DIABETES ANALYSIS USING MACHINE LEARNING (KNN)

INTRODUCTION

Diabetes Mellitus is a chronic metabolic disorder

Characterized by high blood glucose levels

Caused by insulin deficiency or resistance

OBJECTIVES

- UNDERSTAND DIABETES AND ITS TYPES

- ANALYZE CAUSES, SYMPTOMS, AND COMPLICATIONS

- APPLY MACHINE LEARNING FOR PREDICTION

TYPES OF DIABETES

Type 1 Diabetes – Autoimmune

Type 2 Diabetes – Insulin resistance

Gestational Diabetes – During pregnancy

CAUSES & RISK FACTORS

Genetic factors

Obesity & sedentary lifestyle

Poor diet, stress, aging
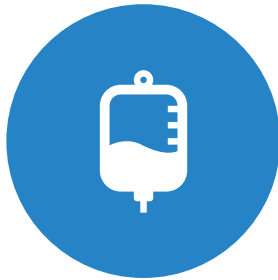
SYMPTOMS & DIAGNOSIS

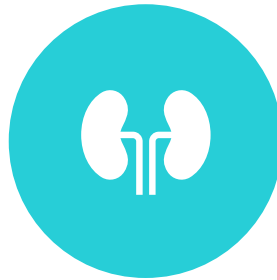Frequent urination & thirst

Fatigue & blurred vision

Tests: FBS, OGTT, HbA1c

COMPLICATIONS

ACUTE: HYPOGLYCEMIA, DKA

CHRONIC: KIDNEY, EYE, NERVE DAMAGE

CARDIOVASCULAR DISEASES

DATASET USED

Diabetes Dataset (diabetes.csv)

Medical attributes like glucose, BMI, age

Outcome: Diabetic / Non-diabetic

MACHINE LEARNING — KNN

SUPERVISED CLASSIFICATION ALGORITHM

USES DISTANCE-BASED SIMILARITY

K = 5 NEIGHBORS

MODEL WORKFLOW

- Data preprocessing & scaling

- Train-test split

- KNN model training & prediction

MODEL EVALUATION

Accuracy

Confusion Matrix

Precision, Recall, F1-score

ROC CURVE & AUC

ROC shows TPR vs FPR

AUC measures classification ability

Higher AUC = Better performance

RESULTS & DISCUSSION

KNN performs well on diabetes data

Feature scaling improves accuracy

Useful for early detection

ADVANTAGES & LIMITATIONS

Advantages:

Simple & interpretable

Effective for small datasets

Limitations:

Sensitive to noise

Computational cost

DIABETES SCENARIO IN INDIA

Rapid increase in diabetes cases

Affects younger population

Major healthcare burden

CONCLUSION

Diabetes needs early diagnosis & control

KNN helps in effective prediction

ML improves healthcare decision-making