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Supply Chain Management for Business Process Optimization using Decision Tree Regression Model

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Abstract: *Business process optimization and increases supply chain is the practice of increasing organizational efficiency by improving optimized processes, and supply chain lead to optimized business goals. Any business model supply chain can be improvised by optimizing the process between two or more parties. In our application, there is a need to optimize and classify a large amount of data between clients and enterprises, then classify requirements and purchase update details between employees and the purchasing team. Thus we propose a Decision tree regression model. Decision trees are powerful machine learning algorithms that can be used for classification and regression tasks. They work by splitting the data up multiple times based on the category that they fall into or their continuous output in the case of regression. In the base paper Linear regression is used to predict output but for a linear relationship between dataset and output variable.*

Keywords: Business process optimization

I. INTRODUCTION

Our application plays a vital role in the classification of data provided by the client which contains multiple types of data nonlinear by nature. Our proposed model is Decision tree regression that learns by splitting the training examples in a way such that the sum of squared residuals is minimized. It then predicts the output value by taking the average of all of the examples that fall into a certain leaf on the decision tree and using that as the output prediction. As there is a lot of data involved in the process classification and regression models are necessary. Eventually, whenever there are a lot of complex datasets involved in the process we recommend a decision tree model. Thus Linear Regression model is not recommended in our scenario as there is a nonlinear relationship between the dataset and the output variable. By mitigating the redundancy and unnecessary process involved in large data classification business our proposed system is vital.

1.1 PURPOSE OF THE SYSTEM

- Finding the fault with in an efficient time.
- Swift action in reallocation of respective machines.
- Increased productivity.
- Graphical view of monitoring system which is interactive to find malfunction.
- To retain customer.

1.2 INPUT AND OUTPUT

The major inputs and outputs and major functions of the system are follows:

Input:

- The employee must create the account for login. All the employee details have been stored the data in our database.
- The employee gets their corresponding machines with prior training by the data trainer.
- The production team updates the error to admin to resolve the issue on production side.
- Customer purchasing the product approach the industry and provide the requirements.

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Output:

- The production team which is monitoring the machine performance will note the error raised by the machines in the graphical view.
- Reallocating the machine has the same functionality of the faulty machine results in speedy recovery of production efficiency.

1.3 LIMITATIONS

- Existing system is not cost effective while compared to the proposed system.
- Output is not visualizing the error to mitigate the future error.
- The huge distributed computing system
- More Regression is used which is not a good idea by industrial standards.
- The changed machine can again give failure data

1.4 PROBLEMS IN EXISTING SYSTEM

In the previous application and our base paper, the Linear regression model is used as that scenario is a linear relationship between dataset and output variable. Linear regression can be prone to underfitting the data. If you build a model using linear regression and you find that both the test accuracy and the training accuracy are low then this would likely be due to underfitting. Our application creates non-linear data as the relationship between clients and enterprises is complex. Eventually, Decision tree regression is good in handling complex datasets and it utilizes the fullest potential of the decision tree to classify the complex data and create a robust supply chain by mitigating the unnecessary process involved to complete the job.

1.5 PROPOSED SYSTEM

Our proposed model helps identify the required prototype upload by the number of clients and the data itself is complex non-linear data that requires a lot of analysis and optimization then the employee and purchase team need to create a mechanism where supply chain and productivity should only increase not in reverse. As there is complex data involved in the process for classification, decision trees are used. Decision trees learn by splitting the training examples so that they can divide the data into subsets that separate the categories the data points fall into as much as possible. They then make output predictions based on the most common category in the subset that the new example would fall into. Admin verifies and manages clients and their data then derived output from enterprises using ML decision tree enables the testing process of enterprises faster agreement after confirmation. Our Employee and Purchase team plays an important role to keep updating the requirements of material and purchase list for the following. Thus our proposed system manages the number of clients and maintains the supply chain.

Advantages:

- One of the advantages of decision trees is that their outputs are easy to read and interpret without requiring statistical knowledge
- Compared to other decision techniques, decision trees take less effort for data preparation
- They can also create classifications of data without having to compute complex calculations
- Another advantage of decision trees is that there is less data cleaning required once the variables have been created.

1.6 PERFORMANCE REQUIREMENTS

Performance is measured in terms of the output provided by the application. Requirement specification plays an important part in the analysis of a system. Only when the requirement specifications are properly given, it is possible to design a system, which will fit into required environment. It rests largely in the part of the users of the existing system to give the required specifications because they are the people who finally use the system. This is because the requirements have to be known during the initial stages so that the system can be designed according to those

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requirements. It is very difficult to change the system once it has been designed and on the other hand designing a system, which does not cater to the requirements of the user, is of no use.

II. SYSTEM DESIGN

2.1 Module Description:

- Client
- Enterprise
- Employee
- Purchase team
- Admin

2.2 Client

This module provides the registration process with the client details of name, email id, contact number, and password. Within this, the client can log in to the client page. After the login process in the client module client uploads the company details. Once the company uploads its details and then it uploads the product details. In the another sub-module the client makes the agreement with the enterprises.

2.3 Enterprises

This module provides the registration process with the enterprises details of name, email id, contact number, and password. After registration, the enterprises can log in to the page. Within the enterprises module there are many sub-modules in which in one module, the enterprise view the product details. In the another sub-module, the enterprise analyse the product details. And finally the enterprise makes the agreement with the client.

2.4 Employee

This module provides the registration process with the employee details of name, email id, contact number, and password. After registration, the employee can log in to the page. Within the employee module there are many sub-modules in which in one module, the employee uploads the work in and work out details. In the another module the employee requests the needs for the manufacturing process.

2.5 Purchase team

This module gives the registration process with the Purchase team details of name, email id, contact number, and password. After registration, the purchase team can log in to the page. Within the purchase team module, there are sub-modules in which the requested material can be viewed. In the another sub-module the purchase team can supply the requested materials. And finally the purchase team can upload the stock files.

2.6 Admin

This module allows the admin to login into the admin page. In the admin module, there are sub-modules in which the admin approves the client. In the another sub-module, the admin approves the client. Then in the another sub-module, the admin view the uploaded products. Then the admin send the product details to the client. In the final module, the admin manages the client.

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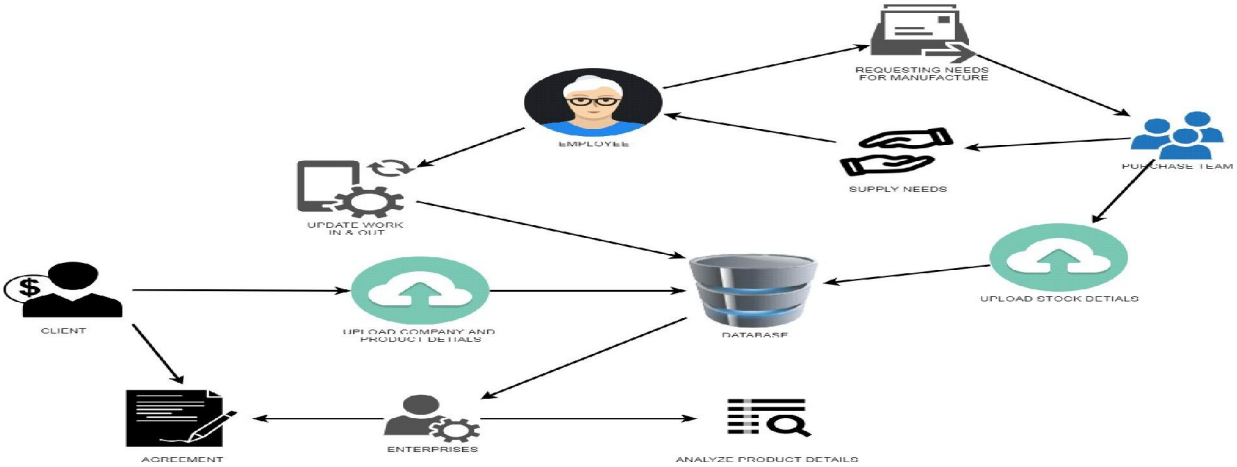
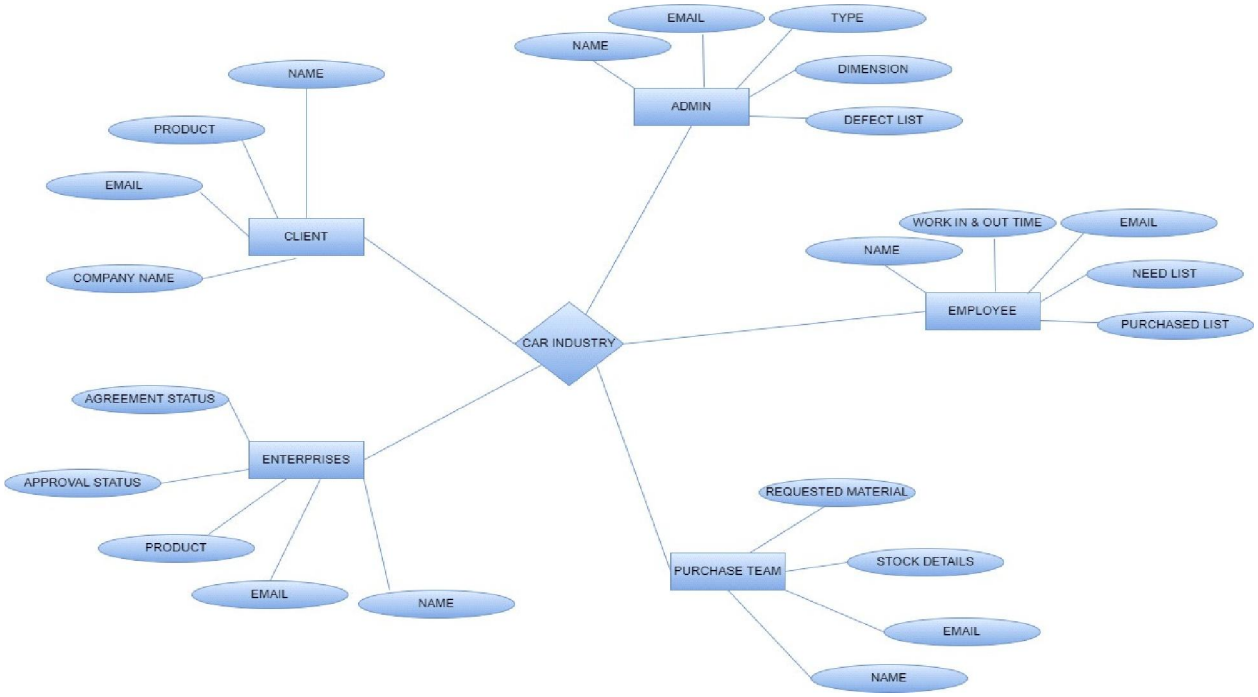
III. SYSTEM ARCHITECTURE



3.1 E – R DIAGRAMS



The relation upon the system is structured through a conceptual ER-Diagram, which not only specifics the existing entities, but also the standard relations through which the system exists and the cardinalities that are necessary for the system state to continue.

The Entity Relationship Diagram (ERD) depicts the relationship between the data objects. The ERD is the notation that is used to conduct, the date modeling activity the attributes of each data object noted, is the ERD can be described resign a data object description.

The set of primary components that are identified by the ERD are

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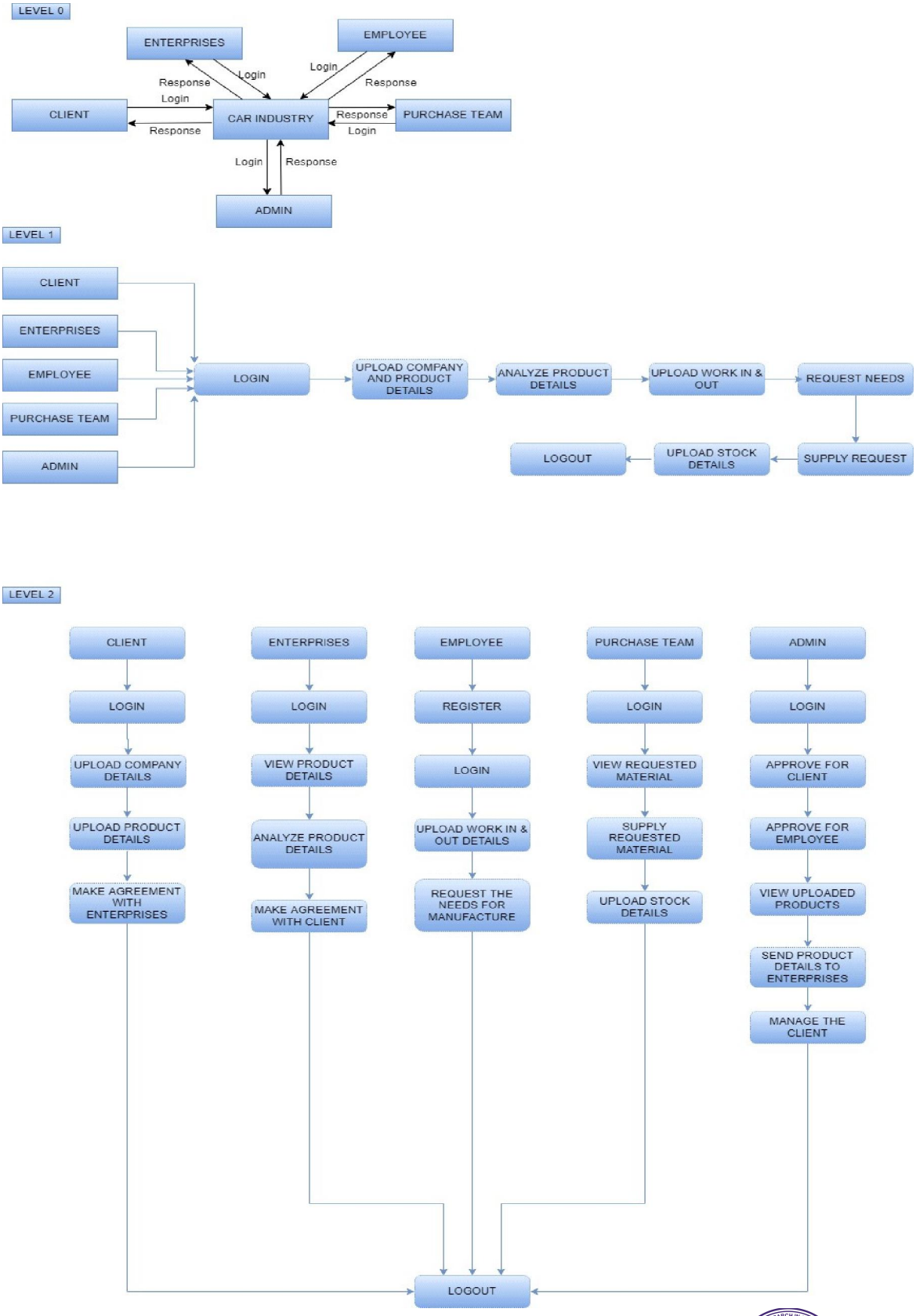
3.2 DATA FLOW DIAGRAMS



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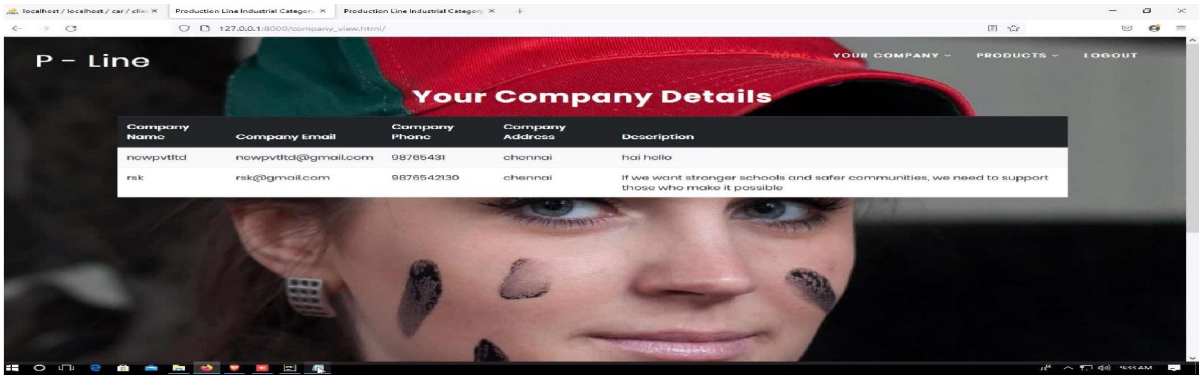
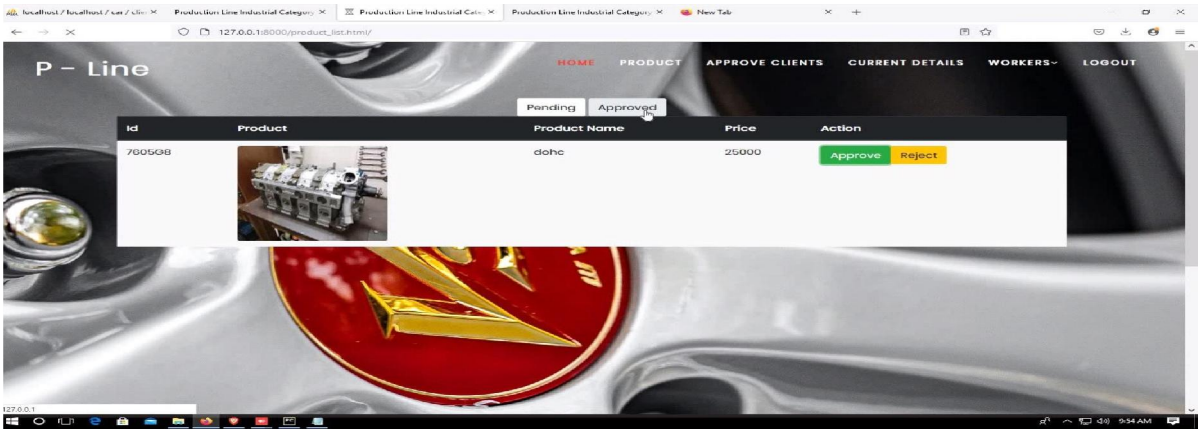
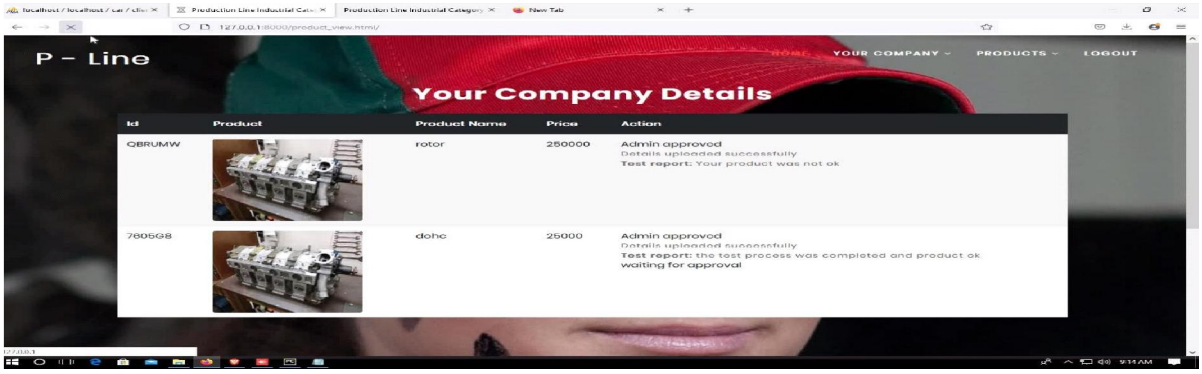
IV. OUTPUT SCREENSHOTS







V. CONCLUSION AND FUTURE ENHANCEMENT

Our application creates an environment for a large-scale business medium where several clients can upload their prototypes. Each client's prototype may be a nonlinear dataset. So, Enterprise needs to find required prototypes for the given complex nonlinear datasets, thus we applied a decision tree model. Yet decision tree is less effective in predicting the outcome of a continuous variable In addition, decision trees are less effective in making predictions when the main goal is to predict the outcome of a continuous variable. This is because decision trees tend to lose information when categorizing variables into multiple categories. So, In the future application can be improvised by adding functionality where the prediction or classification can be achieved even when there is a continuous variable.

In the future scope need to add some additional features which can assist the trainer or maintainer to reduce the effort for them. This means if failure is found in the console then it visualizes the failure of a particular machine and also it

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type along with that automatically change or allocate the fail occurred machine with an error-free machine this reduces the effort of the trainer or maintainer.

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