**PREDICTION OF BLOOD DONOR AVAILABILITY**

1. **AIM**

To develop a machine learning model that predicts the availability of blood donors based on demographic and medical attributes, thereby supporting efficient blood donation management and quick access to donors in emergency situations.

1. **PROBLEM STATEMENT**

Blood donation is a crucial life-saving activity, but one of the major challenges faced by healthcare systems and blood banks is ensuring timely availability of donors. Traditional donor management systems often lack predictive capabilities, leading to shortages or delays in blood supply during emergencies.This project aims to build a predictive model using machine learning techniques to classify the availability of donors based on features such as location, blood group, and other attributes, enabling more efficient donor coordination.

1. **REQUIREMENTS**

**Hardware Requirements**

* A computer with minimum 4 GB RAM (8 GB preferred for faster model training).
* Processor: Intel i5 or above / AMD equivalent.

**Software Requirements**

* Python 3.x
* Jupyter Notebook / Google Colab
* Required Libraries:
  + pandas (data handling)
  + scikit-learn (machine learning algorithms, preprocessing, evaluation)
  + numpy (numerical operations)

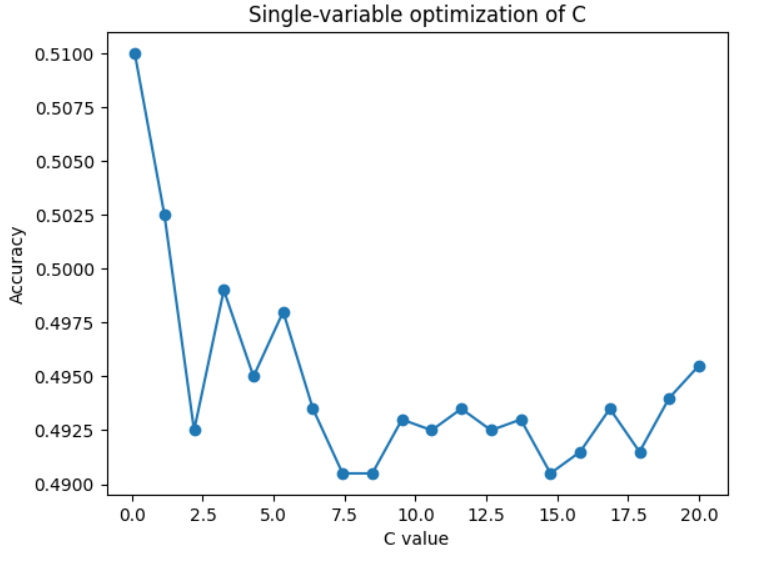
**Dataset Requirements**

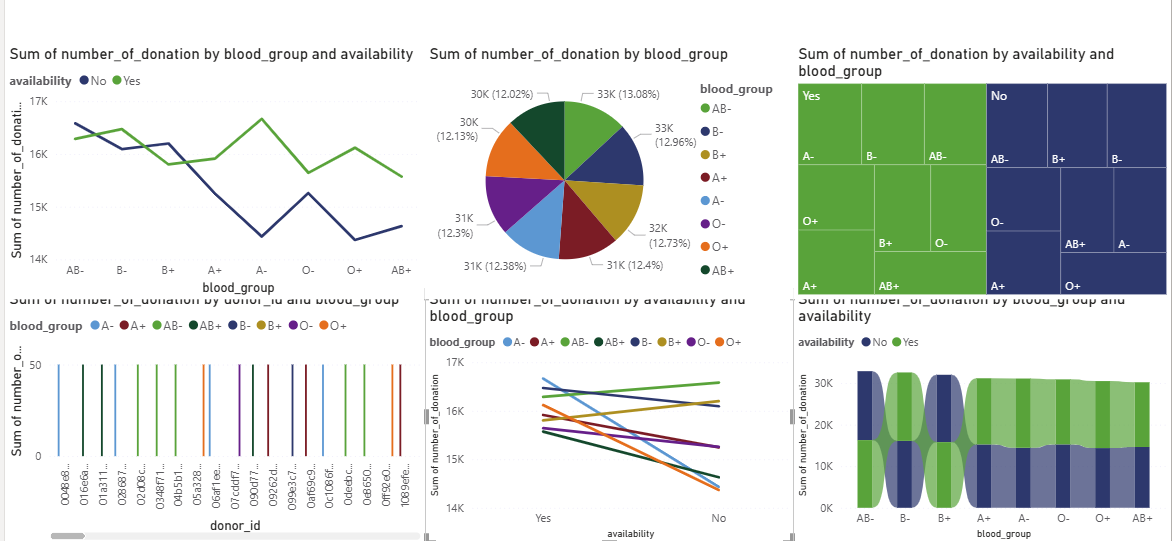
* A dataset containing donor details such as:
  + City/Location
  + Blood Group
  + Availability status (target variable)
  + Other demographic/medical attributes

1. **PROCEDURE**

* Data Collection
  + Gather donor-related data (e.g., blood group, city, availability).
  + Store in CSV format (blood.csv in this case).
* Data Preprocessing
  + Remove personal identifiers (e.g., name, email, phone number).
  + Encode categorical variables (city, blood\_group, availability).
  + Split the dataset into features (X) and target (y).
* Data Splitting
  + Divide data into training and testing sets (80%-20% split).
* Feature Scaling
  + Normalize/standardize data using StandardScaler for better model performance.
* Model Training
  + Train a Support Vector Machine (SVM) model with RBF kernel.
  + Fine-tune hyperparameters (e.g., C, gamma).
* Model Evaluation
  + Predict availability on test data.
  + Evaluate performance using metrics such as accuracy and classification report.
* Result Analysis
  + Interpret accuracy and other evaluation metrics.
  + Assess whether the model can effectively predict donor availability.

1. **VISUALISATION**

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