

Early Prediction of Gestational Diabetes using Machine Learning Model



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Research Background

In first decades,

Main reason for diabetes is high level of glucose.

Types of diabetes:

- Type 1
- Type 2
- Gestational diabetes

Gestational diabetes is a type of diabetes that happens during pregnancy.

Mainly effect mother and babies.

Machine Learning approaches now more popular for diabetes detection.

Literature Review



Paper [1] :



- Predict Gestational Diabetes and glucose levels using ML model.
- **Combined clinical, lifestyle, and previous medical background data** for accurate predictions.
- **Predict early detection Gestational Diabetes** that can improve mother and child health.

Paper [2] :



- Predict **GDM-related biomarkers and glucose levels** early in pregnancy.
- Apply **machine learning techniques** for accurate prediction.
- Help to detect Gestational Diabetes early and provide timely care for mother and baby.

Paper [3] :



- Predict Gestational diabetes based on pregnancies, age, weight, blood pressure, insulin, glucose levels.
- Using publicly datasets for training and testing.
- Applied Popular Machine Learning Algorithms such as Random Forest, SVM and Hybrid SVM.
- Hybrid model performed the highest accuracy of 83%.

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Problem Statements

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Observation:

- Traditional diagnostic methods like oral tolerance tests are time consuming mainly detect the condition.
- Delayed diagnosis can complications for both mothers and baby.
- Predict gestational diabetes need accurate, reliable ML model using clinical and medical history data.

Research Aim and Objective

Aim: To improve the accuracy and efficiency of early Gestational Diabetes detection using ML.

Objectives:

To predict early gestational diabetes for a machine learning-based system.

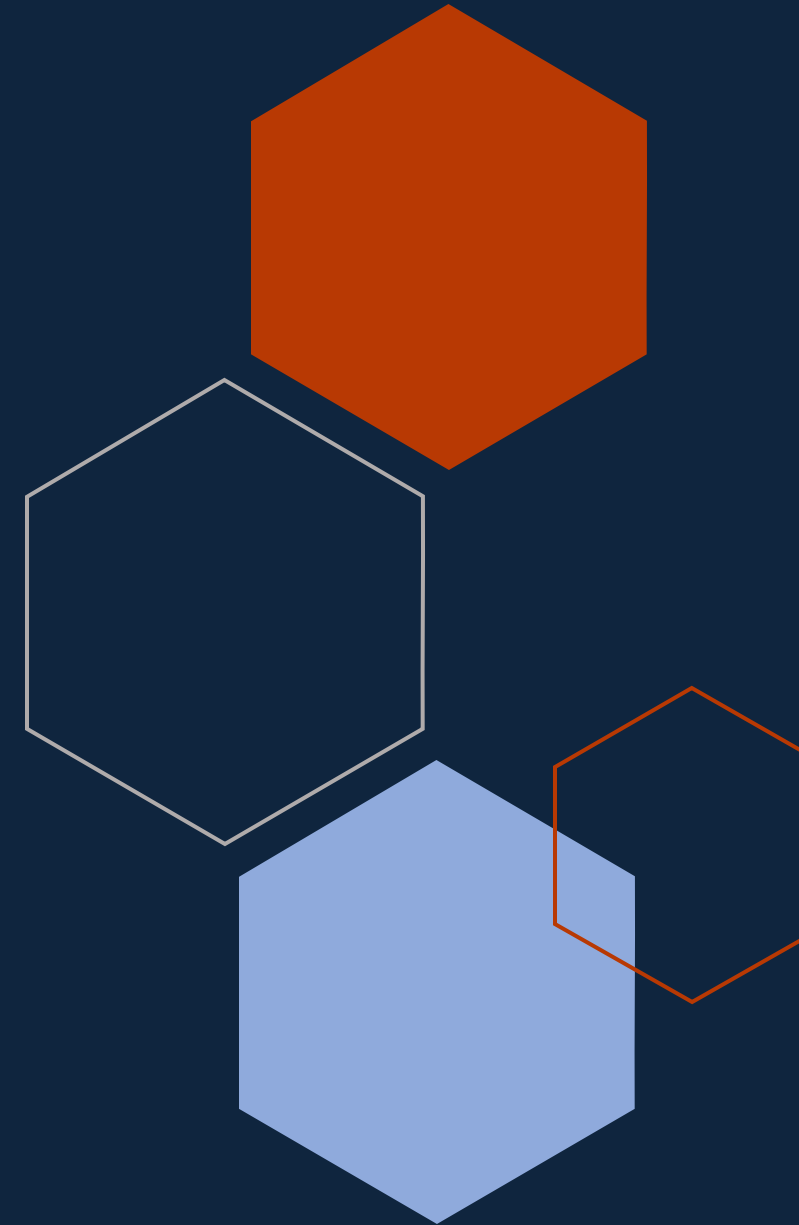
To use early prediction can enable timely interventions and improve mother and child health outcomes due to exactly early symptoms.

To evaluate the model using evaluation metrics.

To use fully wearable devices, lifestyle, or continuous monitoring data.

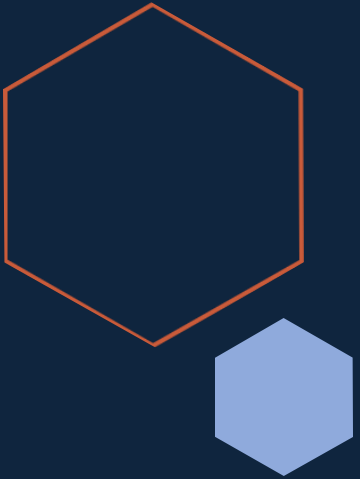
Research Methodology

1. Collect early pregnancy dataset.
2. Clean and prepare the data.
3. Choose important risk factors.
4. Train machine learning models.
5. Select best performing model.
6. **Finally Predict early Gestational Diabetes .**

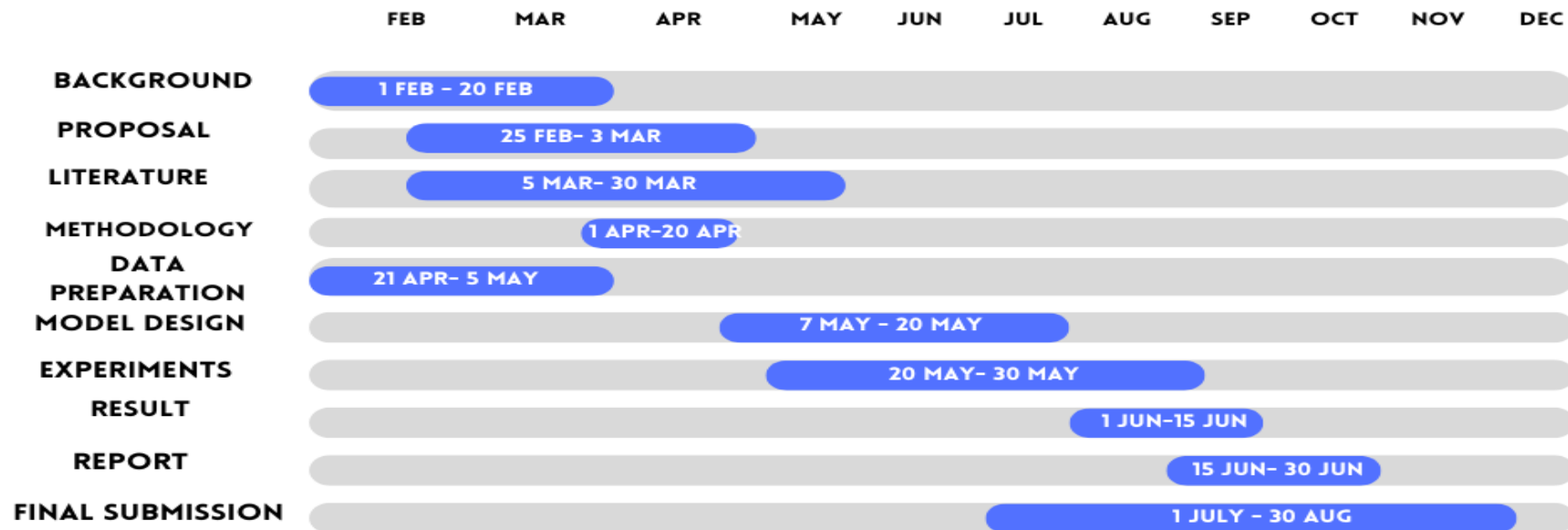




Project Planning and Resources



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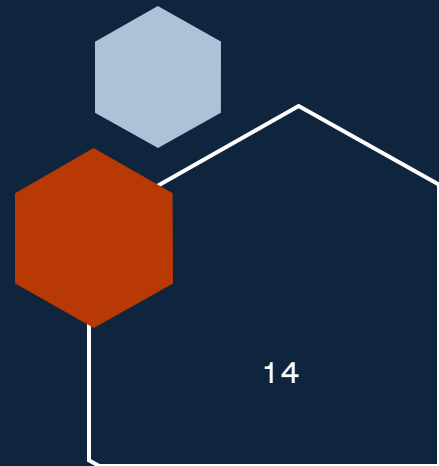


Resources :

Data : Need a perfect Datasets using publicly available datasets.

Software and Tools :

- Using Python Programming Language.
- Machine Learning Libraries like Scikit-learn, Tensorflow, PyTorch.
- Pandas, NumPy for Data Preprocessing.
- Matplotlib, Seaborn for Visualization.





Project impact and limitations

Impact :

1. Early detection of gestational diabetes provides timely support for mothers and reduces pregnancy risk.
2. Support healthcare professionals with decision making tools to improve early screening.

Limitations :

1. Some ML model are difficult to interpret for healthcare professionals which affect trust and use.
2. Gestational Diabetes case are lower than non-cases as a result class imbalanced and reduced model accuracy.



References

- [1] A novel machine learning approach for diagnosing diabetes with a self-explainable interface.
- [2] Gestational Diabetes Prediction using ML Integrated with Web UI.
- [3] Prediction Analysis for Diabetic Disease Using Machine Learning Model.
- [4] Identification of Diabetes Level Using AI/ML Model.
- [5] A Novel Hybrid Model for Efficient Prediction of Diabetes Using Machine Learning.

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Thank you