AI enabled B2B fintech cloud application

PROJECT REPORT

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IN

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Acknowledgement

First I would like to thank Sashi Narahari. President & Chief Executive Officer of Highradius Corporation for giving me the opportunity to do an internship within the organisation. I also would like all the people that worked along with me at Highradius Corporation with their patience and openness to create an enjoyable working environment. It is indeed with a great sense of pleasure and immense sense of gratitude that I acknowledge the help of these individuals. I am highly indebted to our college Narula Institute of Technology and Principal Prof.(Dr.) Maitreyi Ray Kanjilal , for the facilities provided to accomplish this internship. I would like to thank the teachers of our Electronics And Communication Engineering Department for their constructive criticism throughout my internship. I would like to thank the training and placement department of our College for their support and advice to get and complete an internship in the above said organisation. I am extremely grateful to my friends who helped me in successfully completing this internship.

Abstract

This project is a part of the Highway to Highradius program. We are required to build an AI-Enabled FinTech B2B cloud Application.

The B2B world operates differently from the B2C or C2C world. Businesses work with other businesses on credit. When a buyer business orders goods from the seller business, the seller business issues an invoice for the same.This invoice for the goods contains various information like the details of the goods purchased and when it should be paid. This is known in accounting terminology as“Accounts Receivable”

This involves keeping track of all invoices from all the buyers. The buyer business needs to clear its amount due before the due date.However, in real-world scenarios, the invoices are not always cleared i.e. paid in full amount by the due date.The problem is to create an application for managing B2B order invoices. We have to build a Machine Learning Model to predict the payment date of an invoice when it gets created in the system and categorise the invoice into different buckets based on the predicted payment date. In this given project we were required to make a full-stack Order Management application backed by a Machine Learning Model to predict the date of payment and ageing bucket of an invoice.So my project i.e. “AI-enabled FinTech B2B cloud system” should help the Account Receivables team by collecting payments from buyers businessmen for their past dues, sending reminders and follow-ups to the customers for payments to be made, and help the company get paid for the services and products supplied.

OVERVIEW

A web application to help the people working in Accounts Receivable departments in their day to day activities. You need to build a web application where the users in the Account Receivable department can :

- View the invoice data from various buyers
- See various fields / attributes of the invoice(s) from a particular buyer
- Perform searching and sorting on the invoices
- Get a prediction of when the invoice is going to get paid

PURPOSE

In real-world scenarios, the invoices are not always cleared i.e. paid in full amount by the due date. So the purpose of my project is to help the Account Receivables team by collecting payments from customers for their past dues, sending reminders and follow-ups to the customers for payments to be made, and help the company get paid for the services and products supplied

SCOPE

This includes making a Machine Learning model, then making a beautiful UI, so that we could add, edit, delete records from the database, and with the help of the Machine Learning model, we can predict the payment date.

About the Organisation: HIGHRADIUS CORPORATION

HighRadius is a Fintech enterprise Software-as-a-Service (SaaS) company that leverages Artificial Intelligence-based Autonomous Systems to help companies automate Accounts Receivable and Treasury processes.

The CEO and founder of the company is Sashi Narahari. It was founded in 2006. Its headquarters are located in Houston, Texas, USA.

HighRadius offers cloud-based Autonomous Software for the Office of the CFO. More than 700 of the world's leading companies have transformed their order to cash, treasury and record to report processes with HighRadius. Our customers include 3M, Unilever, Anheuser-Busch InBev, Sanofi, Kellogg Company, Danone, Hershey's and many more.

Autonomous Software is data-driven software that continuously morphs its behavior to the ever-changing underlying domain transactional data. It brings modern digital transformation capabilities like Artificial Intelligence, Robotic Process Automation, Natural Language Processing and Connected Workspaces as out-of-the-box features for the finance & accounting domain.

Efficiency and productivity enhancements are central to the value HighRadius provides to our customers. Regardless of what ERP, Accounts Receivable or Treasury Management system you are using, our products automate manually-intensive tasks, streamline communication, and allow standardisation of processes to drive best practices into your receivables and treasury processes.

Here's What We Believe In

Let the Best Idea Win

Crowdsource by applying First Principles method to make better decisions

Call BS on Your Boss

Transparency from the top builds trust for all of us

Be Bold and Blunt

Honest feedback is oxygen for good business debates

Go Gritty or Go Home

Grit is the #1 reason for success

Hop on the Roller Coaster

Fail-fast, learn-fast, fix-fast is how we execute

Be Humble But Ready To Rumble at HighRadius

Curiosity and humility is how we learn and grow professionally

Ride or Die with the Customer

Customer service is everyone's job

Bring the Zing!

Life is too short for work without play

Project Implementation

ML - DATA ANALYSIS & MODELLING

In this project, we ask two questions about a new business invoice when giving instances of historical invoices and outcomes: " Would the invoice payment delay or not? " If it would delay, how long would it be? To answer these two questions, we will invoice payment delay, build a regression model that predicts the number of days by which it will get delayed, based on a training set of data containing instances whose outcome is known. We formulate the invoice outcome prediction task as a supervised learning problem: given instances of past invoices and their outcomes, build a model that can predict when a newly issued invoice will be paid, if no advanced actions are taken. And this model shall help us understand the characteristics of delayed invoices and problematic customers. In other words, it doesn't not only identify the payment delay but also evaluates the customers.

- The dataset consisted of 50,000 rows, from which 4094 rows did not have the attribute ‘clear_date’. These observations (samples) are considered in the testing set. The other portion of the dataset is divided into training and two validation sets. All the date-related attributes are converted to DateTime format. The supervising attribute or the target variable is named ‘label’, which interprets the number of days of invoice payment delay. It is calculated by subtracting the due_in_date from the clear_date in terms of days. The training set consisted of 32134 observation data and the two validation sets consisted of 6886 observations each.
- The upper right barplot identified the average delay for customers from different business codes. Here we can see the customers from business code U001, make the minimum delay, and the customers from U013 make the maximum delay.
- From the lower right plot, we can observe the distribution of the total open amount curve on log transformation.
- From the first plot, we can observe that most of the open amount is in between 0-100,000 i.e. very less number of customers are there whose high amounts are pending.
- From the second curve, we can observe, most of the customers delay for a period mostly between 0-50.

Application Development

The application development part is related to building a web-based application that consists of a frontend dashboard displaying the data in a tabular form with different options like add, delete, edit and predict, connected to a backend database. We have created a beautiful user interface to add, edit, delete, print, and most importantly,

predict order invoices with ReactJS(Frontend Library) and HTML. For this we have followed certain steps :

1. Loading of Data in the Database

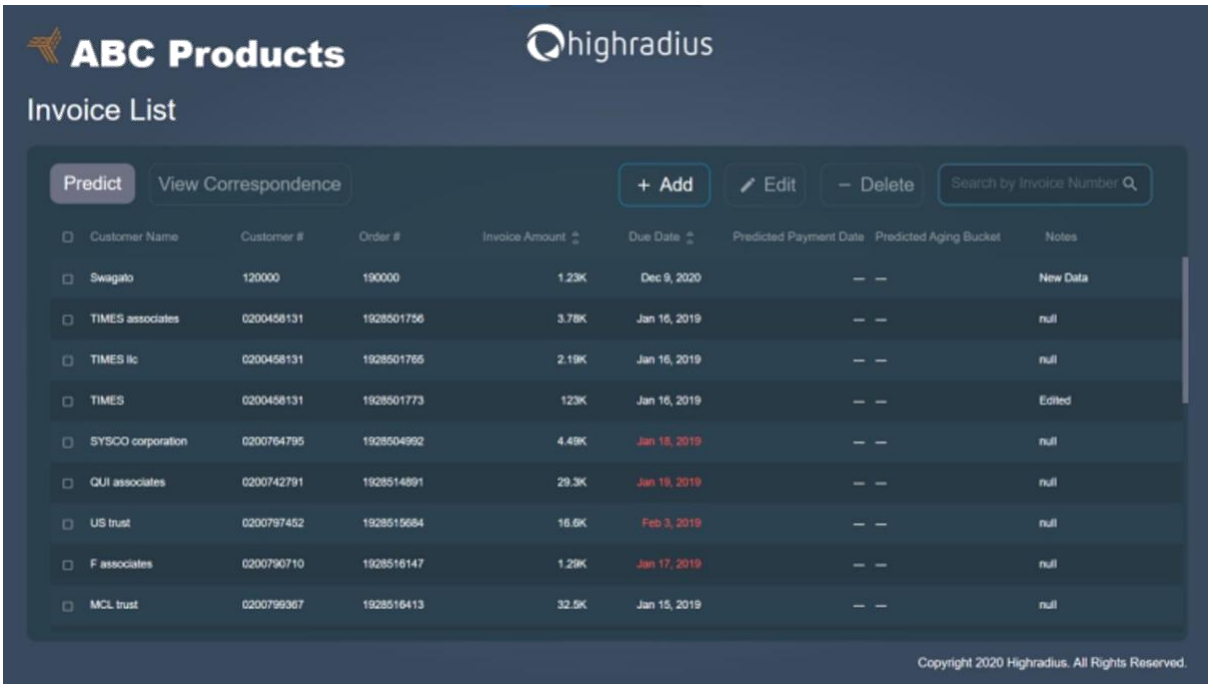
- The data was loaded in the database using SQL and all tables and queries were created and successfully displayed. This was done by creating a raw CSV reader module from scratch. This module can read CSV files and can process the data to input into the database with the help of the JDBC Driver class.

2. Creation of the Backend

    - The backend portion was done in Java. The first JDBC connection was established with SQL. Then servlets were created for every functionality.
    - Add servlet - POST request from the frontend with parameters such as invoice amount, notes, date, etc and pass them to the SQL database to add a new order to the database
    - Edit Servlet - POST request from the frontend with parameters such as doc_id to identify the invoice in addition to the parameters which need to be changed.
    - Delete Servlet - Delete the selected invoices from the database, by passing their respective doc_id's to identify them in the database.
    - Search Servlet - Get the invoice number from the frontend and pass them as an HTTP request and search through the database and return it to the frontend again.
    - Data Display Servlet - Display the table of invoices to the frontend UI.

3. Creating a Responsive Dashboard

- A responsive dashboard was made in React Js. The main page had a Head Section, composed of the company logo and account name logo, and then the Grid Section, comprised of a panel having Add, Delete, Edit, and search button. The Predicted Payment Date will remain blank and selecting one or multiple rows and then clicking on predict will get the payment date populated. Whenever multiple rows are selected the add button will remain activated and the user can type in the value he/she wants to insert. Also, the user has to fill all the required fields otherwise insertion won't happen. Clicking on the edit button permits the user to edit all the editable columns, but only when one row is selected. With the help of the delete button, the user can delete one or more pre-existing data. The search button helps to look for particular data. View Correspondence button will help to print the invoices of one or more orders. All these functionalities were carried out by using material-UI and establishing a connection with the backend.



Cloud based

Highradius offers cloud based Autonomous software. It simply connects the web application server to the cloud so that it can handle the application system. Following are the characteristics provide by the cloud:

- It provide High reliability to the application
- It provide storage to the application
- It also provides data security to the application only the administrator has the right to operate the application.

Flask Integration

Finally, integration of the ML model was done with help of the flask module. First, one .pickle file was generated then using some lines of python script flask integration was done. As same as the servlet used as an API for the functionalities, for the prediction also some POST request was made using this .pickle file. And finally, the project is complete.

Skills

- Machine learning
- Python
- React js
- HTML CSS

- SQL
- Cloud

Conclusion

During the tenure of my training at HighRadius, I had exposure to various technical languages which helped in shaping my analytical and problem-solving skills as well as provide knowledge that could be applicable in real-time projects as well. By making the Cloud Application System I was able to learn how a flow of code works and how to establish connections between different languages.

Future Scope

With the help of AI-Enabled Fintech B2B Cloud application the organizations, companies, and in fact, individuals can keep track of the payment of their orders irrespective of a large number of clients. This will not only reduce time but also provide a functional manner for the proper functioning of an organization and/or workplace.