

## Phase-1 Submission

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**Institution:** PPG INSTITUTE OF TECHNOLOGY

**Department:** CSE

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### 1.Problem Statement

*Credit card fraud is a critical issue in digital transactions, causing major financial losses. Traditional detection methods are slow and inaccurate. This project aims to build an AI-powered system that detects fraud in real-time to enhance transaction security and trust.*

### 2.Objectives of the Project

- Detect fraudulent credit card transactions using machine learning
- Provide real-time prediction via web interface
- Visualize fraud patterns and predictions

### 3.Scope of the Project

*Includes model training, API creation, and a frontend dashboard.*

*Limitations: static dataset, basic login, and free-tier hosting constraints.*

### 4.Data Sources

*Dataset from Kaggle: Credit Card Fraud Detection (public, static).*

*Data Source Link: <https://www.kaggle.com/datasets/mlg-ulb/creditcardfraud?select=creditcard.csv>*

## 5.High-Level Methodology

- **Data Collection** – The dataset will be downloaded from Kaggle.
- **Data Cleaning** – Missing values will be handled (if any), duplicate entries removed, and features normalized as required.
- **Exploratory Data Analysis (EDA)** – Graphs and charts such as histograms, heatmaps, and correlation matrices will be used to explore relationships and patterns in the data.
- **Feature Engineering** – New features may be derived from time and amount fields, and dimensionality reduction may be applied.
- **Model Building** – Machine learning models such as Logistic Regression, Random Forest, and XG Boost will be experimented with to determine the best fit.
- **Model Evaluation** – Metrics such as accuracy, precision, recall, F1-score, and confusion matrix will be used to evaluate model performance.
- **Visualization & Interpretation** – Dashboards and charts will be built using libraries like matplotlib and seaborn to present insights and predictions.
- **Deployment** – The final model and application will be deployed as a web app using Fast API for backend and Vercel or Netlify for frontend hosting.

## 6.Tools and Technologies

- **Programming Language** – Python.
- **Notebook/IDE** – Jupyter Notebook, VS Code.
- **Libraries** – pandas, numpy, seaborn, matplotlib, scikit-learn, joblib, xgboost.

- **Optional Tools for Deployment** – *FastAPI, Streamlit, Vercel, Render.*

## 7.Team Members and Roles

<i><b>NAME</b></i>	<i><b>ROLE</b></i>	<i><b>WORK</b></i>
<i>Jayaprakash K</i>	<i>Frontend Developer</i>	<i>Responsible for designing and building the user interface using React and Tailwind CSS.</i>
<i>Prajith R</i>	<i>Backend Developer</i>	<i>Implements the API using FastAPI and connects the ML model to the frontend.</i>
<i>Lohith R</i>	<i>ML Engineer</i>	<i>Handles data preprocessing, model training, evaluation, and optimization.</i>
<i>Dinesh A</i>	<i>Documentation and Presentation</i>	<i>Prepares project documentation, report, and final presentation.</i>
<i>Prakadeeshwaran A</i>	<i>Testing and Deployment</i>	<i>Performs QA testing and deploys the application to cloud platforms.</i>