Project Report

On

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

Submitted for partial fulfillment of requirement for the degree of

BACHELOR OF ENGINEERING

(Computer Science and Engineering)

Submitted By

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2022 - 2023

CERTIFICATE

This is to certify that the Project (8KS07) entitled

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

is a bonafide work and it is submitted to the

Sant Gadge Baba Amravati University, Amravati

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in the partial fulfillment of the requirement for the degree of ***Bachelor of Engineering*** *in* ***Computer Science & Engineering*** *, during the academic year* ***2022-2023*** *under my guidance .*

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ABSTRACT

Farming is the backbone of Indian economy. In this agriculture sector, there is a lot of fieldwork, such as weeding, reaping, sowing etc. these operations previously were done by traditional equipment's. Working with that equipment's was tedious and laborious. Also traditional ways are time consuming. Mechanization in agricul ture made farming easier and quick. There are variety of machines are available for almost every task in agriculture. Beginning with preparing land to the harvesting of crop and further process can be done by machines. The agriculture machineries that are used now days are costlier and cannot be afforded by most of farmer with rural background. Most of the farmers in India own very small pieces of land and owning these costlier machines may not be feasible for them. Apart from this most of farmers consider the traditional ways of farming as primary methods. Considering above mentioned factors there is need to develop such a system which will recommend and suggest essential equipments on rent to improve farming.

In this seminar, we proposed a two way decision support system using which farmers will get required equipments recommendations for hiring the equipments to improve farming and on the other hand equipment owner will get analytics report about registered farmers and their requirement. In this seminar we proposed decision tree algorithm to develop decision support system. In our proposed system there will be 3 users: admin, farmer and equipment owner.

CHAPTER 1

INRODUCTION

1.1 Overview

The developing countries lag behind in farm productivity owing to improper use of machines in various agriculture operations. On the other hand, automation of farming operations contributes significantly to rural and agricultural growth in many developing countries. Therefore, farmers must be encouraged to use machines in the field to increase efficiency and the produce of their products. It is also necessary to put agriculture on automation the current rate of agricultural production required to feed the world population cannot be realized without mechanization. Unfortunately, the use of farm machinery, is still under consideration in most parts of the world, including in some parts of India. It is high time that both the government and the private sectors should put their head together to push the country towards mechanized farming. Researchers are developing strategies to introduce the innovative system of mechanized farming to boost productivity and economy. Mechanized farming has boosted their productivity besides strenghthening the economy of their respective states.

Custom hiring center is a novel concept in farming that intends to stimulate the adoption of improved resource management strategies. These resource sharing techniques at a cheaper cost to individual farmers are prevalent in some specific parts of the country. Under this innovative programme/strategy, agricultural equipment and tools are shared with the farming community. Custom hiring centers enable needy farmers to gain the advantages of automation via the utilization of costly equipment.

1.2 Motivation

As an alternative to maintaining own farm machinery, there is a need to en- courage rental facilities for medium to small farmers. Farmers have many benefits when leasing equipment, including timely harvests and reduced expenses from paying down payments on equipment. Because farmers depend on complete equipment every day, its significance is crucial to its overall performance. Lack of equipment means low returns and job security are in danger. The leasing system offers landowners the opportunity to increase

production quickly. Losing one day of labor may have considerable effects, since agriculture is so time-sensitive. Conventional loan applications and putting down a down payment on equipment purchases require time that farmers do not have. This is a quick and straightforward way to conduct everyday duties on the farm. The lease cost is substantially lower than conventional debt, making it more straightforward for smaller and local producers to pay. Producers may negotiate more credit facilities and make fewer payments through leasing. Leasing enables farmer to experiment with technology without buying it first.

1.3 Problem Defination

The variety of fields required Face detection and recognition mechanism in the modern life. Face recognition algorithms are also used in many different applications apart from bio- metrics, such as video compressions, indexing etc. In this system help in forensic sciences, identification for law enforcement, surveillance, authentication for banking and security system.

1.4 Objectives

- **Need and Benefits of Hiring and Renting Farming Equipment and Tools:**

As an alternative to maintaining own farm machinery, there is a need to encourage rental facilities for medium to small farmers. Farmers have many benefits when leas-ing equipment, including timely harvests and reduced expenses from paying down payments on equipment. Because farmers depend on complete equipment every day, its significance is crucial to its overall performance. Lack of equipment means low returns and job security are in danger. The leasing system offers landowners the opportunity to increase production quickly. Losing one day of labor may have considerable effects, since agriculture is so time-sensitive. Conventional loan applications and putting down a down payment on equipment purchases require time that farmers do not have. This is a quick and straightforward way to conduct everyday duties on the farm. The lease cost is substantially lower than conventional debt, making it more straightforward for smaller and local producers to pay. Producers may negotiate more credit facilities and make fewer payments through leasing. Leasing enables farmers to experiment with technology without buying it first.

- **Recommendation System for Renting and Sharing:**

A suggested system is used to provide the best possible alternative to a user looking for a certain product on a system. In this research, farmers interested in renting equipment will use the search module to locate the appropriate equipment. The farmers will provide the system with parameters, and depending on the search, the system will propose something to the user. The proposed system includes many options. Moreover, the main problem faced bythe farmers is the infection or disease caught by the various crops in the field. They encounter huge losses because of this. In agriculture, machine learning allows for more accurate disease diagnosis while con- serving energy and avoiding false data. Farmers can upload field images captured by intelligent systems like satellites, unmanned aerial vehicles (UAVs), land-based rovers, smart phones, and tools such as the Climate Field View platform, which can identify potential farm issues and recommend a management plan.

CHAPTER 2

LITERATURE REVIEW

(1974) Sharma [1] in his study regarding the custom hiring services and the agricultural resource productivity opined that the small and marginal farmers, who could not purchase the machinery due to the price considerations, certainly were not in a position to avoid its use for some of the operations of cultivation. The study revealed that 26.03 per cent of the farmers hired farm machinery up to 3 operations, 32.88 per cent up to 6 operations and 41.09per cent farmers for 7 or more farm operations. The extent of hiring depended upon the adequacy or inadequacy of the draft and the stationary power source andother considerations with the farmer.

(1988) Kaur [2] opined that mechanization helps in expeditious performance of the farm operations during the peak periods. The time thus saved gave more time to the crop to mature, afforded the farmer more flexibility in his farming operation and facilitates multiple cropping. The average farm size in Punjab in 1980- 81 was 3.7 hectares. This small size was not feasible for the farmer to opt for costlier machinery and hence the farmer looked out for customer hiring, wherever necessary. It was concluded that the farmers with small and marginal holdings, 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 in1985-86 for South Western, Central and Semi-Hilly Zones, respectively. Net returns from the Agro Service Centres performing all the operations were more as compared to those doing only threshing in all the three zones.

(1999) Bhatia [3] in his report stated that the tractor was not a scale-free technology like seeds and fertilizers, which implied that the purchase of tractor was only justified if there was sufficient work throughout the year besides the usual field operations. The possession of a tractor was quite irrational if evaluated from its use pattern. Being a costly farm re-source, its use was ought to be carefully studied. Tractor should be used for a specified length of period in a year but its power should also be utilized adequately.

(2000) Aggarwal and Yadav [4] conducted a study in the three districts of Haryana State to ascertain the trends in tractor sales and economic analysis of utilization of farm tractors. The study revealed that the average annual use of farm tractor in these districts was 594.32 hours, out of which 58.46per cent of time, was used for custom work and only41.54per cent for own work. Maximum annual use of farm tractor in the state was found in tillage operation i.e. 20.92 percent for own work and 13.49per cent for custom work. The operating costs of less than 25 hp, 30–35 hp and more than 35 hp tractors were found as '147.30, 157.51 and 169.08per hour, respectively.

(2004) Nagarajan [5] emphasized the role of implements and machinery in crop production by saying that the demand for agricultural machinery in future would be for high capacity crop production equipment mainly to be used on a custom hiring basis and on a commercial farm where the agriculture is becoming increasingly commercialized and the focus was on saving money, time and labor. The productivity of the farms depended on the availability and judicious utilization of power by farmers. The traditional animal drawn power had a low output and required 3-4 tillage operations in light soils for land prepara- tion. Disc 7 harrow and cultivator could do the same task in same soils but could cover 2-3times more area,with a better quality of ploughing.

(2009) Syed Mutahir Mohiuddin [6] in their study of economic analysis of custom hir-ing of combine harvesters concluded that the combine harvesters were introduced due to the labor shortage particularly on harvesting season and uncertain weather condition and these were being popularized and adopted by all categories of farmers in the North-Western Indo-Gangetic plains of India. About 90per cent of combine harvesters on the farms were of local made. The area of coverage of combine harvester was about l49.81ha in Kharif season and 261.81 ha in Rabi season. The field capacity of commercial combine was 0.86ha/h in Rabi season and 0.66 ha/h in Kharif season. Combine owners reported that the business of combines on custom hiring had become highly competitive.

(2014) satapathy [7] stated that farm mechanization had led to an increase in the productivity of land by as much as 30 %. Some of the studies had revealed that the use of seed cum fertilizer drills not only saves 20 % of the seeds and 15 to 20 %of fertilizer but also increase the yield by 15 %. Comparing the level of mechanization of India with

other developed nations, it was observed that in 2010 India had a tractor density of 7.17 tractors per 1000 ha while China had 7.89 tractors and Pakistan had 13.63 tractors per 000' ha. The world's average was 19.14 tractors per 1000 ha. It was concluded that the India would need to produce higher quantities of agricultural commodities in the coming years and for that a foresighted planning was essential with special emphasis on increasing the availability of mechanical power to the agriculture.

(2018) B. Nagaraj [8] stated that The present study was conducted in Kandi Mandal of Sangareddy district in Telangana state with objective of analyzing the cost of establishing a model custom hiring center in the study area with required machinery and its economic feasibility. The secondary data regarding the land holdings were collected from the Mandal Agricultural Office, Kandi and District Agricultural Office, Sangareddy. Secondary data about machinery and their prices were collected from Telangana State Agro Industries Development Corporation Limited (TSAIDCL), Hyderabad. Tabular analysis and discounted project evaluation techniques were used to worked out the establishment costs and returns and economic feasibility of the model CHC respectively. Based on the parameters like cropping pattern, soil type and land holdings the suitable type of implements and machinery were selected.

(2019) V. Saiz-Rubio [9] This paper reviews the current status of advanced farm management systems by revisiting each crucial step, from data acquisition in crop fields to variable rate applications, so that growers can make optimized decisions to save money while protecting the environment and transforming how food will be produced to sustainably match the forthcoming population growth.

(2021) M. Rakhra [9] stated that diverse farm mechanization scenario prevailed in the country due to varied size of farm holdings and socioeconomic disparities. Indian agriculture continued to be dependent upon human and draught animal power. Animate power contributed 92per cent of the total farm power in 1960–61 and mechanical and electrical together contributed only 8per cent. By 2000–2018, the contribution of animate power came down to only 10 percent and from rest of the sources such as tractors, power tillers, electric motors and diesel engines; it increased to 90 per cent. Potential farm power available per unit cultivated land from all sources (animate and mechanical) increased from 0.32 kW/hain 1965–66 to 1.15 kW/ha (net-cropped area basis) in 1997–98. Even with

not much in- crease in cropping intensityand area under irrigation, the land productivity (for food grains only) has gone up by 144per cent from 0.636 t/ha in 1965– 66 to 1.554 t/ha in 1997–98. This was possible due to introduction of high yielding varieties and need based farm mechanization.

Table 2-1: Summary and Discussions

Author	Paper Name	Work
Yarazari	"Custom hiring services of farm machinery in India. "	Developed the concept of previously existing bespoke recruiting centers in India based on these studies. Additionally, it is necessary to educate farmers who reside in rural regions about custom hiring centers in India.
M. B. Santosh kumar and K. Balakrishnan	"Development of a model recommender system for agriculture using the Apriori algorithm"	Incorporated the concept of the recommendation system on the basis of rating and searching of products.
W. Zhao, L. Wang, and Z. Zhang	"Supply-demand-based optimization: a novel economics-inspired algorithm for global optimization"	Presented the idea of demand and supply algorithms and demonstrated how to optimize demand based on supply and seasonal variations through these studies.
B. Jothi Jahnavi, R. Monica, N. Sripriya C	"Efficient farming, hiring equipment for farmers"	Deduced the need of developing an uberized model for equipment rental and sharing.

CHAPTER 3

ANALYSIS

3.1 Problem Statement:

In numerous developing countries, farmers cannot put resources into advancements because of little landholdings and credit limitations, which can enable them to build efficiency and procure better lives. Often no mechanism exist with two way communication for Recommendation of Farming Equipment To The Farmers For Effective Farming. Most of the Famers in India are From The Background Who Cannot afford Expensive Equipment. There is need for system to be designed and developed comprising a machine learning based approach and methodology for recommendation of Farming Equipment.

3.2 System Requirements:

Our project has some software requirements which are as follows:

3.2.1 Eclipse Software:

Eclipse is an integrated development environment used in computer programming. It contains a base workspace and an extensible plug-in system for customizing the environment. We used this software to develop our project because of it's compatibility with java programming language. The Eclipse SDK includes the Eclipse Java development tools (JDT), offering an IDE with a built- in Java incremental compiler and a full model of the Java source files. This allows for advanced refactoring techniques and code analysis. The IDE also makes use of a workspace, in this case a set of metadata over a flat file space allowing external file modifications as long as the corresponding workspace resource is refreshed afterward. Eclipse implements the graphical control elements of the Java toolkit called Standard Widget Toolkit (SWT), whereas most Java applications use the Java standard Abstract Window Toolkit (AWT) or Swing. Eclipse's user interface also uses an intermediate based on SWT. We used this software to develop our project because of it's compatibility with java programming language.

3.2.2 Apache Tomcat Server:

Apache Tomcat (called Tomcat for short) is an opensource implementation of the Java Servlet, JavaServer Pages, Java Expression Language and WebSocket technologies. Tomcat provides a "pure Java" HTTP web server environment in which Java code can run. We have used Tomcat 4.x which was released with Catalina (a servlet container), Coyote (an HTTP connector) and Jasper (a JSP engine). As our project is a web application for detecting duplicate images in user's own created database so we used this because it has also added user as well as system-based web applications enhancement to add support for deployment across the variety of environments. Tomcat is building additional components. A number of additional components may be used with Apache Tomcat. These components may be built by users should they need them or they can be downloaded from one of the mirrors. We have also used its high- availability feature facilitate the scheduling of system upgrades (e.g. new releases, change requests) without affecting the live environment. It isvery useful in handling user requests on high-traffic web applications.

3.2.3 MySQL Workbench:

MySQL Workbench is a visual database design tool that integrates SQL development, administration, database design, creation and maintenance into a single integrated development environment for the MySQL database system. MySQL Workbench is a unified cross-platform, open-source relational database design tool that adds functionality and ease to MySQL and SQL development work.

MySQL Workbench provides data modeling, SQL development, and various administration tools for configuration. It also offers a graphical interface to work with the databases in a structured way.

3.2.4 XAMPP:

XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages. Since most actual web server deployments use the same components as XAMPP, it makes transitioning from a local test server to a live server possible.

3.3 Technologies Involved:

3.3.1 Python:

Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms.

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together.

3.2.2 Jakarta Server Pages (JSP):

Jakarta Server pages is one of the original java web technology which is being widely used to create dynamic web pages that can connect to java backend. It is built on top of the Java Servlet specification. JSP may be viewed as a high-level abstraction of Java servlets. JSPs are translated into servlets at runtime, therefore JSP is a Servlet; each JSP servlet is cached and re-used until the original JSP is modified. Jakarta Server Pages can be used independently or as the view component of a server-side model–view–controller design, normally with JavaBeans as the model and Java servlets (or a framework such as Apache Struts) as the controller.

JSP allows Java code and certain predefined actions to be interleaved with static web markup content, such as HTML. The resulting page is compiled and executed on the server to deliver a document. The compiled pages, as well as any dependent Java libraries, contain Java bytecode rather than machine code. Like any other .jar or Java program, code must be executed within a Java virtual machine (JVM) that interacts with the server's host operating system to provide an abstract, platform-neutral environment.

JSPs are usually used to deliver HTML and XML documents, but through the use of Output Stream, they can deliver other types of data as well. The Web container creates JSP implicit objects like request, response, session, application, config, page, pageContext, out and exception. JSP Engine creates these objects during translation phase.

3.2.3 JavaScript:

JavaScript is one of the core technologies of the WWW (World Wide Web). It enables interactive web pages and is an essential part of web applications. It has application programming interfaces (APIs) for working with text, dates, regular expressions, standard data structures, and the Document Object Model (DOM). Almost all the websites and web browser uses JavaScript engines to execute client side page behavior. JavaScript engines were originally used only in web browsers, but they are now embedded in some servers, usually via Node.js. They are also embedded in a variety of applications created with frameworks such as Electron and Cordova.

CHAPTER 4

SYSTEM DESIGN

Systems design is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements. Systems design could be seen as the application of systems theory to product development. There is some overlap with the disciplines of systems analysis, systems architecture and systems engineering.

4.1 System Architecture:

In terms of the procedure, only users who have been granted permission by the system administrator are permitted to rent or hire their equipment. The user who wants to hire equipment must submit the necessary information in the form of a 7 picture of the equipment, the distance for which it may be leased, and the fee per day for leasing the unit. As soon as the data is submitted by the user, it will be crosschecked by the system's administrator before being made accessible in the client and search lists. The customer is responsible for uploading all of the properties that the client wishes to have listed for hire or rental.

The client after selecting the location through Google Maps longitude and latitude will be able to search for the equipment using filters. From the displayed list, the client who wants to hire the equipment selects the product and clicks on it; it will pop up showing all the details such as cost of hiring, available for how many days. If it matches with the requirement of the client, he will have to select the hiring dates from the day he wants to hire and till the day it will be hired for. Once the days are fixed for hiring, the system will display the total rent it will cost. The client then has to send a request to the admin for authentication. It will be listed on the client dashboard only after the admin approves the request. Along with this, the equipment will be removed from the main search list for other clients for the same equipment for the same dates. Only those users who are having an account in this system can access and update details of their own profile only. There are number of parameters used for the filtration of data such as location, distance, cost per day, and number of days. Machine learning is employed to determine the location, pricing information, and number of days the equipment is rented for. Search is done via a database in order to locate a machine matching the specifications set by the

customers. The cost per day is fixed, which will be invoiced after computing the cost for the number of days specified using the calendar function to and from filters. The model was built using machine learning for data Interpretation and report production.

- **Client Section:**

Figure represents the systematic approach for renting equipment. The client here can rent and hire the equipment. The client once gets registered will uploadthe equipment details using the name, dates for displaying in the search 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 client dashboard, and a message will be received by the client.

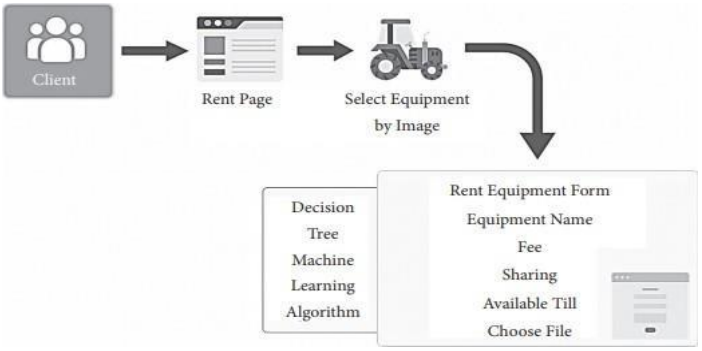


Fig. 4.1: Systematic approach for renting equipment.

- **Location Prediction Approach:**

This is the step where the system identifies the location using Google Maps' longitude and latitude clicked by the users logged in to the system, searches the locations within the range selected by the user, and displays the list of results.

- **Distance and Cost Predication Approach:**

The distance here is used for search and distance of client who is hiring the rented equipment. It will allow the client to have a cost variation that depends on the distance from where the equipment is hired.

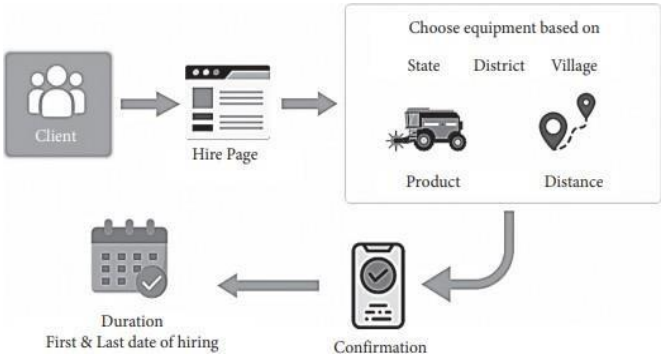


Fig. 4.2: Distance and cost approach.

- **Decision Tree Algorithm:**

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. These are the basic fundamental steps to explain this tree. The leaves represent the final outcomes, and the decision nodes represent the points at which the data is split . Training data may be used for both regression tasks but is mostly employed for addressing classification issues. Figure depicts a representation of the decision tree. An internal node represents a data set feature; a branch represents a rule base; and each leaf node represents a result. A decision tree has two nodes, a decision node and a leaf node. Selection nodes serve to make any decision, while leaf nodes act as the results of such choices. The judgements of the tests are based primarily mostly on the data sets characteristics.

- **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 aniterative process.
- Assigns each data point to its closest k-center. Those datapoints which are near to the particular k-center, create a cluster.

4.2 Data Flow Diagram:

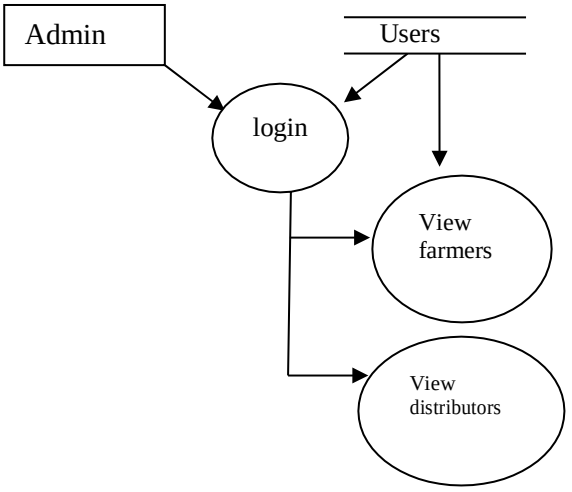


Fig 4.3: Site Can be visited by

- 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.

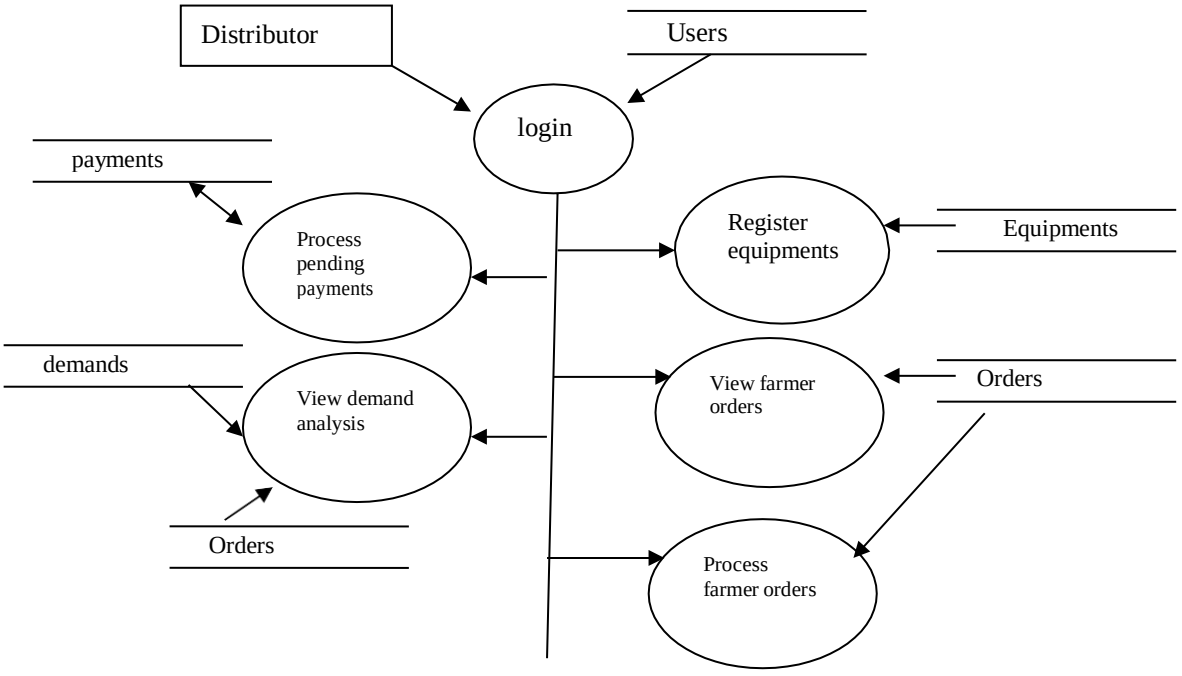


Fig 4.4: Distributor

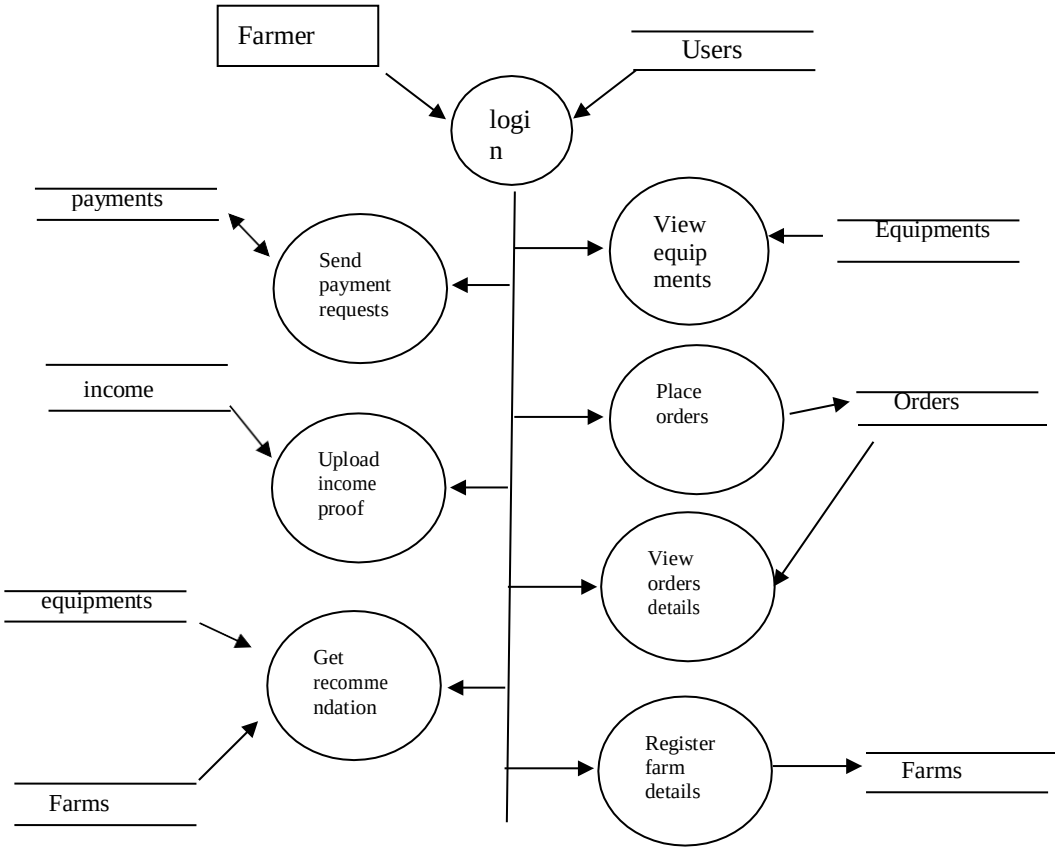


Fig 4.5: Farmer

CHAPTER 5

IMPLEMENTATION & RESULTS

5.1 IMPLEMENTATION:

5.1.1 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 DataDeduplication 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.

5.1.2 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:**

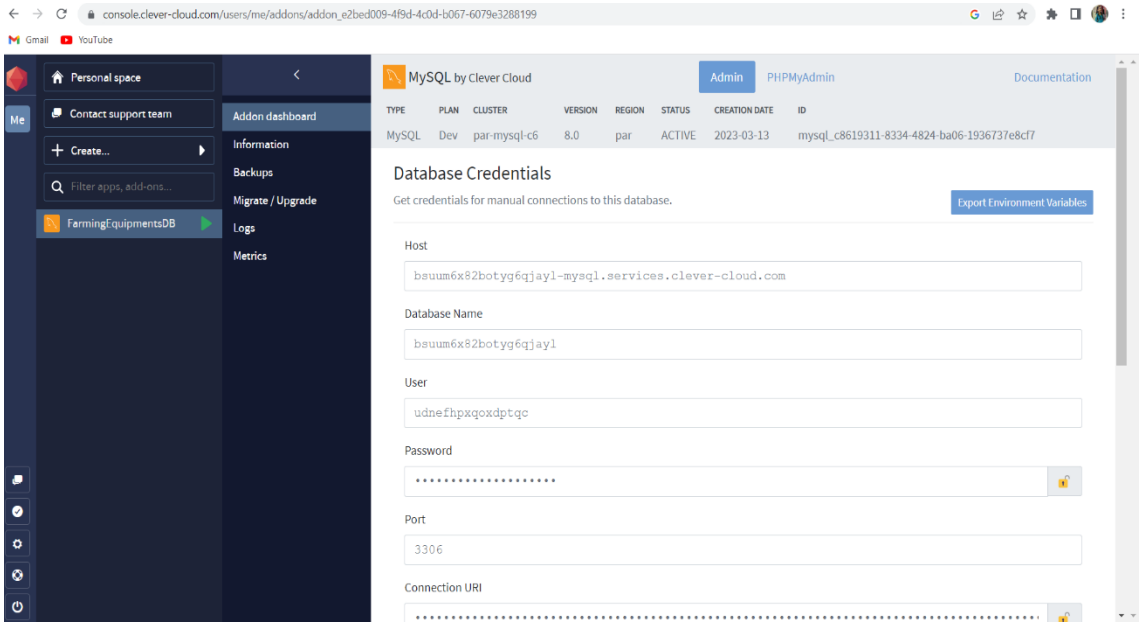
In this stage, we have implemented recommendation and demand analysis modules. Farmers will register their farm details and on the basis of farmer's profile we have build the equipments recommendation using decision tree algorithm.

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.

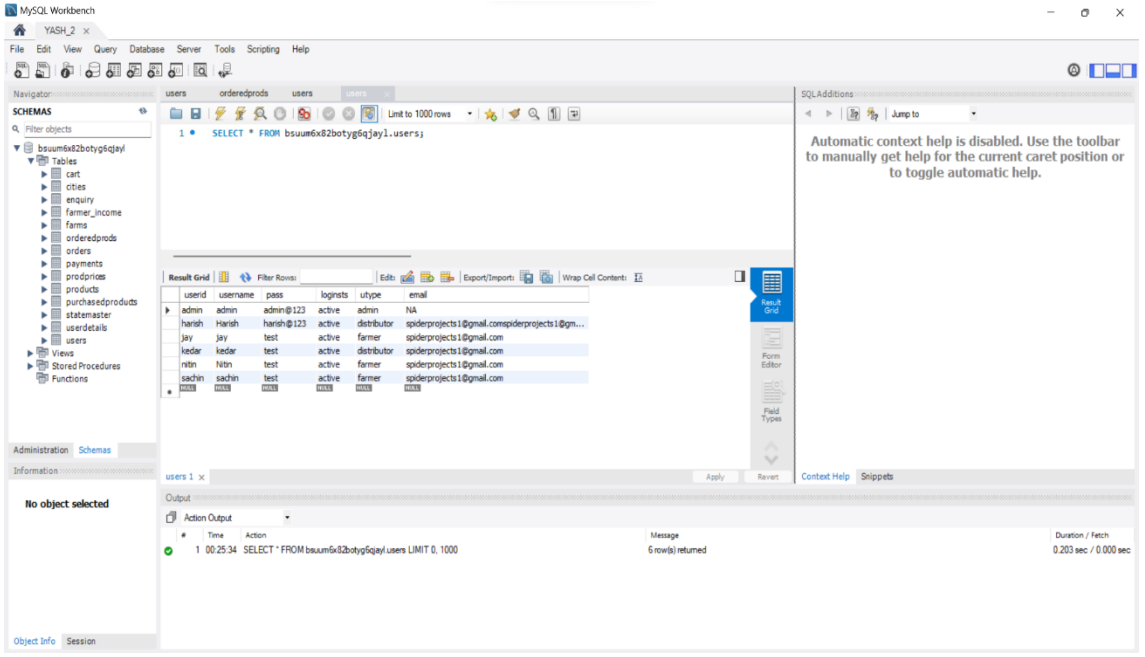
5.2 RESULT:

5.2.1 Screenshots:

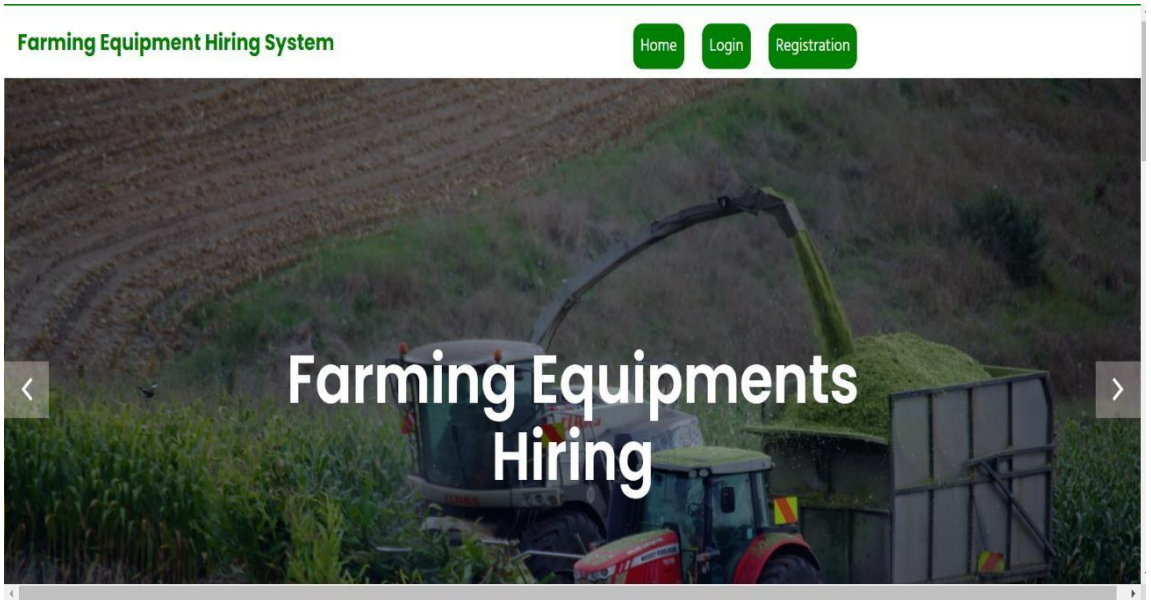
Screenshot 1: Database on Clever Cloud:



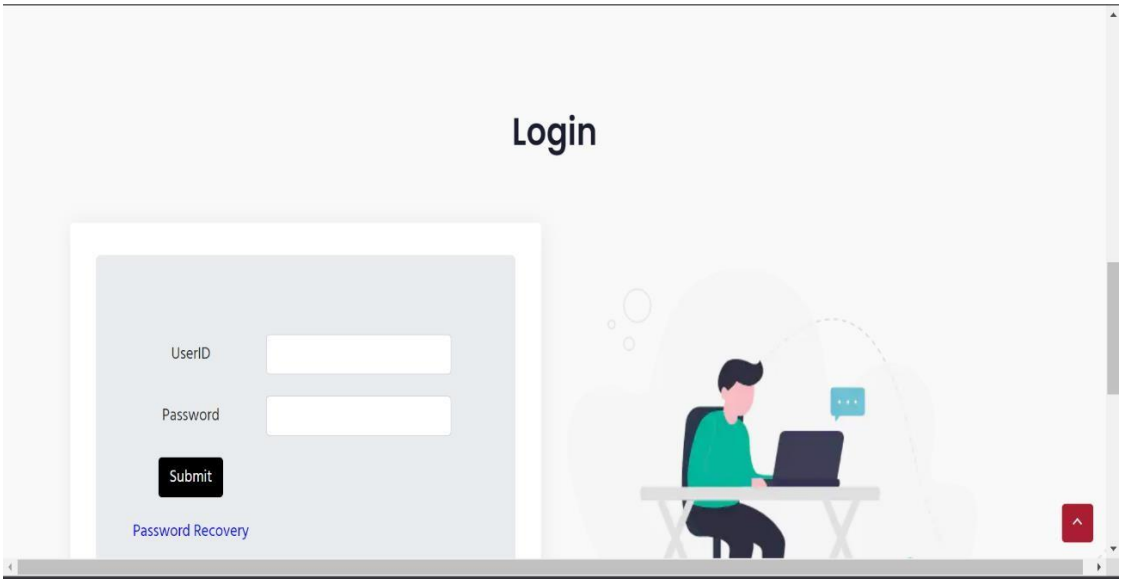
Screenshot 2: MySQL Workbench-Users:



Screenshot 3: Home Page:

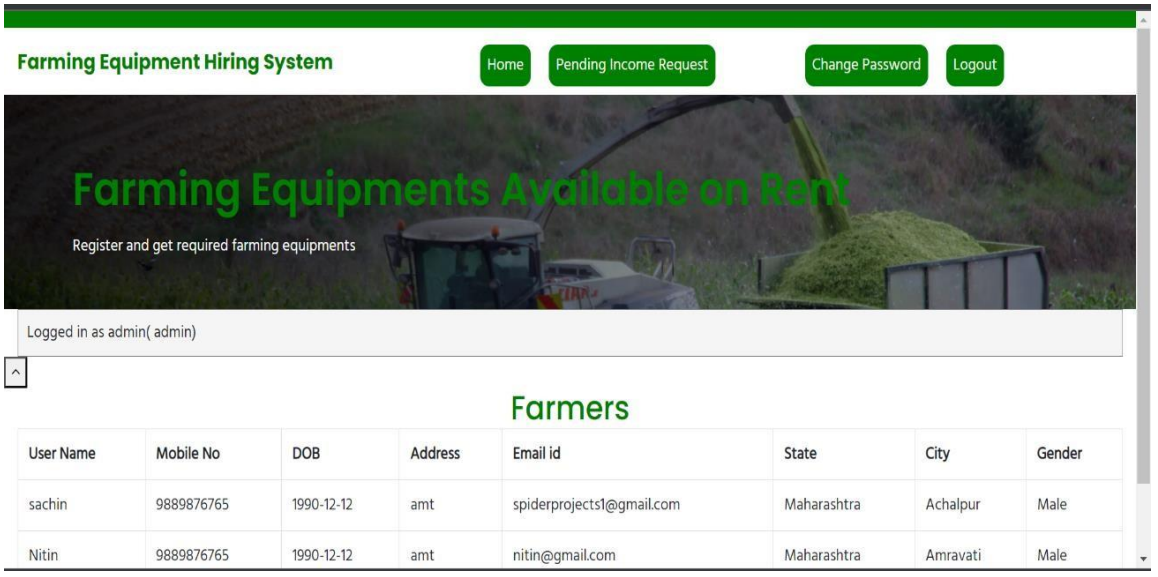


Screenshot 4: Login/Registration:

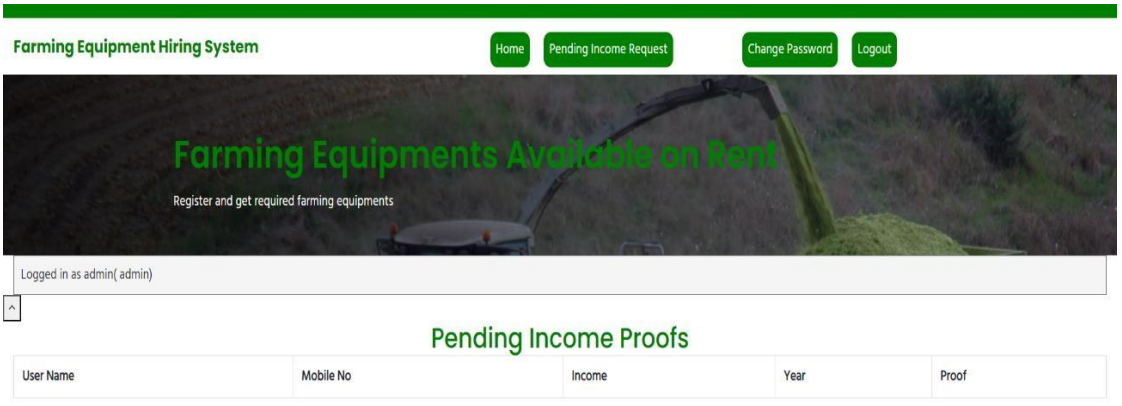


- **Login as Admin:**

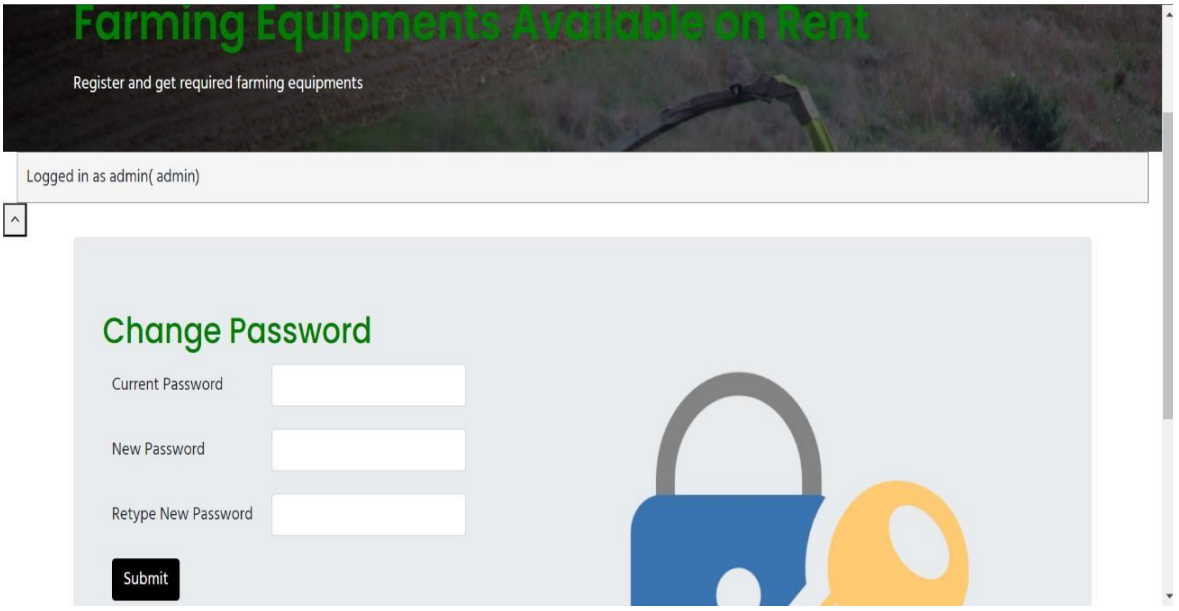
Screenshot 5: Admin Home Page:



Screenshot 6: Pending Income Requests:

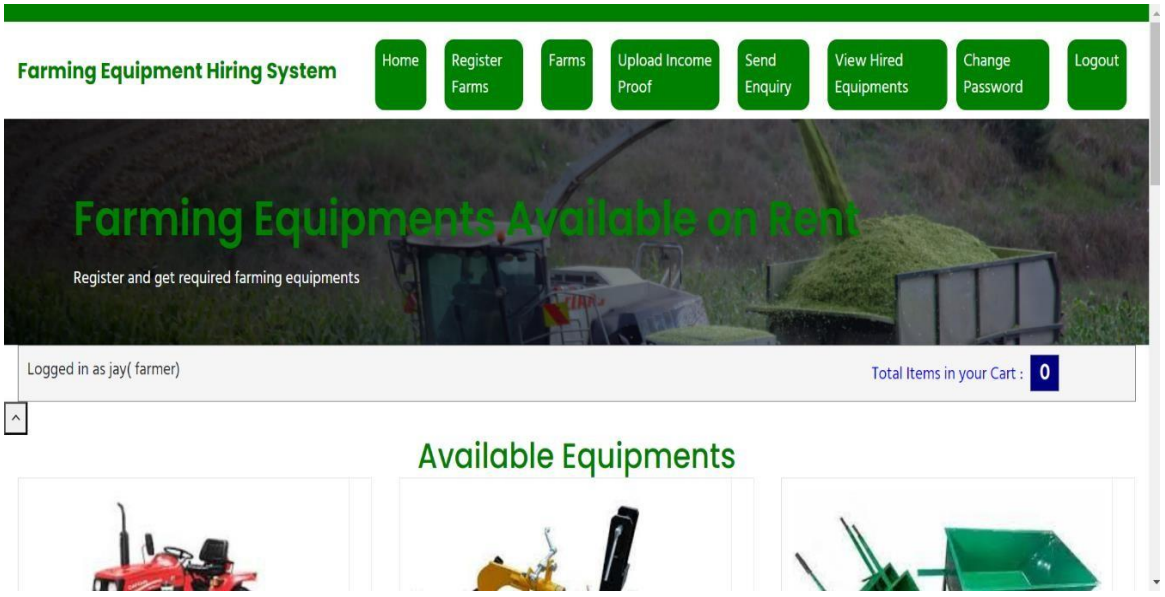


Screenshot 7: Change Password:

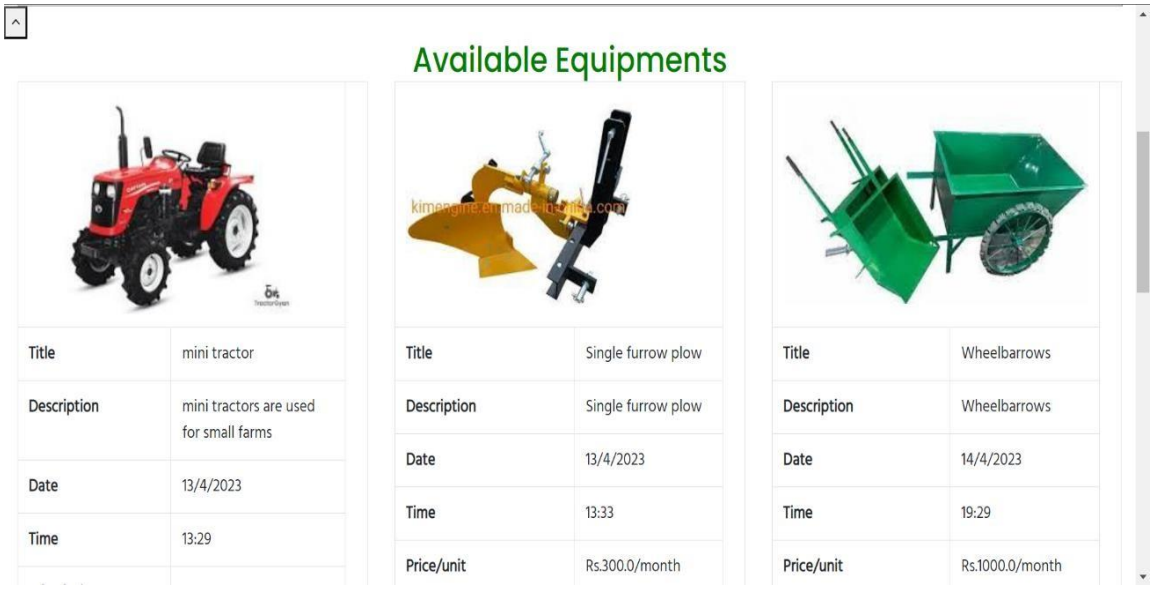


- **Login as Farmer:**

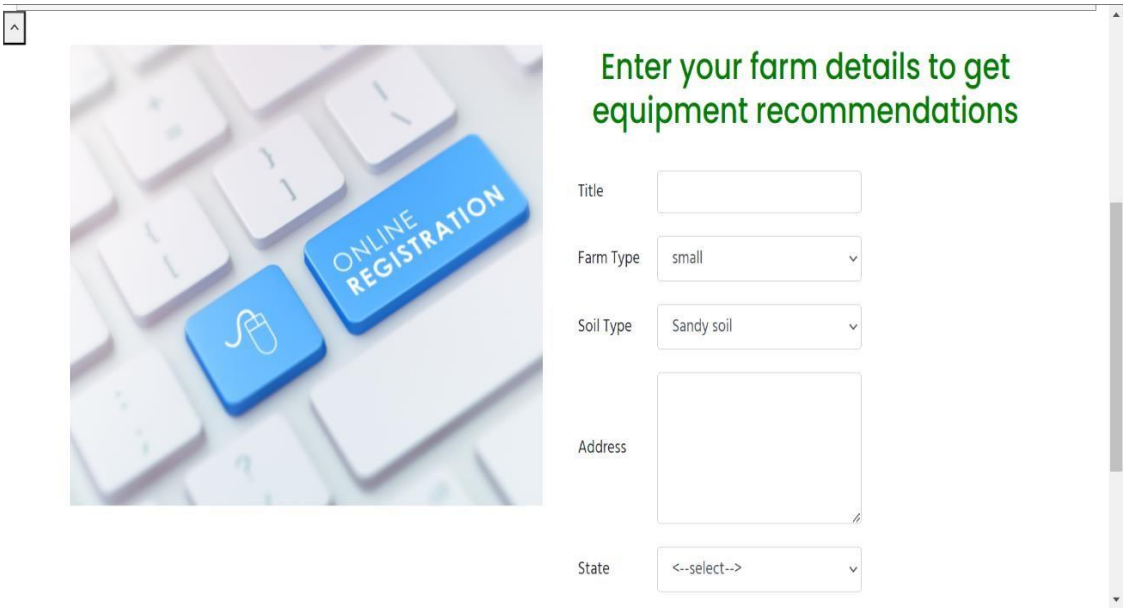
Screenshot 8: Farmer Home Page:



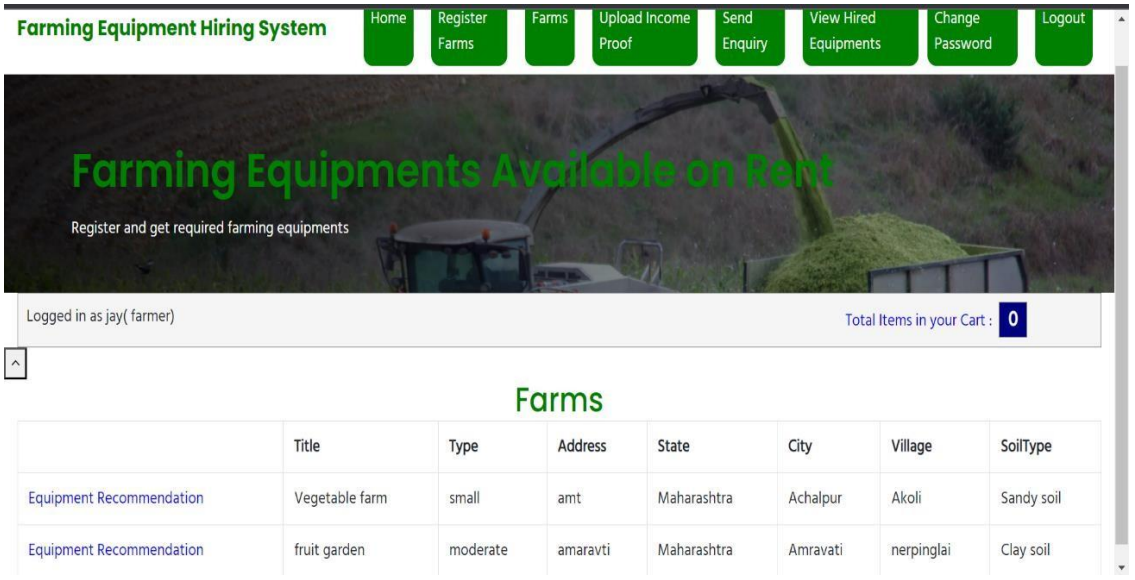
Screenshot 9: Available Equipments:



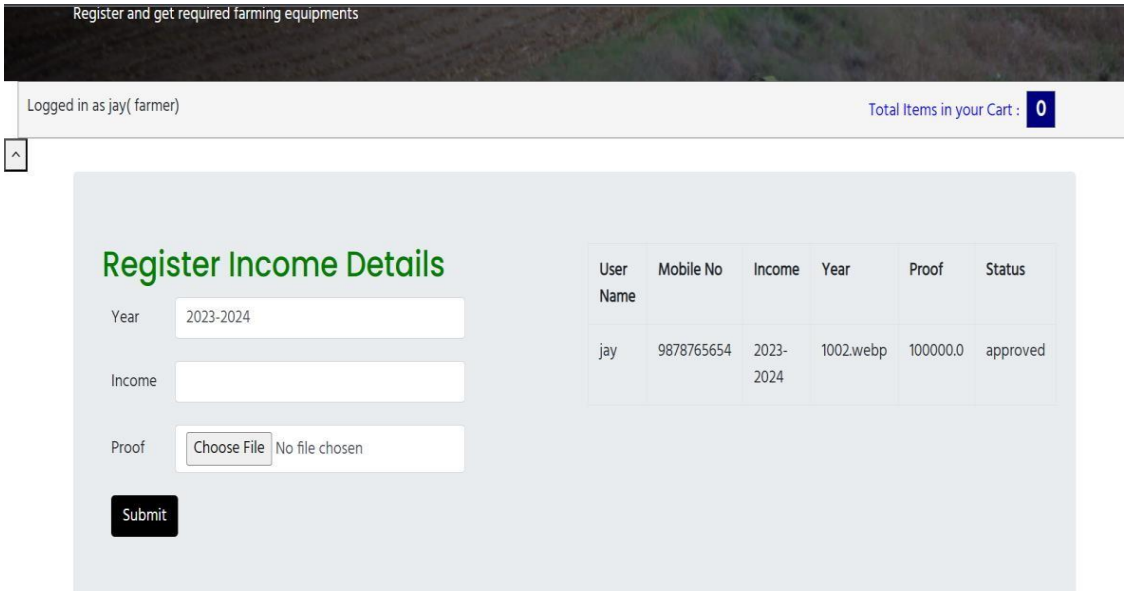
Screenshot 10: Farm Registration:



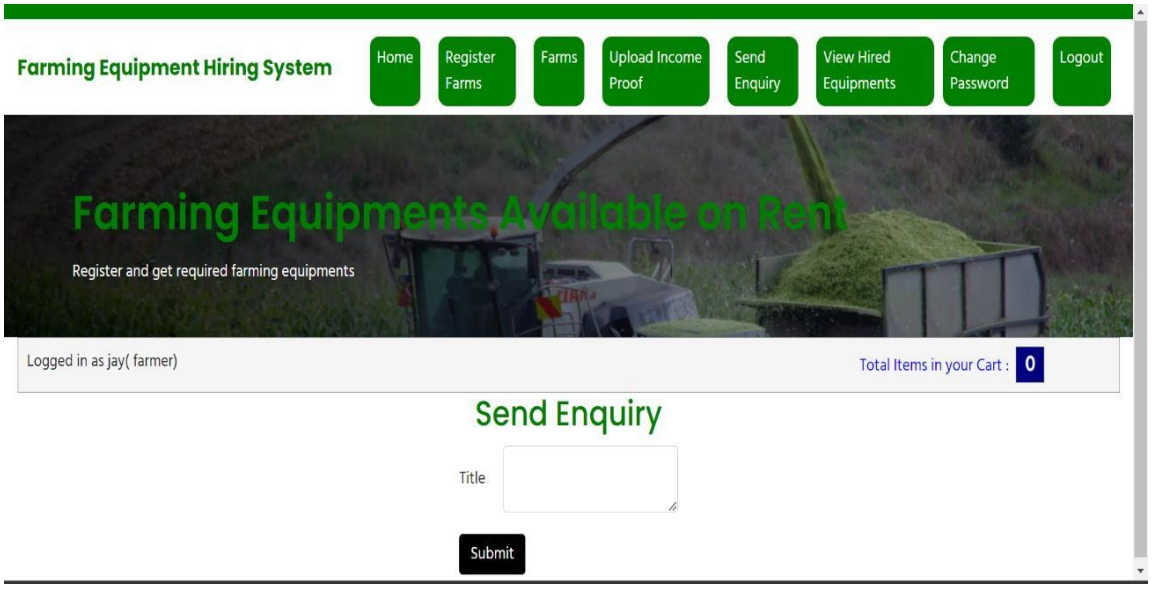
Screenshot 11: Farms:



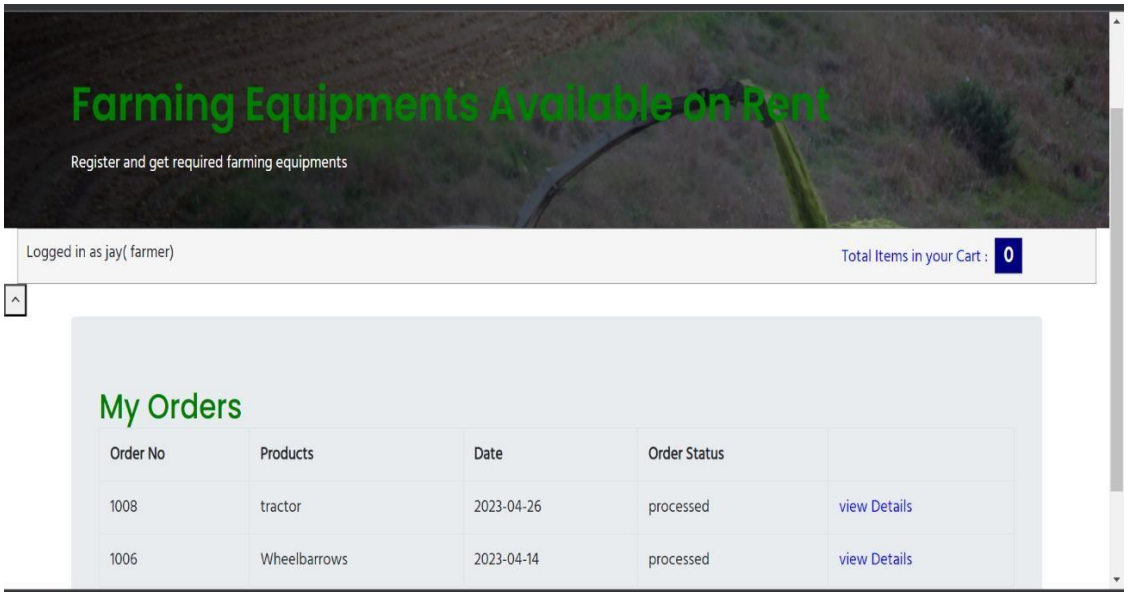
Screenshot 12: Upload Income Proof:



Screenshot 13: Send Enquiry:

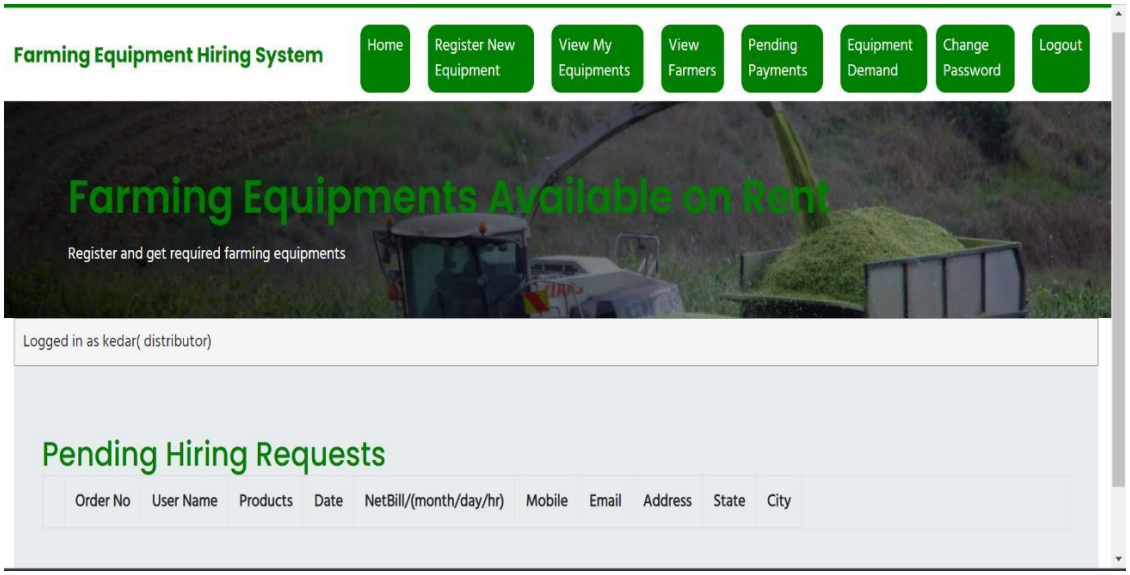


Screenshot 14: View Hired Equipments:

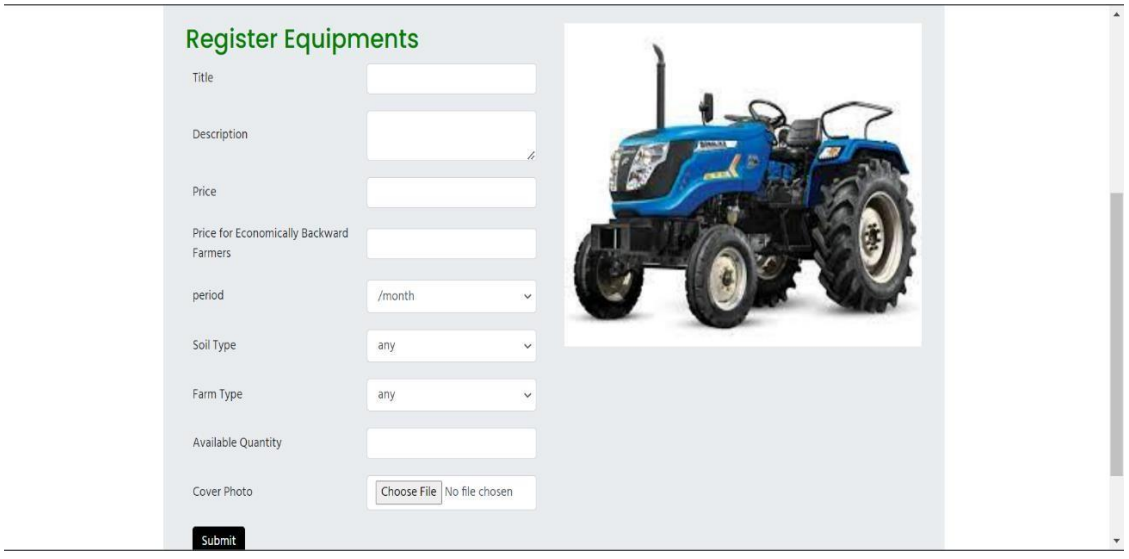


- **Login as Distributor:**

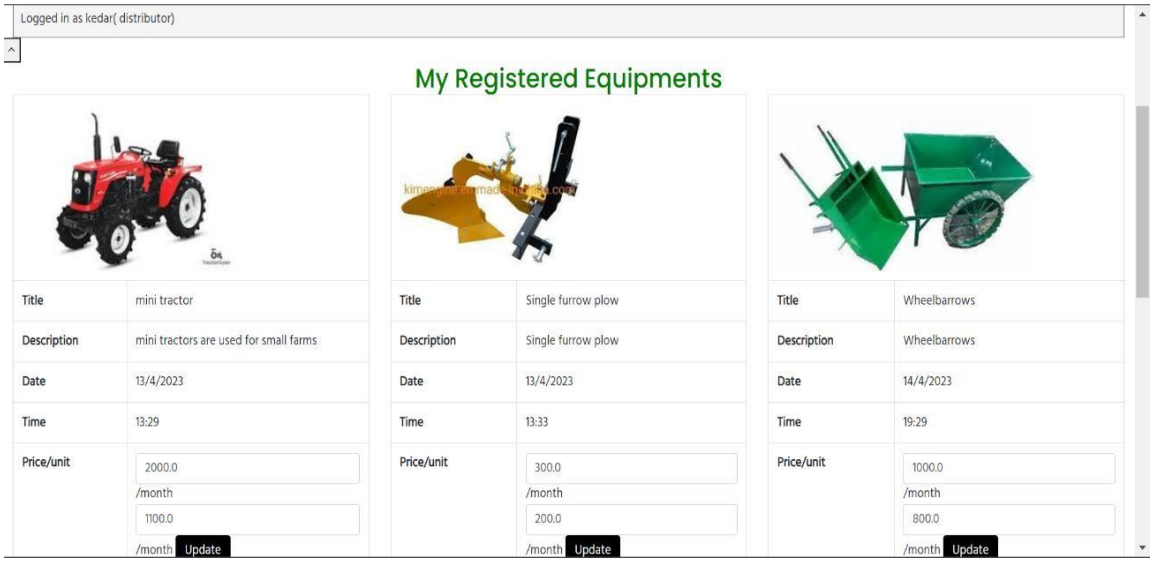
Screenshot 15: Distributor Home Page:



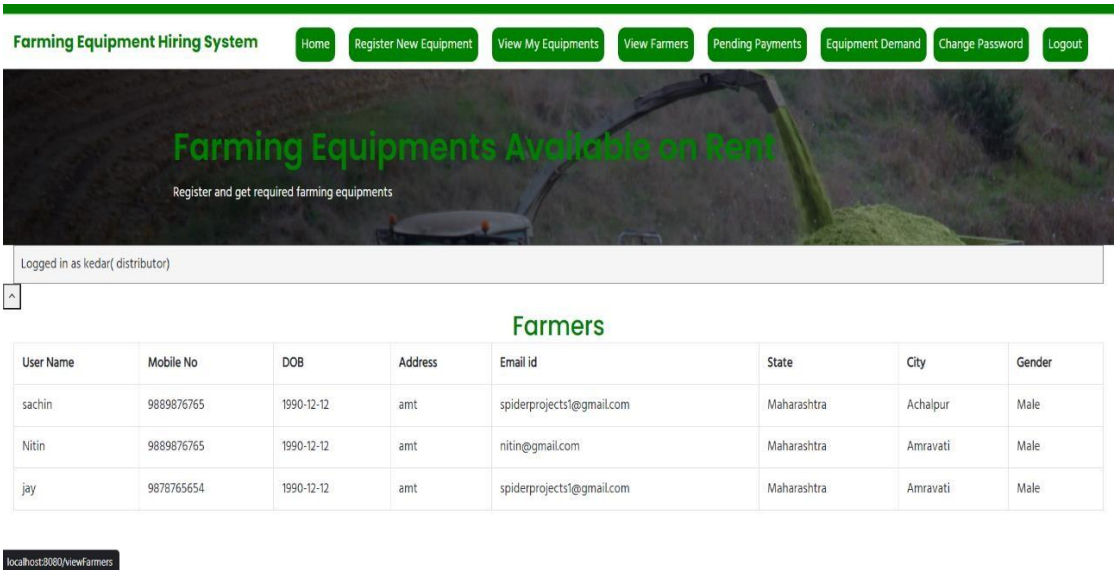
Screenshot 16: Register New Equipments:



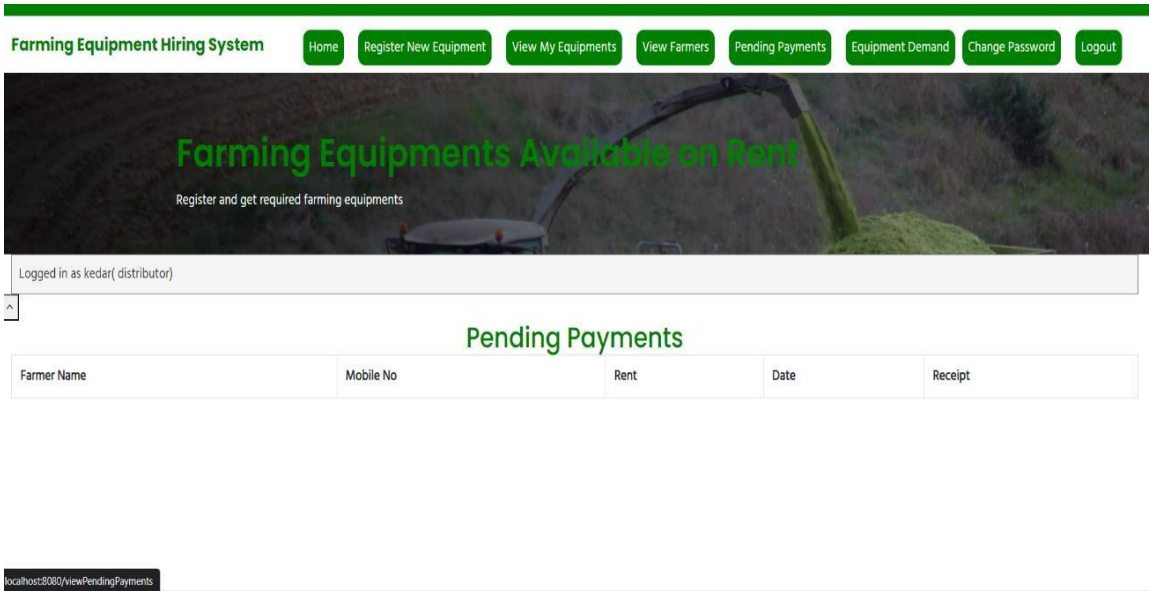
Screenshot 17: Distributor's Registered Equipments:



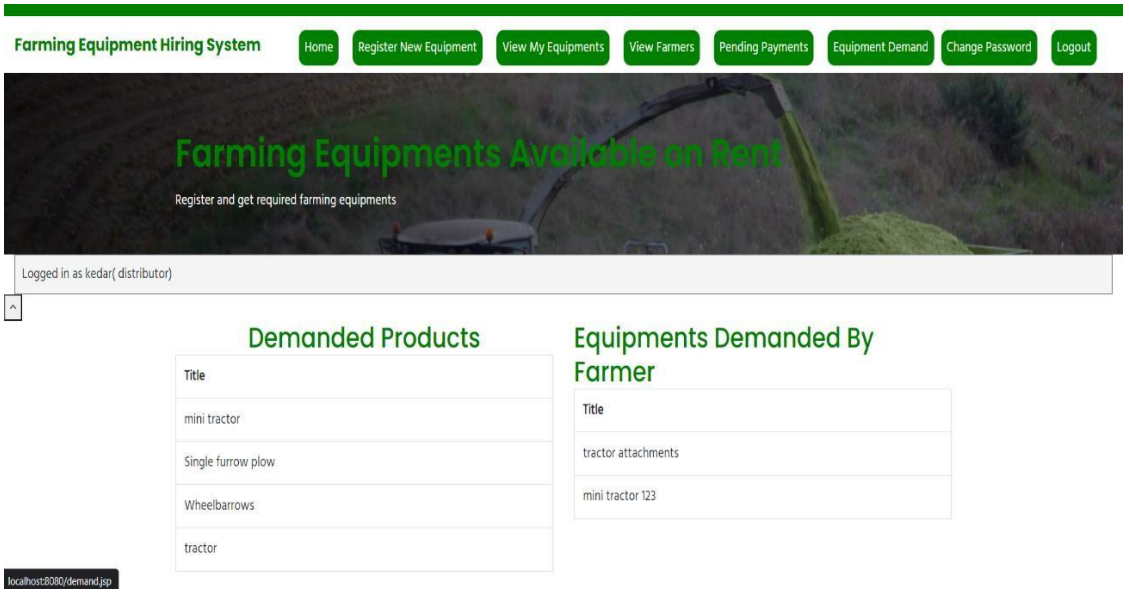
Screenshot 18: View Farmers:



Screenshot 19: Pending Payments:



Screenshot 20: Equipment Demand:



CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1. Conclusion

Farmers' physical labor and debt are reduced as a result of agricultural automation, which emphasizes efficient and effective use of various machines in farming operations with the purpose of reducing physical labor and debt. It is a revolutionary idea in agriculture to create custom hiring centers, which are intended to make it easier for like-minded farmers to embrace technology/machinery for enhanced resource management practices. the study in question examines the significance of tool renting and sharing in the workplace. Rental and sharing equipment are two approaches that might be used to enable farmers to borrow equipment at a cheaper cost than they would otherwise have to pay for it.

This project developed smart tillage, a platform that enables farmers to rent and lease equipment. The study also built a machine learning model. Decision trees are ideal for machine learning and tool and equipment hiring. It also tries to improve farmers' quality of life by decreasing labor-intensive tasks.

This thesis focuses on smart farming via equipment sharing and leasing. The proposed tasks employing various machine learning techniques were developed as a result of exploratory and highly experimental work; future work is expected to include new experiments as related method and result optimization.

6.2. Future Scope

The online administration framework for Agri-Equipment rental framework was made to guarantee the productive task. It reduces the manual work. It reduces the paper work, thus supporting the sustainable environment. It saves time also. Analytics can be extended in such a way that State head can view, in which region which machinery is required and move to that location in prior. Inclusion of crops and fertilizers to the list. Inclusion of GPS and maps which can help in identifying the current locomotion state of the equipment.

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RESUME

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EDUCATION DETAILS

Name of Board		Passing Year	% of Marks/ CGPA
10th SSC	Maharashtra State Board	2017	92.40
12th HSC	Maharashtra State Board	2019	73.69
Diploma	Maharashtra State Board Of Technical Education		

Bachelor Of Engineering (B.E)		Passing Year & Month	Marks Obt/ Out of	% of Marks	Pointer
I st Year	I - SEM	**W-2020**	**415/600**	**65.83**	**8.08**
	II - SEM	**S-2020**	**497/600**	**82.83**	**9.70**
II nd Year	III - SEM	**W-2021**	**677/700**	**96.71**	**10**
	IV - SEM	**S-2021**	**721/800**	**90.12**	**10**
III rd Year	V - SEM	**W-2022**	**657/700**	**93.85**	**10**
	VI - SEM	**S-2022**	**451/700**	**64.42**	**6.8**
IV th Year	VII - SEM	**W-2023**	**438/700**	**62.57**	**6.87**
	VIII - SEM				

PLACEMENT DETAILS	
Campus Placement (If Any)	NA
(If Any) Name Of Company	**NA**

FUTUTRE PLANNING		
Higher Studies/ Job Preferences	Higher Studies	Yes
	Job	
	Training	
	Business	

Place: Nagpur
Date: 20/4/2023

Signature
Name of Student

RESUME

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EDUCATION DETAILS					
Name of Board			**Passing Year**		**% of Marks/ CGPA**
10th SSC	Maharashtra State Board		2017		8.2
12th HSC	Maharashtra State Board		2019		60%
Diploma	Maharashtra State Board Of Technical Education		NA		NA
Bachelor Of Engineering (B.E)		Passing Year & Month	Marks Obt/ Out of	% of Marks	Pointer
I st Year	I - SEM	**W-2020**	**392/600**	**65.33**	**7.56**
	II - SEM	**S-2020**	**489/600**	**81.05**	**9.60**
II nd Year	III - SEM	**W-2021**	**678/700**	**96.85**	**10.00**
	IV - SEM	**S-2021**	**724/800**	**90.05**	**9.95**
III rd Year	V - SEM	**W-2022**	**631/700**	**90.14**	**9.75**
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IV th Year	VII - SEM	**W-2023**	**478/700**	**68.28**	**8.13**
	VIII - SEM				

PLACEMENT DETAILS	
Campus Placement (If Any)	YES
(If Any) Name Of Company	**COGNIZANT, TCS**

FUTUTRE PLANNING		
Higher Studies/ Job Preferences	Higher Studies	
	Job	
	Training	
	Business	

Place: Amravati
Date: 20/4/2023

Signature
Name of Student

RESUME

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EDUCATION DETAILS

Name of Board		Passing Year	% of Marks/ CGPA
10th SSC	Maharashtra State Board	2017	9.4
12th HSC	Maharashtra State Board	2019	64.92
Diploma	Maharashtra State Board Of Technical Education	NA	NA

Bachelor Of Engineering (B.E)		Passing Year & Month	Marks Obt/ Out of	% of Marks	Pointer
I st Year	I - SEM	**W-2019**	**375/600**	**62.50%**	**7.00**
	II - SEM	**S-2020**	**468/600**	**78.00%**	**8.90**
II nd Year	III - SEM	**W-2020**	**677/700**	**96.71%**	**10.00**
	IV - SEM	**S-2021**	**713/800**	**89.12%**	**9.86**
III rd Year	V - SEM	**W-2021**	**624/700**	**89.14%**	**9.65**
	VI - SEM	**S-2022**	**556/700**	**79.42%**	**9.10**
IV th Year	VII - SEM	**W-2022**	**478/700**	**68.28%**	**8.17**
	VIII - SEM				

PLACEMENT DETAILS	
Campus Placement (If Any)	No
(If Any) Name Of Company	-

FUTUTRE PLANNING		
Higher Studies/ Job Preferences	Higher Studies	Yes
	Job	-
	Training	-
	Business	-

Place: Amravati
Date: 20/4/2023

Signature
Name of Student

RESUME

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NAME	Swaraj Gajanan Rawate
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EDUCATION DETAILS

Name of Board		Passing Year	% of Marks/ CGPA
10th SSC	Maharashtra State Board	2017	91.40
12th HSC	Maharashtra State Board	2019	67.08
Diploma	Maharashtra State Board Of Technical Education		

Bachelor Of Engineering (B.E)		Passing Year & Month	Marks Obt/ Out of	% of Marks	Pointer
I st Year	I - SEM	**W-2020**	**395/600**	**65.83**	**7.08**
	II - SEM	**S-2020**	**439/600**	**73.16**	**8.3**
II nd Year	III - SEM	**W-2021**	**670/700**	**95.71**	**10**
	IV - SEM	**S-2021**	**717/800**	**89.62**	**9.91**
III rd Year	V - SEM	**W-2022**	**626/700**	**89.42**	**9.8**
	VI - SEM	**S-2022**	**454/700**	**64.85**	**7.45**
IV th Year	VII - SEM	**W-2023**	**435/700**	**62.14**	**7.13**
	VIII - SEM				

PLACEMENT DETAILS	
Campus Placement (If Any)	NA
(If Any) Name Of Company	**NA**

FUTUTRE PLANNING		
Higher Studies/ Job Preferences	Higher Studies	Yes
	Job	
	Training	
	Business	

Place: Amravati
Date: 20/4/2023

Signature
Name of Student