**Python Machine Learning Projects Overview**

In this collection of machine learning projects, we explore three diverse applications of data science techniques: detecting fraudulent credit card transactions, identifying spam SMS messages, and predicting movie genres based on textual descriptions. These projects leverage various machine learning algorithms and Natural Language Processing (NLP) methods, and they are implemented using Python on Google Colab. Each project demonstrates how to preprocess data, build models, and evaluate their performance. The links to Colab notebooks are provided for hands-on exploration.

**1. Fraud Credit Card Detection**

Description: In this project, we tackle the problem of identifying fraudulent credit card transactions using machine learning techniques. The objective is to classify transactions as either fraudulent or non-fraudulent based on anonymized features. We use classification model Logistic Regression to detect fraud with high accuracy.

- Key Steps:

- Data Preprocessing (handling missing data, scaling)

- Exploratory Data Analysis (EDA) to uncover transaction patterns

- Training and Evaluation of machine learning models

- Hyperparameter tuning for model optimization

- Performance evaluation using metrics like ROC-AUC, Precision-Recall, and Accuracy

**Colab Link**: [Fraud Credit Card Detection

<https://colab.research.google.com/drive/15QW_5LIXROKatDaN6Da15hxTV-hiwequ>

**2. Spam SMS Detection**

- \*\*Description\*\*: The aim of this project is to create a model that can classify SMS messages as either spam or ham (non-spam). Using a labeled dataset of SMS messages, we apply NLP techniques for text preprocessing and machine learning algorithms such as Naive Bayes to

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2. Spam SMS Detection

- \*\*Description\*\*: The aim of this project is to create a model that can classify SMS messages as either spam or ham (non-spam). Using a labeled dataset of SMS messages, we apply NLP techniques for text preprocessing and machine learning algorithms such as Naive Bayes or Logistic Regression to detect spam efficiently.

- \*\*Key Steps\*\*:

- Text Preprocessing (tokenization, stopword removal, stemming)

- Feature Extraction using methods like TF-IDF or Count Vectorizer

- Model Training using classification algorithms

- Model Evaluation with F1-score, accuracy, and confusion matrix

- Deployment for real-time spam detection

Colab Link: Spam SMS Detection

https://colab.research.google.com/drive/1cyhaY3uvJOM4IqNKoGnlBEkGVz5p6Qbz

3. Movie Genre Detection

Movie Genre Detection In this project, we predict the genre of a movie based on its plot description using Natural Language Processing (NLP) and machine learning. The dataset contains movie descriptions labeled by genre, and the goal is to build a text classification model that can predict the genre based on the synopsis.

Key Steps:

- Text Preprocessing (cleaning, stemming, and vectorizing)

- Feature Extraction using TF-IDF or word embeddings

- Training models such as SVM, Logistic Regression, or neural networks

- Model Evaluation using metrics like precision, recall, and accuracy

- Tuning models to improve prediction performance

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Colab Link: Movie Genre Detection

https://colab.research.google.com/drive/18bVT5svx2bV5x6GeKbD1m-EA-RhafTzC

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