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Department of
Electronics & Communication Engineering

PCOS Identification Using Machine learning Techniques

Project Domain: Machine learning

Project Members

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Project Guide :

Prof. D.P. Sangeetha (AP / ECE)

AGENDA

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- Motivation & contribution of work
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- 5a review paper 2
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- Existing System
- Proposed System
- Architecture Diagram & Flow Chart /Design
- Proposed work (Methodology)
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- Results (hardware and software)
- Video explanation
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Introduction

- Polycystic Ovary Syndrome (PCOS) is a prevalent health disorder affecting millions of women worldwide, with a higher incidence in India.
- Early identification of PCOS is critical to prevent the development of associated health complications such as diabetes, high blood pressure, obesity, and heart disease.
- Unfortunately, due to a lack of awareness and the need for a doctor's prescription for testing, less than 50% of women with PCOS receive proper treatment.
- Our project aims to identify common diseases that indicate the presence of PCOS and predict the risk of obesity, providing valuable insights for early diagnosis and treatment.

Objective

- The objective of this project is to identify common diseases that indicate the presence of Polycystic Ovary Syndrome (PCOS) and predict the risk of obesity.

- PCOS is a particularly common disease in India with around 1 in every 5 women distressed by the condition. Around 5-10 percent of women of reproductive age are suffering from PCOS.

- In this project, we aim to raise awareness about the prevalence of PCOS among women in India and the potential health risks associated with it.

Motivation & contribution of work

- PCOS affects 1 in 10 women and is a complex hormonal, metabolic, and reproductive disorder that can cause infertility.
- Women with PCOS are at a higher risk of developing type 2 diabetes and cardiovascular disease, with more than 50% becoming diabetic or prediabetic before age 40.
- PCOS increases the risk of endometrial, ovarian, and breast cancers in women, with some studies suggesting two to four times higher risk for breast cancer.
- Unbalanced diets can also contribute to PCOS, which is increasingly being diagnosed in pre-teens and teens

Literature Review 1

Project name	Authors	Techniques used
Diagnosis of Polycystic Ovary Syndrome Using Machine Learning Algorithms (DATE - 5-7 June 2020)	**Subrato Bharati , Prajoy Podder and Rubaiyat Hossain Mondal**	Data amalgamation is performed by merging two different datasets of heart diseases and diabetes.

Literature Review 2

Project name	Authors	Techniques used
i-HOPE: Detection And Prediction System For Polycystic Ovary Syndrome (PCOS) Using Machine Learning Techniques (19 December 2019)	**Amsy Denny , Ashi Ashok , Maneesh Ram C**	Feature selection process is explained

Literature Review 3

Project name	Authors	Techniques used
Early identification of PCOS with commonly known diseases: Obesity, diabetes, high blood pressure and heart disease using machine learning techniques	**Shivani Aggarwal , Kavita Pandey**	supervised and unsupervised learning algorithms are classified

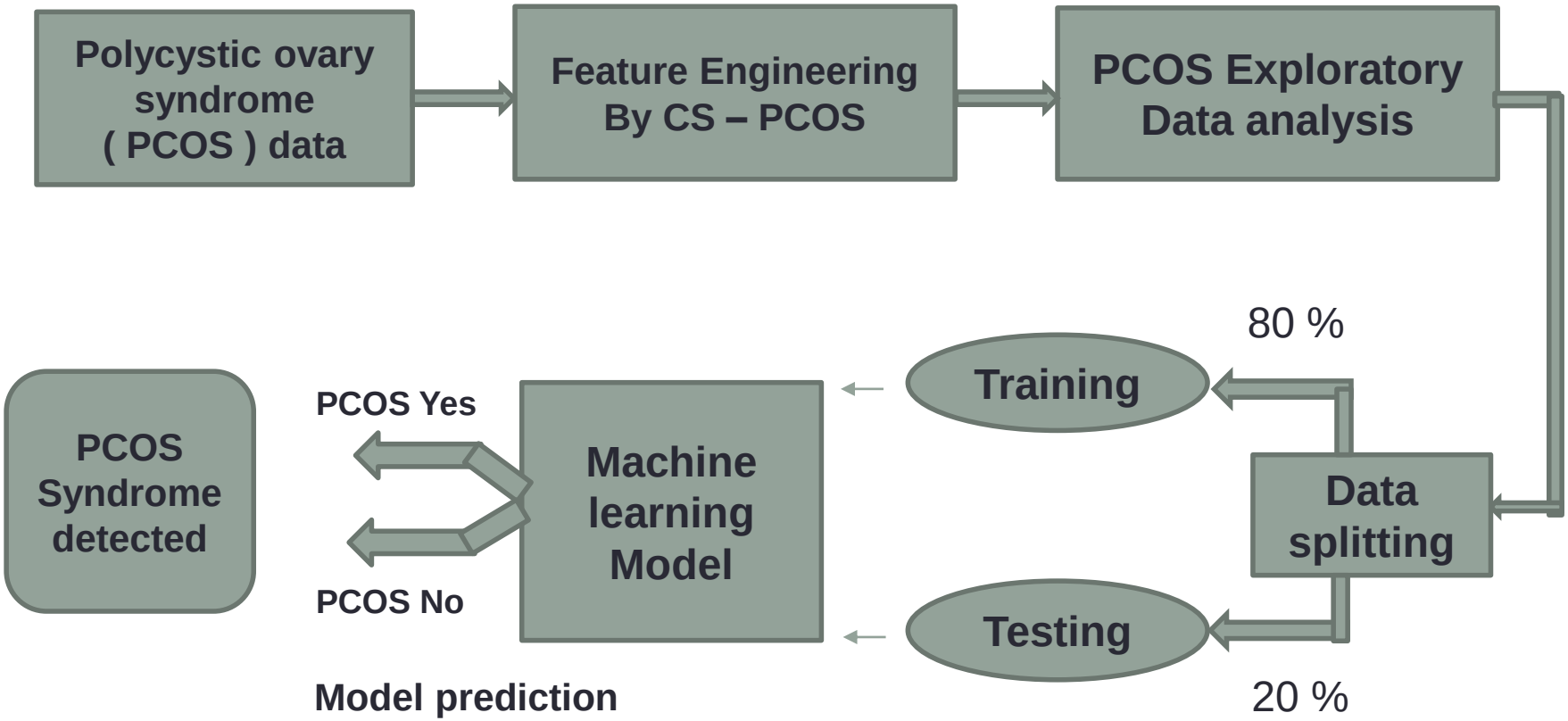
Existing System

- Already existing Ways are of medical diagnosis, biological test , blood test , improper or no menstrual cycle and non existing ovulation also.
- Very few people know about PCOS and it requires more time to identify.
- Thus by using machine learning algorithms with 8 important features we can quickly identify pcos disease prediction and implement proper treatment.

Proposed System

- An Analysis of PCOS Disease Prediction Model Using Machine Learning Classification Algorithms
- Determining the representative features of PCOS via design experiments
- A manual feature selection is made over it and Machine learning algorithms are used to identify the important features to diagnose PCOS.
- The objective is to find the most important parameters for identifying the PCOS with the Design of experiments (DOE)
- The pathogenesis of PCOS metabolic symptoms and the relationship between metabolites and the pathophysiology of PCOS.

Architecture



Block Diagram

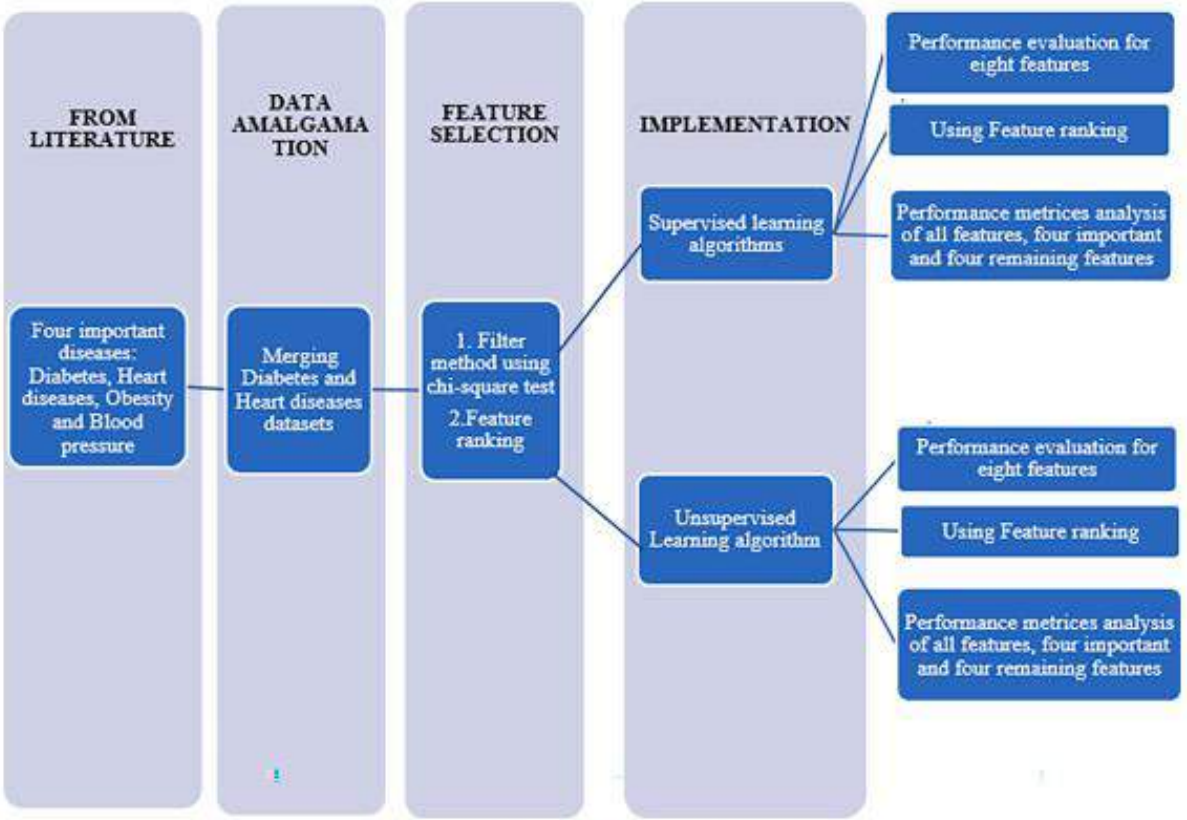


Fig. 1. Flowchart of the main contribution.

Proposed Work

- SVM,logistic Regression,Gradient Boosting and Random forest
- Experiment has been carried out for each of the 2k-p potential parameter combinations
- The features obtained was not suitable for performing ML Techniques
- PCOS is also associated with metabolic abnormalities, including insulin resistance and β-cell dysfunction
  BAT-mediated process,
  PPAR-gamma receptor function process

Execution of project / Implementation

- Data preprocessing
- Data Amalgamation
- Decision Tree
- Gradient Boosting
- Random Forest
- Logistic Regression
- KNN
- Support Vector Machine

Heart Disease Dataset :

https://www.kaggle.com/datasets/johnsmith88/heart-disease-dataset

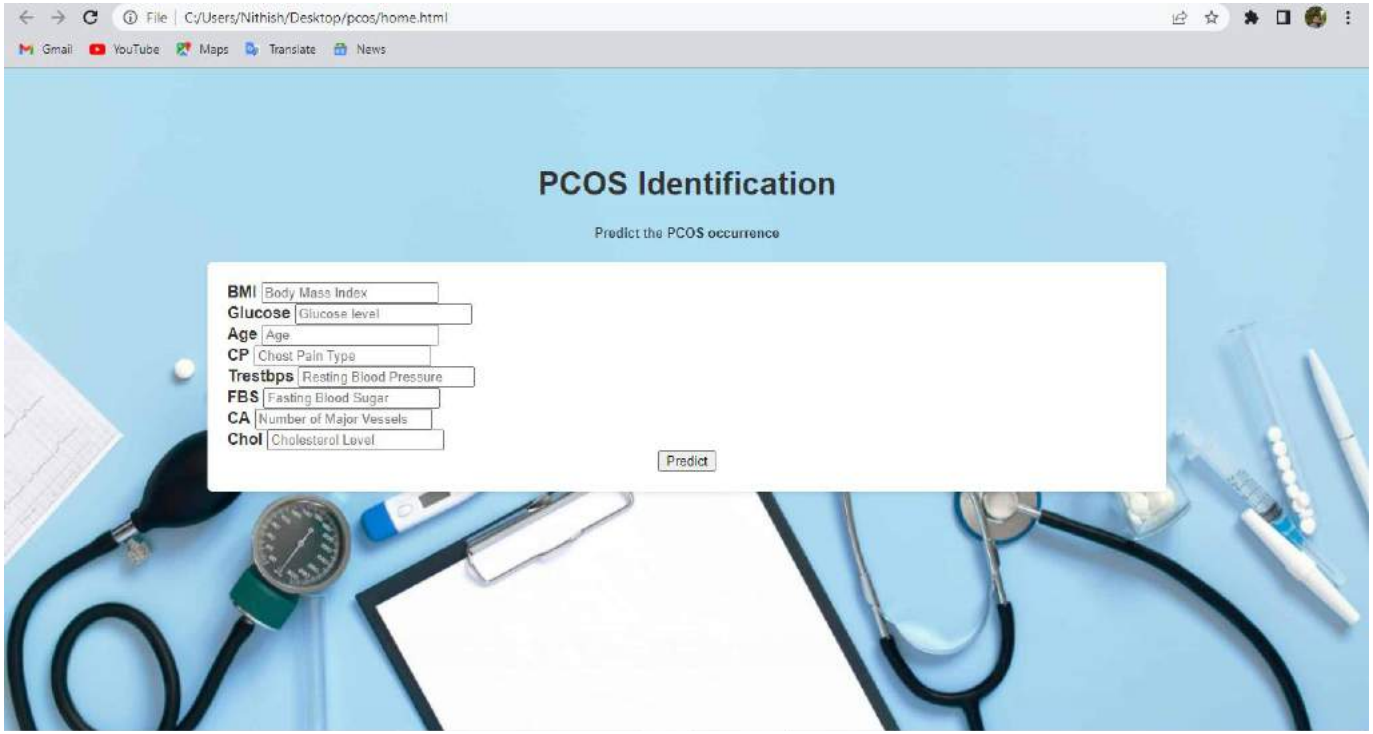
Diabetes Dataset :

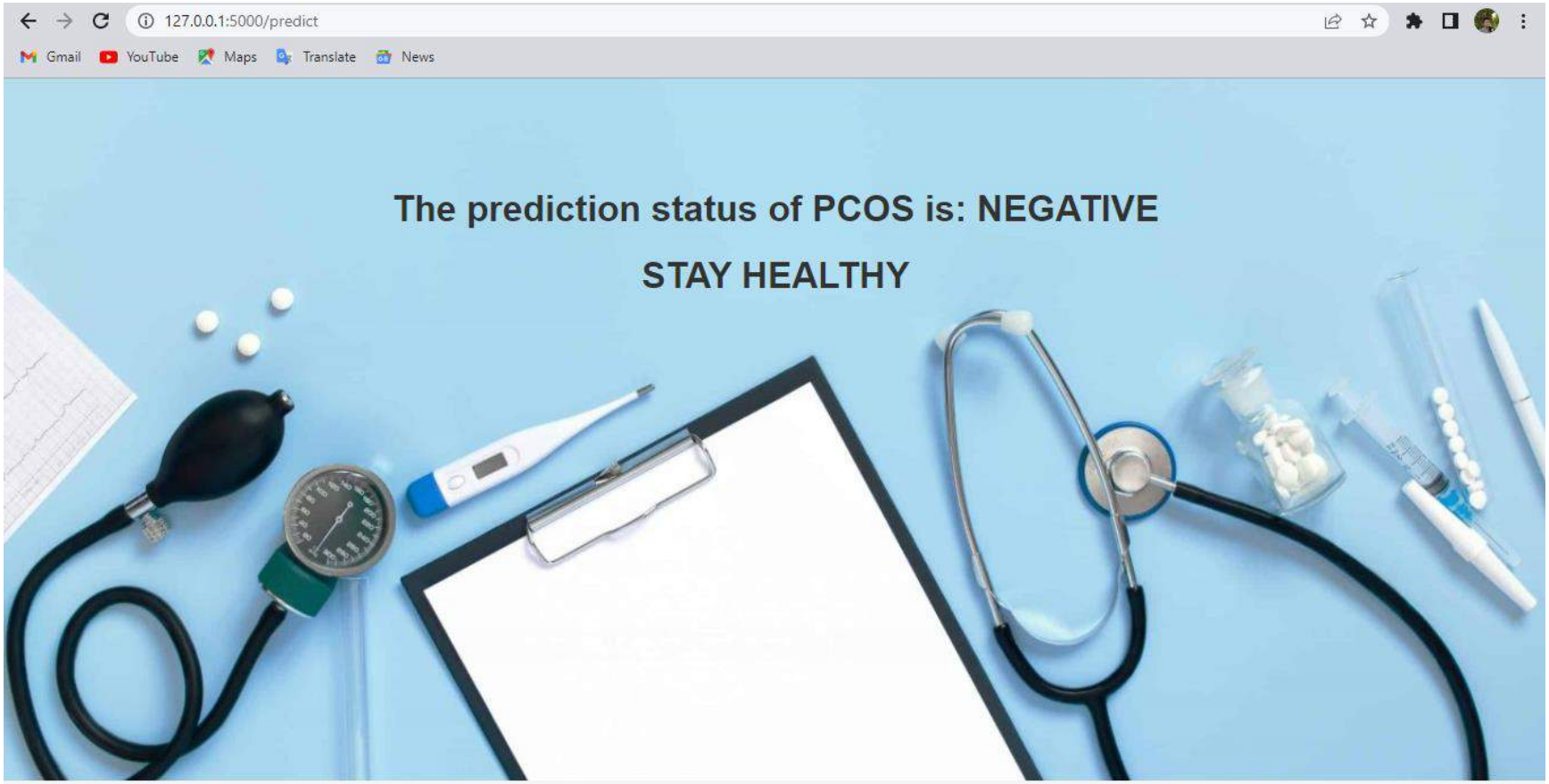
https://www.kaggle.com/datasets/uciml/pima-indians-diabetes-database

Amalgamated Dataset :

https://drive.google.com/file/d/1VtWwTOykG4DyzxjYO73LrcZVIhBmFGOA/view?usp=share_link

Results(We obtained)

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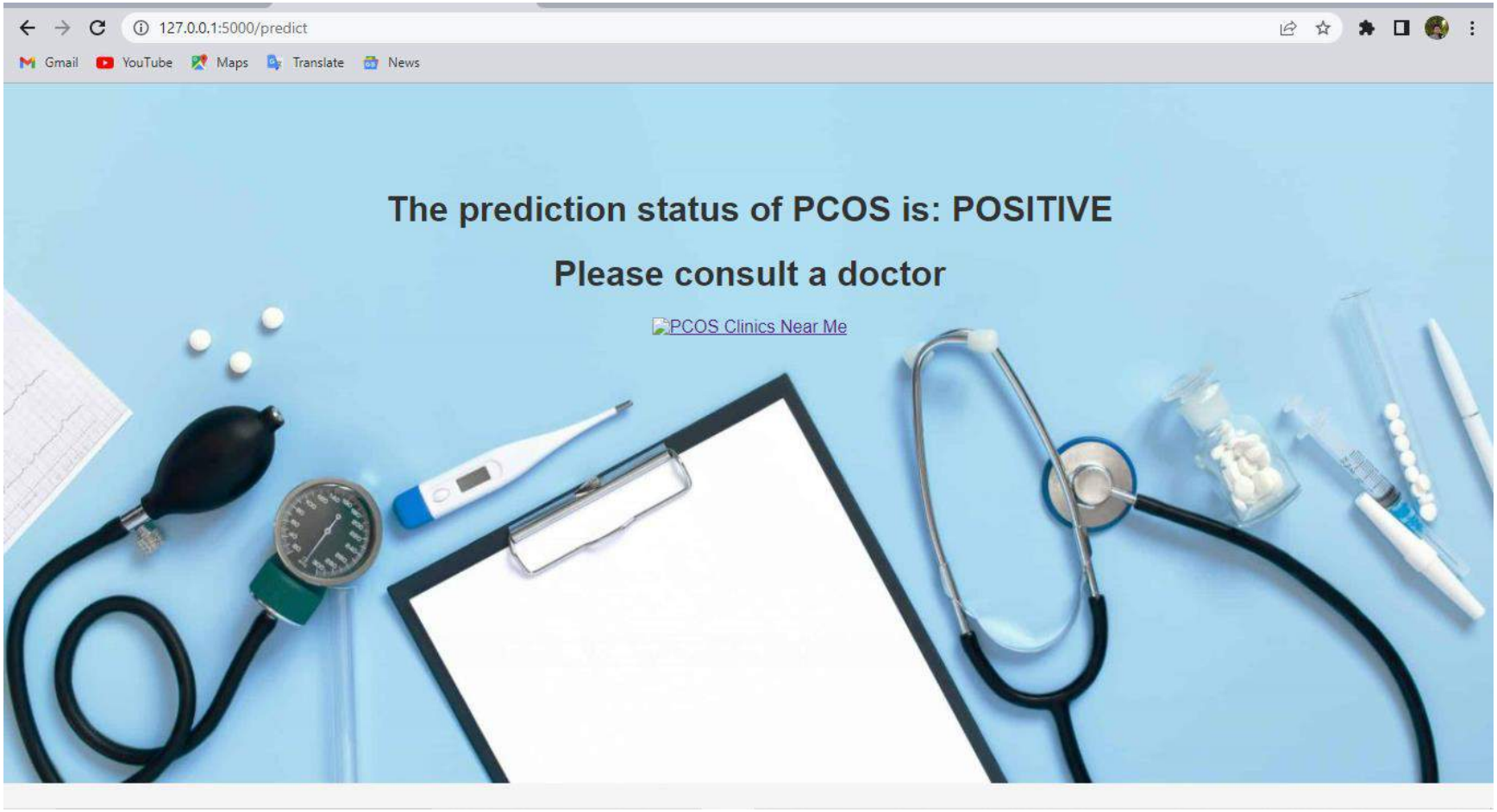
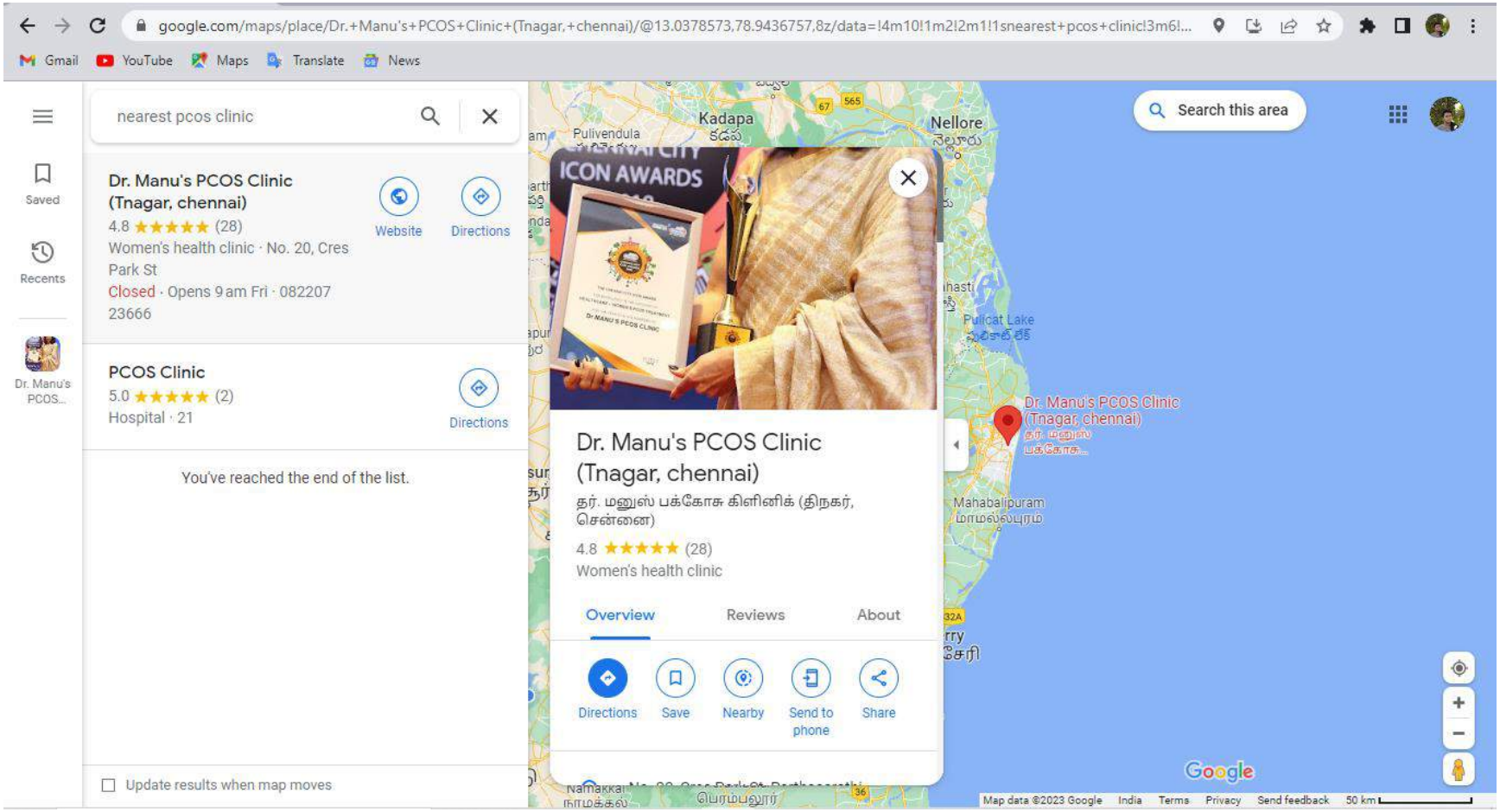
YouTube
Maps
Translate
News
The prediction status of PCOS is: NEGATIVE
STAY HEALTHY


127.0.0.1:5000/predict
Gmail
YouTube
Maps
Translate
News
The prediction status of PCOS is: POSITIVE
Please consult a doctor
PCOS Clinics Near Me


google.com/maps/place/Dr.+Manu's+PCOS+Clinic+(Tnagar,+chennai)/@13.0378573,78.9436757,8z/data=!4m10!1m2!2m1!1snearest+pcos+clinic!3m6!...
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Dr. Manu's PCOS...
Dr. Manu's PCOS Clinic (Tnagar, chennai)
4.8 ★★★★★ (28)
Women's health clinic · No. 20, Cres Park St
Closed · Opens 9 am Fri · 082207 23666
Website
Directions
PCOS Clinic
5.0 ★★★★★ (2)
Hospital · 21
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4.8 ★★★★★ (28)
Women's health clinic
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Conclusion

- The goal of the article is to identify related diseases that aid in early detection of PCOS.
- Women with PCOS are 50% more likely to have obesity and diabetes and are highly prone to heart diseases.
- Feature selection techniques were applied to reduce the parameters used for PCOS diagnosis.
- Supervised learning algorithms were used to find the performance metrics of the model for all, important, and remaining features.
- Important features provided better accuracies of the algorithms compared to all and remaining features.
- Gradient boosting had the best accuracy among all supervised learning algorithms.
- Unsupervised learning K-means clustering algorithm was applied to the unlabelled amalgamated data for validation of the outcomes of supervised learning algorithms.

Time Schedule

i) Dataset collection & Pre-processing - 1week

ii) Data amalgamation - 2week

iii) Feature extraction - 3week

iv) supervised learning algorithms - 3weeks

v) unsupervised learning algorithms - 4weeks

References

Diagnosis of Polycystic Ovary Syndrome Using Machine Learning Algorithms Subrato Bharati1, Prajoy Podder2, M. Rubaiyat Hossain Mondal3 Institute of Information and Communication Technology Bangladesh University of Engineering and Technology Dhaka, Bangladesh 1subratobharati1@gmail.com, 2prajoypodder@gmail.com, 3rubaiyat97@yahoo.com

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i-HOPE: Detection And Prediction System For Polycystic Ovary Syndrome (PCOS) Using Machine Learning Techniques (19 December 2019) Amsy Denny, Ashi Ashok

Dept. of Biomedical Engineering, Sahrdaya College of Engineering and Technology (Affiliated to APJ Abdul Kalam Technological University) Thrissur, India amsydennykallingal@gmail.com

Early identification of PCOS with commonly known diseases: Obesity, diabetes, high blood pressure and heart disease using machine learning techniques

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Thank
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