

A PROJECT REPORT

on

**“AI-Enabled FinTech B2B Invoice Management
Application”**

**Submitted to
KIIT Deemed to be University**

In Partial Fulfilment of the Requirement for the Award of

**BACHELOR’S DEGREE
IN
COMPUTER SCIENCE AND ENGINEERING**

BY

VISHAL SINGH

1905704

**UNDER THE GUIDANCE OF
MENTOR NAME
DHUVI KALYANRAM, VARUN
(HOUSE-DAREDEVIL)**



**SCHOOL OF COMPUTER ENGINEERING
KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY
BHUBANESWAR, ODISHA - 751024
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School of Computer Engineering
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CERTIFICATE

This is certify that the project entitled

“AI-Enabled FinTech B2B Invoice Management
Application”

submitted by

VISHAL SINGH

1905704

is a record of bonafide work carried out by them, in the partial fulfilment of the requirement for the award of Degree of Bachelor of Engineering (Computer Science & Engineering OR Information Technology) at KIIT Deemed to be university, Bhubaneswar. This work is done during year 2022-2023, under our guidance.

Date: 14/04/2022

DHUVI KALYANRAM, VARUN
Project Mentor

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ABSTRACT

Seller business interacts with various businesses and sells goods to all of them at various times. Hence, the seller business needs to keep track of the total amount it owes from all the buyers. This involves keeping track of all invoices from all the buyers. Each invoice will have various important fields like a payment due date, invoice date, invoice amount, baseline date etc.

The buyer business needs to clear its amount due before the due date. However, in real-world scenarios, the invoices are not always cleared ie. paid in full amount by the due date. The date on which a customer clears the payment for an invoice is called the payment date.

Account receivables Department:

In the ideal world, the buyer business should pay back within the stipulated time (ie the Payment Term). However, in the real world, the buyer business seldom pays within their established time frame, and this is where the Account Receivables Department comes into the picture.

Every business consists of a dedicated Account receivables Department to collect and track payment of invoices.

It consists of an Account receivables team that is responsible for:

- Collecting payments from customers for their past due to invoices.
- Sending reminders and follow-ups to the customers for payments to be made.
- Looking after the entire process of getting the cash inflow.
- Help the company get paid for the services and products supplied.

Keywords: B2B, Invoice, Payment Date Prediction, Accounts Receivable, Analytics

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Chapter 1

Introduction

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” and thus we need an application for keeping record of invoices and predict when the invoices are going to be paid.

Chapter 2

Basic Concepts

Machine Learning : Pandas,Numpy,Matplotlib,Scikit-learn

Frontend : HTML,CSS,JavaScript,React.js

Backend : Java,Servlets,JDBC,JSP,Flask,MySQL

Tools : Eclipse IDE,TomCat Server,Postman API Testing Tools,SQL
Yog,Jupyter Notebook

2.1 Machine Learning -

Pandas,Numpy,Matplotlib,Scikit-learn are the basic library used for data processing and making plots for analysis and further making prediction of payment Date

2.2 Frontend -

In frontend mainly React.js (a javascript library) is Used for Creating UI for our Invoice Managment application.

2.3 Backend -

In Backend JavaServlets are used for CRUD operation in Database.

2.4 Tools -

Eclipse IDE is used for maintaning backend Java Part ,and we have two servers Tomcat and Flask for handling API request from FrontEnd.

Chapter 3

Problem Statement / Requirement Specifications

To Build a web application to help the people working in the Accounts Receivable departments in their day-to-day activities. we need to build a web application where the users in the Account Receivable department can keep record of invoice and get pridiction of Payment Date using Machine Learning.

REQUIREMENTS OF APPLICATION-

Specifically, below are the major aspects of the application that needs to be developed. The details for each of the below are provided in the functional overview section.

Data Loading in DB:

1. You will be provided with an invoices dataset which you need to parse, process, and load in the provided database schemas.

UI Representation of the data:

2. Build a responsive UI that can display the invoice data loaded from the database.
3. The UI should support searching and pagination
4. The UI should support editing of some editable fields, adding a new row to the grid, deleting rows from the grid and advance search.

AI Support in the application:

5. Add support for predicting the payment date for one or more invoice(s).
6. UI should have a button to trigger the prediction of the payment date.
7. The payment date needs to be persisted across sessions in the UI.

3.1 Project Planning

First ML model is designed from given Dataset that Predicts Payment Date and then Front end UI is developed. Here are the list of Feactures that web application has:

1. View the invoice data from various buyers.
2. See various fields/attributes of the invoice(s) from a particular buyer.
3. Perform Data Pre-processing on the invoice data.
4. Get account-level analytics to easily visualize and interpret data- EDA and Feature Engineering.

5. Get a prediction of when the invoice is going to get paid.
6. Get a responsive Receivables Dashboard.
7. Visualize Data in the form of grids.
8. Visualize Data in the form of graphs.
9. Perform Searching operations on the invoices.
10. Add & Edit data in the editable fields of the grid.
11. Delete data of selected rows in predefined templates.

3.2 Project Analysis

After the requirements are collected or the problem statements is conceptualized, this needs to be analyzed for finding any short of ambiguity, mistake, etc.

3.3 System Design

3.3.1 Design Constraints

In designing our ML model Jupyter Notebook , For backend Java part Eclipse IDE is used and For Creating UI React Setup is needed.

3.3.2 System Architecture OR Block Diagram

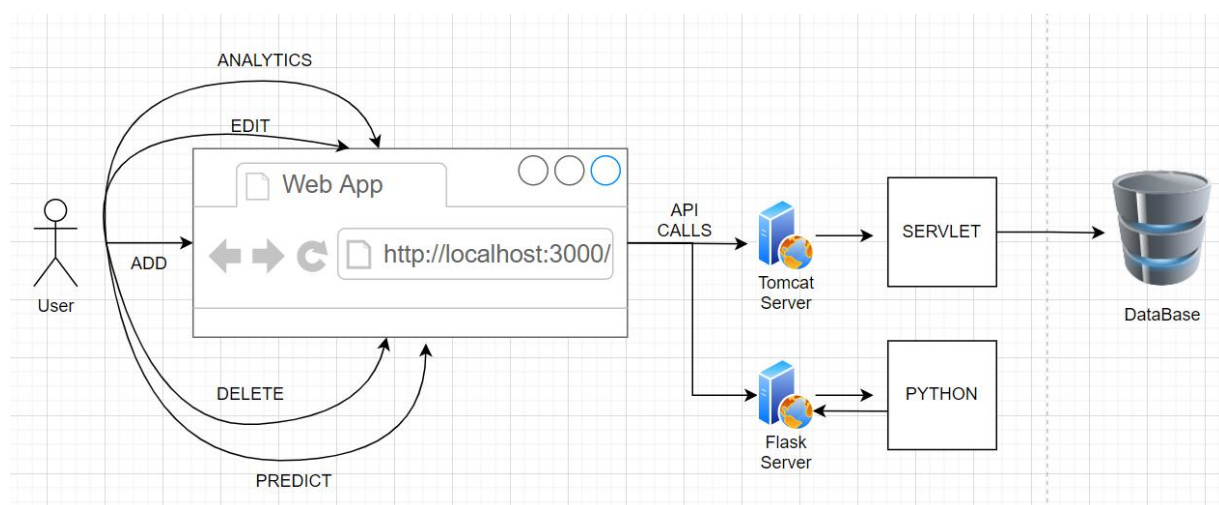


Figure 1.1: SYSTEM ARCHITECTURE

Chapter 4

Implementation

In this section, present the implementation done by you during the project development.

4.1 Methodology OR Proposal

In Machine Learning Part we started with cleaning of given data and performed splitting of data, EDA, Feature Engineering, Feature Selection, Modelling and finally predicted the payment date using that Model.

In React UI Datagrid is used for showing data and react-chart-js2 for analytics view.

In Backend Servlets are used to Perform CRUD on databases connected by JDBC.

4.2 Testing OR Verification Plan

After project work is complete, it must have some verification criterion so that we can decide whether the project satisfactorily completed or not. This is called Testing or verification. For example, in software development, some test case must be included and used to verify the outcome of the project.

Test ID	Test Case Title	Test Condition	System Behavior	Expected Result
T01	Predict Payment Date	On Selection of atleast one row it should activated	Aging Bucket populated with Predicted Value	Aging Bucket should be populated with Predicted Value
T02	Add a Invoice in Data	Button should be in disabled state until a row is selected	A row added in invoices table with given data	A row should be added in invoices table with given data
T03	Edit Data	Button should be activated on single row selection	Data edited with given value	Data should edited with given value

T04	Delete Data	Button activated on selecting atleast one row	Is_deleted column set to 1 i.e; row deleted from invoice table	Selected Rows[s] should be deleted from Table
T05	Search Data	Search by Customer number	Shows only row matching with customer ID	Should Show only row matching with customer ID
T06	Advance Search	Search data based on given values	Shows only rows matching with Given data	Should Show only rows matching with Given data
T07	Analytics View	Show Bar chart For all Businesses with Total No. Customers and total amount open	Showing Bar chart for Given Data	Should display Bar chart/Pie Chart for Given Data

4.3 Result Analysis OR Screenshots

Prediction:

Posting Id	Total Open Amount	Baseline Create Date	Customer Payments Terms	Invoice Id	Aging Bucket
1	54273.28	2020-01-26	NAH5	1930438491	30-45
1	79656.6	2019-07-22	NAD1	1929646410	15-30
1	2253.86	2019-09-14	NAA8	1929873765	
1	3299.7	2020-03-31	CA10	2147483647	
1	33133.29	2019-11-13	NAH4	1930147974	

Figure 1.2: PREDICTION

Search by customer Id:

ABC Products		highradius					
PREDICT	ANALYTICS	ADVANCE SEARCH	RELOAD	2007844	ADD	EDIT	DELETE
<input type="checkbox"/>	SL No	Business Code	Customer Number	Clear Date	Business Year	Document Id	Posting Date
<input type="checkbox"/>	2326	U001	200784489	2019-03-08	2019-01-01	1928834717	2019-02-21
<input type="checkbox"/>	2520	U001	200784454	2019-10-29	2019-01-01	1929664154	2019-07-30
<input type="checkbox"/>	3517	U001	200784489	0000-00-00	2020-01-01	1930819443	2020-04-23
<input type="checkbox"/>	4851	U001	200784454	2020-02-26	2020-01-01	1930485413	2020-02-10
<input type="checkbox"/>	4947	U001	200784489	2020-03-13	2020-01-01	1930571863	2020-02-26

Figure 1.3: SEARCH

Analytics:

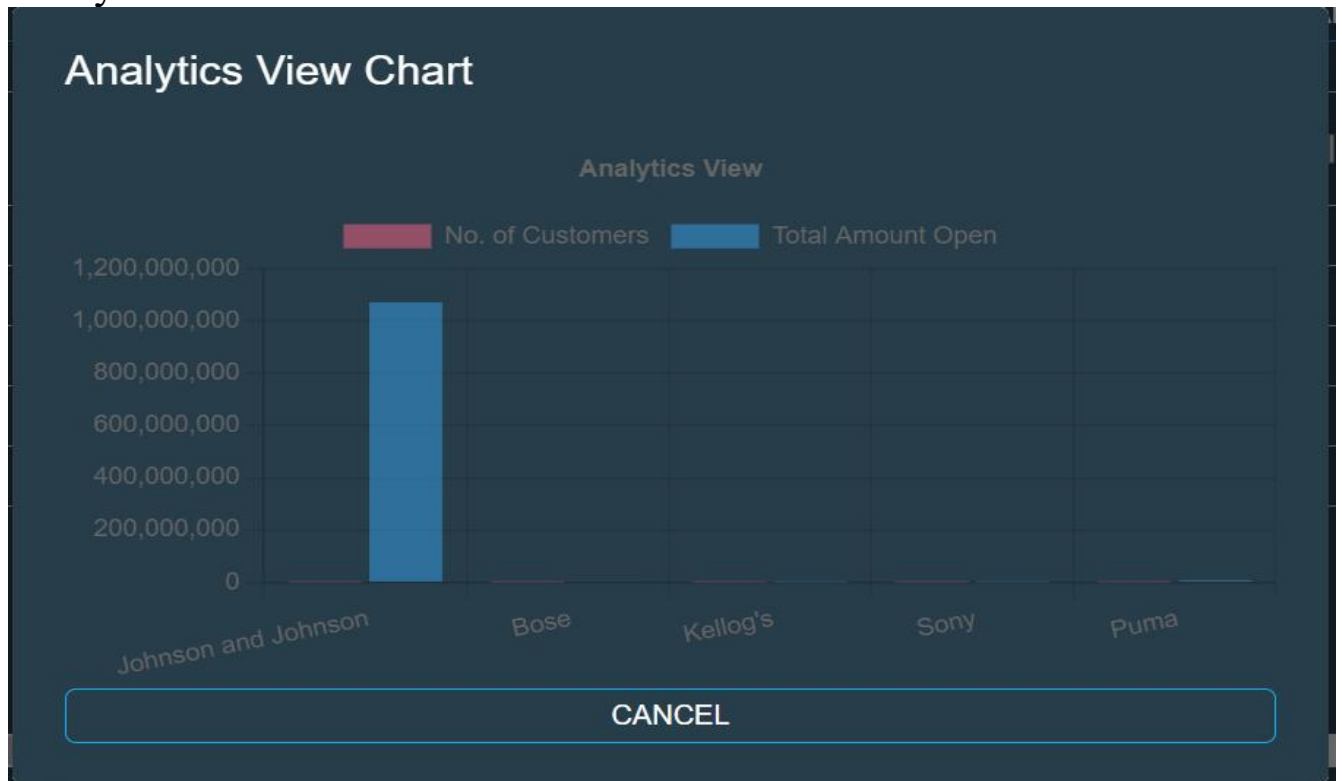


Figure 1.4: ANALYTICS VIEW

Advance Search:

<input type="checkbox"/>	SL No	Business Code	Customer Number	Clear Date	Business Year	Document Id	Posting Date
<input checked="" type="checkbox"/>	22368	U001	200673194	2019-04-08	2019-01-01	1929063134	2019-04-03

Figure 1.5: ADVANCE SEARCH

Chapter 5

Conclusion & Future Scope

5.1 Conclusion

As we Know every companies have to keep track of its invoices and Every business consists of a dedicated Account receivables Department to collect and track payment of invoices and payments due to customers. Our web application can predict payment prediction date for the perticular customer with accuracy of Model approx 80 Percent and we can also send reminders and follow-ups to the customers for payments to be made and also use analytics data to make some business decisions.

5.2 Future Scope

This Web application scope will go on high as the number of cutomers in a business go high ,beacuse it won't be easy to manage payments of such number of customer without this application and furthur enhancment can be done in application to send reminders and follow-ups to the customers for payments to be made.

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