**Summary Report**

**Group 5**

**Credit Card Fraud Detection**

# 1). Introduction

Credit card fraud has become a common problem in our increasingly digital age, costing people and businesses a lot of money. This issue is being addressed by the Credit Card Transactions Fraud Detection project, which intends to produce a reliable dataset to make it easier to develop and test machine learning models for detecting credit card fraud. Because it helps to increase the security of financial transactions and protect the interests of both consumers and businesses.

# 2). Major Achievements

Till date, data cleaning, data preprocessing, detailed analysis was done on the available data to get insights on the data alignment and Deep Learning models were executed to predict the fraudulent transactions. And we created region wise model prediction like east-coast and west coast those are differentiated by State. And finally, the front-end website design was completed. The website will send the notification when it is detected as fraud and redirected to filtered power-bi dashboard of the fraud transaction’s account number.

# 3). Project Impact

The project's impact will be the rapid and easy fraud detection of credit card transactions and the notifying the merchant to ensure efficient customer service.

# 4). Future Work

Optimizing the models that we executed. Merging some more data to this current data and finding more behavior patterns of the data using deep analysis. Website backend creation is still in progress. Creating some meaningful reports and predictions to add those on the website.

**Technical Report**

# 1). Introduction

The Technical report provides an in-depth view of the credit card fraud detection project methodology, tools, and results.

# 2). Problem Statement

The primary goal is to detect fraudulent credit transactions accurately and give some analyzed reports.

# 3). Methodology

**Sequential Model:**

**A Sequential Model is a linear stack of layers used in deep learning. It's particularly suitable for feedforward neural networks where you stack layers sequentially. Typically used for simple tasks and as a baseline for more complex architectures.**

**Convolutional Neural Network (CNN):**

**CNN is designed for processing structured grid data like images. It employs convolutional layers to learn spatial hierarchies of features automatically and adaptively from input data. CNNs excel in tasks like image recognition and classification.**

**LSTM Model:**

**Long Short-Term Memory (LSTM) is a type of recurrent neural network (RNN). It's used for sequential data and can capture long-term dependencies. LSTMs are used in tasks like speech recognition, language modeling, and time-series analysis.**

**GRU Model:**

**Gated Recurrent Unit (GRU) is another type of RNN like LSTM. It's more computationally efficient and has a simpler architecture. GRUs are often used when a balance between performance and efficiency is required.**

**Auto encoder model:**

An Autoencoder is an unsupervised machine learning model that aims to learn efficient representations of data. It consists of an encoder network that compresses data into a lower-dimensional representation and a decoder network that reconstructs the original data. Autoencoders are used for tasks like data denoising, dimensionality reduction, and anomaly detection.

# 4). Few Results

**East Coast Modeling:**

**Implementing Sequential Model:**

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**Implementing Convolutional Neural Network (CNN):**

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**Implementing LSTM Model:**

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**Implementing GRU Model:**

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**Implementing Auto encoder model:**

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**West Coast Modeling:**

**Implementing Sequential Model:**

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**Implementing Convolutional Neural Network (CNN):**

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**Implementing LSTM Model:**

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**Implementing GRU Model:**

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**Implementing Auto encoder model:**

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**Website Front-end:**

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GitHub Link: https://github.com/BinduParvati7/Capstone5588/