# Predict **Maternal Health** Classification

# Introduction

Maternal health is an important aspect of women's health during pregnancy, childbirth, and the postpartum period.

Specifically, during pregnancy, different health factors like age, blood disorders, heart rate, etc. can lead to pregnancy complications. Detecting such health factors can alleviate the risk of pregnancy-related complications.

# Objective

This project aims to utilize machine learning techniques to identify factors influencing the health risks of pregnant women based on health data records.

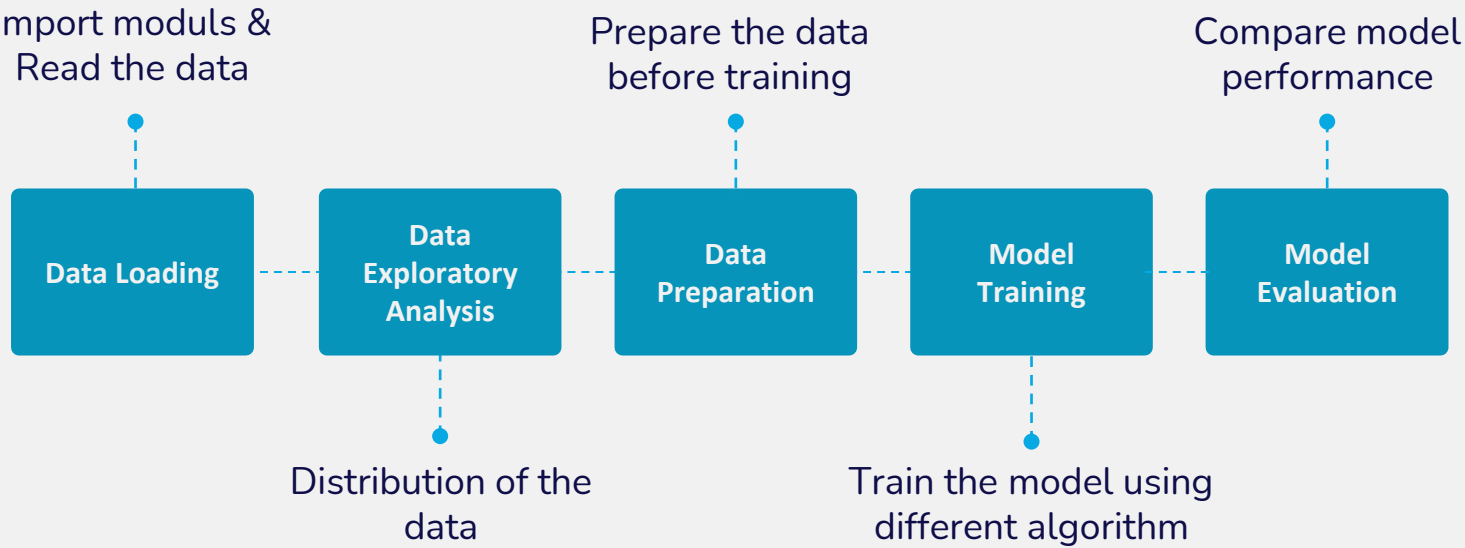
The primary objective is to construct models that precisely predict the risk level during pregnancy, aimed at reducing identification errors and ensuring accurate labelling risk class of pregnant women.

# Data Understanding

The maternal health risk dataset utilized in this project was acquired from Kaggle  and was originally collected from different hospitals, community clinics and maternal health care centers from the rural areas of Bangladesh.  The dataset contained six predictive variables in pregnancy and one target categoric variable of risk level.

- Age : Age in years when a woman is pregnant.
- SystolicBP : Upper value of Blood Pressure.
- DiastolicBP : Lower value of Blood Pressure.
- BS : Blood glucose levels is in terms of a molar concentration.
- HeartRate : A normal resting heart rate in beats per minute.
- RiskLevel : Predicted Risk Intensity Level in tree class (low risk, medium risk, high risk) during pregnancy considering the previous attribute.

# Workflow


Import moduls &
Read the data
Prepare the data
before training
Compare model
performance
Data Loading
Data
Exploratory
Analysis
Data
Preparation
Model
Training
Model
Evaluation
Distribution of the
data
Train the model using
different algorithm

# Model Evaluation Result

Baseline Model Performance using 5 Cross Validation

| Algorithm | Average Accuracy | Standard Deviation |
|---|---|---|
| KNN | 0.68 | 0.03 |
| SVM | 0.65 | 0.03 |
| Decision Tree | 0.80 | 0.03 |
| Random Forest | 0.81 | 0.02 |
| XGBoost | 0.80 | 0.02 |

# Model Evaluation Result

Selected Model with Hyperparameter Tuning

Since objective in this project to reduce identification errors, Recall will be used as a performance matrix.

| Algorithm | Class | Recall | |
|---|---|---|---|
| | | Train | Test |
| Random Forest | Low Risk | 0.95 | 0.87 |
| | Middle Risk | 0.89 | 0.80 |
| | High Risk | 0.93 | 0.92 |

# Conclusion

- Based on statistic calculation age, systolic, diastolic blood pressure, blood glucose levels, and heart rate are factors that significantly influence the risk during pregnancy.

- The model successfully predicted 92% of the data in the high-risk class. However, it could only predict 80% of the data in the medium-risk class.

# Recommendation

Optimal Reproductive Age
(20 – 35 years old)

Health Examinations Before Pregnancy

Maintaine and Monitor During Pregnancy

# Thanks