frame was made to guarantee the productive task. It reduces the homemade work. It reduces the paper work, therefore supporting the sustainable terrain. It saves time also. Analytics can be extended in such a way that State head can view, in which region which ministry is needed and move to that position in previous. Addition of crops and diseases to the list. Addition of GPS and charts which can help in relating the current locomotion state of the outfit.

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