Cairo University-Faculty of Engineering
Computer Department
Machine Learning

Project Proposal

Team 6

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Idea 1 - Bank Customer Churn Prediction

Problem Definition

Customer churn refers to when a customer stops doing business with a company. This project aims to build a machine learning model that predicts whether a bank customer will churn (leave the bank) based on their transaction history, account balance, tenure, and other demographic factors.

Problem Motivation

Customer retention is useful for banks, as acquiring new customers is often more expensive than retaining existing ones. A predictive model can help banks identify at-risk customers early and take proactive measures to retain them through personalized offers or improved customer service.

Evaluation Metrics

- **Accuracy**: Measures the overall correctness of the model's predictions.
- **Precision & Recall**: Important for understanding how well the model identifies actual churners.
- **F1-score**: Balances precision and recall, especially if the dataset is imbalanced.

Dataset Link

https://www.kaggle.com/code/kmalit/bank-customer-churn-prediction/data

Idea 2 - Student Performance Evaluation

Problem Definition

This project aims to predict students' academic performance based on factors like study hours, attendance, social background, parental education, and past academic records. The model can classify students into performance categories (e.g., high, average, low) or predict exact grades.

Problem Motivation

Educational institutions can use predictive models to identify students at risk of underperforming and provide tutoring or counseling. This helps in improving overall academic success rates and providing personalized learning support.

Evaluation Metrics

- **Mean Absolute Error (MAE) & Root Mean Squared Error (RMSE)**: If predicting exact grades.
- **Accuracy**: If classifying students into categories like "low", "average", and "high" performers.
- **Precision & Recall**

Dataset Link

https://archive.ics.uci.edu/dataset/320/student%2Bperformance

Idea 3 - Loan Prediction

Problem Definition

The goal of this project is to predict whether a loan applicant is likely to default or repay a loan based on their credit history, income, employment status, and other financial factors. The model will help financial institutions make informed lending decisions.

Problem Motivation

Loan default poses a significant risk to banks and financial institutions. By using machine learning, banks can reduce financial losses by improving loan approval processes. This helps in making lending decisions fairer.

Evaluation Metrics

- **Accuracy**
- **Precision & Recall**
- **F1-score**

Dataset Link

https://www.kaggle.com/datasets/burak3ergun/loan-data-set