**CREDIT CARD FRAUD DETECTION**

**DEVELOPMENT 2**

**FEATURE ENGINEERING:**

Feature engineering plays vital role in credit card fraud detection. There are some key features to consider:

* Transaction Features:

-Amount: the transaction amount.

-Time: it analysis the time of transaction and detect unusual patterns.

-location: geographical information can be valuable.

* Anomaly Detection:

1. Calculated statistics like mean and standard deviation for identifying outliers.
2. Use technique like clustering to group similar transaction.

**Model training:**

* Data preprocessing: the dataset is cleaned and pre-processed, the missing value and outliers are handled. Again, the data is split into training and testing sets.
* Feature selection: using feature engineering techniques the relevant feature is selected or created. For an example technique like PCA for dimensionality reduction.
* Model training: the selected models on the training data is trained.

**Model evaluation:**

* Prediction on dataset: the trained model to make predictions on the test data.
* Evaluation metrics: assessing the models performance using appropriate evaluation metrics, considering the class imbalance
* Common metrices used are,

1.accuracy.

2.precision.

3.recall(sensitivity).

* Model comparison: the comparison of the performance of different models to select the most suitable one for the task.
* Anomaly detection techniques: the anomaly detection methods like SVM (Support Vector Machine) are used.
* Model monitoring: the model's performance is continuously monitored retraining it as necessary to adapt to changing fraud patterns.

**Evaluation**

* Accuracy: this is a basic metrics, but it may not be the most appropriate for imbalanced dataset where non fraudulent transaction significantly outnumber fraudulent one.
* Precision: precision is the ratio of true positives to the total number of positive prediction.it measures the accuracy of the positive predictions.
* Time based evaluation: if we are dealing with evolving data, consider using time-based evaluation to assess how well your model adapt to changing patterns.
* Feature model: analysing which features contribute the most to the model's predictions, which can provide insights into potential fraud indicators.