PROJECT REPORT

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TITLE OF THE PROJECT :

AI-Enabled FinTech B2B Invoice Management Application

CONTENTS :

INTRODUCTION

B2B

B2B stands for Business to Business. It deals with the Business ecosystem where a buyer business takes service from a seller business and they work out this process on credits. An invoice is generated by a seller business when a buyer business orders the service to the seller business. An invoice contains detailed information about the transaction occurring between the businesses primarily the date when payment should be made.

INVOICE MANAGEMENT APPLICATION

An Invoice Management Application is a web application which is used to track the transactions between businesses. The buyer business needs to clear its amount due before the due date. To maintain the above fact, generally a department is already set up at organizations or businesses which uses this kind of Invoice Management Application to basically keep a check on the integrity of the business and hence, to make sure the payment is made before the due date and remind those businesses for the same. If not, then to track the activities of such business for future purpose.

AI ENABLING

Here, I have implemented the prediction feature in the web application which predicts the date of payment of a buyer business using its past records and activity. The domain of Machine Learning has played a pivotal role in building this project and specifically this feature. Using a dataset which contained various aspects determining the traits of a business, I implemented Linear Regression algorithm on the dataset in order to predict the expected date of payment. We'll discuss more about this in the Project Implementation section.

UI DEVELOPMENT

The most vital component of a web application is its User Interface. I have created the UI for this web application using a dynamic javascript library called ReactJS. The UI consists of a table which contains the same aspects as contained in the dataset which is used for the prediction of payment date. I have also created a predict button and as the name suggests, it is used to predict the payment date using the data present in the table and is integrated with the Machine Learning segment of the project.

DATABASE INTEGRATION

I have used the most widely used database management and retrieval software called SQLyog which uses SQL (Structured Query Language) to store and retrieve the data. The back-end part is handled by JAVA and connecting it with SQL parses all the data stored in the database and transfers it to the web application.

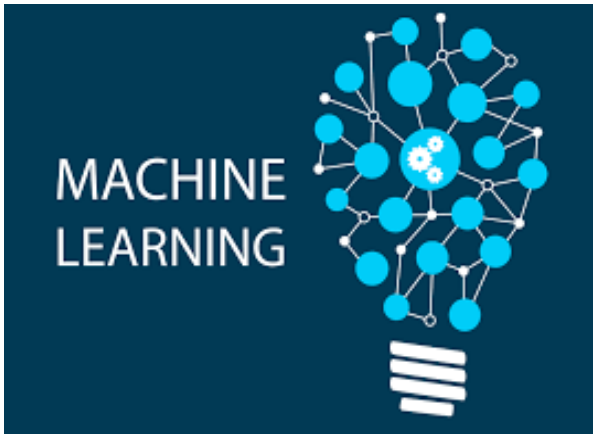
TECHNOLOGIES USED

MACHINE LEARNING

REACTJS

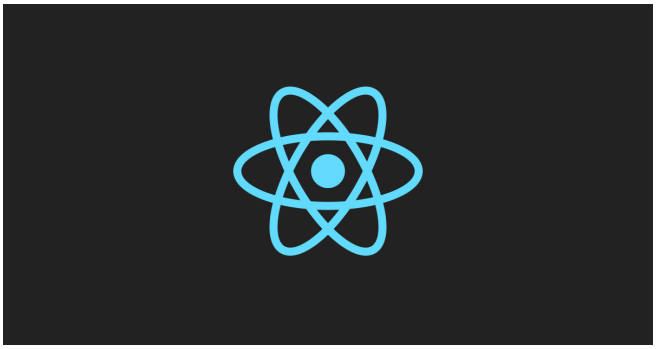
JAVA

SQL



Machine learning is a branch of artificial intelligence (AI) focused on building applications that learn from data and improve their accuracy over time without being programmed to do so. In machine learning, algorithms are 'trained' to find patterns and features in massive amounts of data in order to make decisions and predictions based on new data. The better the algorithm, the more accurate the decisions and predictions will become as it processes more data.

Machine learning is the process that powers many of the services we use today—recommendation systems like those on Netflix, YouTube, and Spotify; search engines like Google and Baidu; social-media feeds like Facebook and Twitter; voice assistants like Siri and Alexa. The list goes on.



React is an open-source front-end JavaScript library for building user interfaces or UI components. It is maintained by Facebook and a community of individual developers and companies. React can be used as a base in the development of single-page or mobile applications. However, React is only concerned with state management and rendering that state to the DOM, so creating React applications usually requires the use of additional libraries for routing, as well as certain client-side functionality.

Java is a high-level, class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible. It is a general-purpose programming language intended to let application developers write once, run anywhere (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. Java applications are typically compiled to bytecode that can run on any Java virtual machine (JVM) regardless of the underlying computer architecture.

SQL (Structured Query Language) is a domain-specific language used in programming and designed for managing data held in a relational database management system (RDBMS), or for stream processing in a relational data stream management system (RDSMS). It is particularly useful in handling structured data, i.e. data incorporating relations among entities and variables.

PROJECT IMPLEMENTATION

The project was completed in two halves:

1. Machine learning
2. UI and database

MACHINE LEARNING:

This half involved :

Data Collection:

Gathering the dataset in the form of rows and columns of buyer business containing their past activities related to payment of the service.

Data pre-processing:

1. Cleaning the dataset which means excluding any NULL values, missing values and duplicate values so that the model could give accurate results.

2. Normalize and standardize the data using appropriate methods and functions so as to achieve a more desired score.

Exploratory Data Analysis:

1. Performed EDA on the pre-processed dataset to gather insights from the data to further visualize and choose the most vital features from the dataset.

2. Visualized the dataset using various plots given in the library of Python like Matplotlib, Seaborn to choose which features have more impact on the date of payment of the business.

3. Analyzed the data to accumulate various statistics involved with the data.

4. Split the dataset into train and test set in order to feed the model, the train set and match it with the test set.

Train the model :

1. After getting to know the most important features in the dataset, I implemented Linear Regression algorithm from the scikit learn library of Python.

2. Linear Regression takes the features and tries to predict the target feature by generating a linear relationship between the features and the target variable.

3. Once the model is trained and stored into a variable, the variable was used to fit the model in the test dataset.

Prediction:

The model was hence, deployed using flask to be used in the web application to enable the predict facility in the UI.

UI & DATABASE:

This half involved :

Back end :

1. Read the dataset using buffer reader in JAVA.

2. Parsed, Processed and loaded the dataset into SQL by establishing connection with JAVA.

3. Added various functionalities like ADD, EDIT, DELETE which would help us do the names operations in the dataset. Also, integrated these functionalities with the UI segment.

4. Created a servlet which would receive and respond to requests from web clients using all the functionalities implemented.

Front End :

1. Used ReactJs to create an UI consisting of tables which will display the data loaded from the database.

2. Made the UI responsive such that zooming in and out will not hinder the prospects.

3. Created ADD, EDIT, DELETE button in the UI and integrated them with the functionality coded in JAVA to perform the respective operations.

4. Also, added the PREDICT button integrated with the model built in the first half of the project which would predict the date of payment of the desired business.

FUTURE SCOPE

Future prospects of this web application can be to increase the accuracy of prediction of the model, UI can be made more attractive and aesthetic and can be deployed to cloud which will make it available for a large audience.