# ML Problem Statement

Mentorness Internship Program

## Project Name: Prediction for Credit Card Approval

Welcome to the Machine Learning Internship program, focused on Credit Card Approval Prediction. In this project, your task is to utilize machine learning techniques to predict whether an applicant will be approved for a credit card or not.

## Problem Statement:

The primary objective of this project is to predict the approval or rejection of credit card applications. The challenge lies in understanding the key factors influencing credit card approval decisions and building a predictive model to assist in the decision-making process.

## Your Mission:

Your mission in this internship is to predict credit card approval using machine learning. Follow these key steps:

1. **Exploratory Data Analysis (EDA):**
   Conduct a comprehensive EDA on the dataset, unveiling valuable insights through data visualization, summary statistics, and pattern identification. Perform Univariate and Bivariate analysis, listing down business findings from EDA.
2. **Feature Engineering:**
   Create new features or transform existing ones if necessary to gain additional insights or improve model performance. Feature engineering may involve aggregating information, creating interaction terms, or applying domain-specific knowledge.
3. **Data Preprocessing:**
   Prepare the data for model training by handling missing values, encoding categorical variables, and scaling or normalizing features as needed.
4. **Machine Learning Model Development:**
   Train various machine learning models for classification, such as logistic regression, decision trees, random forests, and Boosting Algorithms. Experiment with different algorithms to find the best-performing model.
5. **Model Evaluation:**
   Assess the performance of your models using appropriate evaluation metrics like accuracy, precision, recall, F1-score, confusion matrix, and ROC AUC. Identify the model that provides the most accurate predictions of credit card approval.
6. **Predicting Credit Card Approval:**
   Once your model is built and validated, use it to predict the approval of credit cards using the test dataset. Understand the importance of feature importance scores in interpreting the model's predictions.
7. **Recommendations:**
   Provide actionable recommendations to the business based on your findings. These recommendations should aid in reducing risk and improving the credit card approval process.

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## Dataset Overview:

The dataset contains the following columns:

- ID : Unique identifier for each record.
- Gender : Gender of the applicant.
- Has a car : Indicates whether the applicant owns a car (binary: 0 or 1).
- Has a property : Indicates whether the applicant owns a property (binary: 0 or 1).
- Children count : Number of children the applicant has.
- Income : Annual Income of the applicant.
- Employment status : Employment status of the applicant.
- Education level : Highest education level attained by the applicant.
- Marital status : Marital status of the applicant.
- Dwelling : Type of dwelling the applicant resides in.
- Age : Age of the applicant in days. Counted backwards from the current day
- Employment length : How long the customer has been employed (days), counted backwards from the current day. Positive numbers indicate unemployment.
- Has a mobile phone : Indicates whether the applicant has a mobile phone (binary: 0 or 1).
- Has a work phone : Indicates whether the applicant has a work phone (binary: 0 or 1).
- Has a phone : Indicates whether the applicant has any phone (binary: 0 or 1).
- Has an email : Indicates whether the applicant has an email (binary: 0 or 1).
- Job title : Title or position of the applicant's job.
- Family member count : Number of family members.
- Account age : Age of the applicant's account in years. Counted backwards from the current day
- Is high risk **(Target Variable)**: Whether the applicant is considered high risk (0 for no, 1 for yes).

## Conclusion:

This internship offers an exciting opportunity to apply machine learning techniques to a real-world problem. By the end of the internship, you will have gained valuable skills in data analysis, preprocessing, model development, and recommendation generation.

Are you ready to embark on this exciting journey of predicting credit card approvals and making a positive impact on financial decisions? Let's get started!