FEMAURA-AN APPROACH ON POLYCYSTIC OVARY SYNDROME DETECTION USING DEEP LEARNING.

Project Reference No.: *49S_BE_3142*

College : G M Institute of Technology, Davangere.
Branch : Department of Computer Science and Engineering.
Guide : Prof. Nayana K
Student(s) : Ms. Kavana M
Ms. Khushi Gujjar N
Ms. Mamatha C H

Key Words:

FemAura, PCOS Detection, Clinical Data Analysis, Probability Analysis, Python, Flask.

Introduction:

1. Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine disorders affecting women of reproductive age. It is characterized by hormonal imbalance, irregular menstrual cycles, excessive androgen levels, and the presence of multiple small cysts on the ovaries. PCOS not only affects reproductive health but also increases the risk of obesity, insulin resistance, diabetes, and cardiovascular diseases. Despite its prevalence, early diagnosis of PCOS remains a major challenge due to the variation in symptoms and lack of awareness among patients.
2. Traditional methods of PCOS diagnosis rely on clinical examination, ultrasound imaging, and hormone level analysis. However, these approaches can be time-consuming, subjective, and dependent on specialist interpretation. With advancements in data science and artificial intelligence, it has become possible to use computational models to assist in medical diagnosis by analyzing clinical data patterns and predicting disease conditions with high accuracy.
3. This project aims to design and implement an intelligent PCOS detection system using machine learning techniques. The system processes medical parameters such as Body Mass Index (BMI), follicle count, insulin level, and hormonal data to identify potential PCOS cases. Various algorithms such as Decision Tree, Random Forest, and Logistic Regression are applied to improve prediction efficiency and reliability.

Objectives:

1. The main objective is to distinguish PCOS patients from those without the disorder.
2. To collect the data from repositories.
3. To pre-processing the collected data.
4. To analyze hormonal parameters for accurate prediction.
5. To evaluate the system's performace.

Methodology:

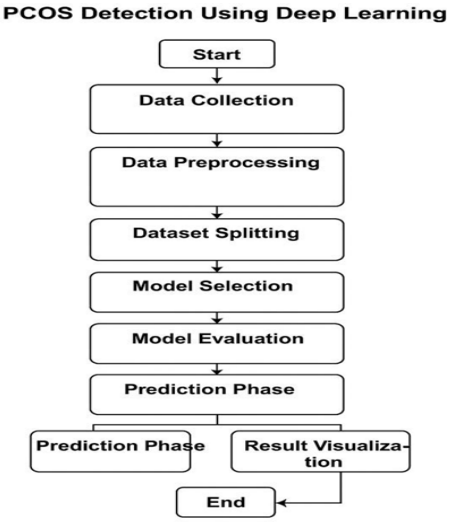

Figure 1: Flow Diagram for PCOS

The project aims to provide an intelligent PCOS detection system by integrating clinical data processing, machine learning algorithms, and a user-friendly web interface. At the initial stage, the system collects patient clinical and biochemical details, which form the primary dataset for analysis.

The collected data is then cleaned and preprocessed to remove inconsistencies and ensure accuracy for model training. Non-convolutional machine learning algorithms are applied to learn patterns and relationships within the data. Based on the trained model, the system generates the likelihood of PCOS in terms of Yes/No along with a confidence percentage.

The results are then displayed through a web-based interface in an easy-to-understand format. Additionally, the system provides insights into key contributing features that influence the prediction. This integrated approach ensures reliable analysis, better interpretability, and effective decision support for PCOS detection.

Results and Conclusion:

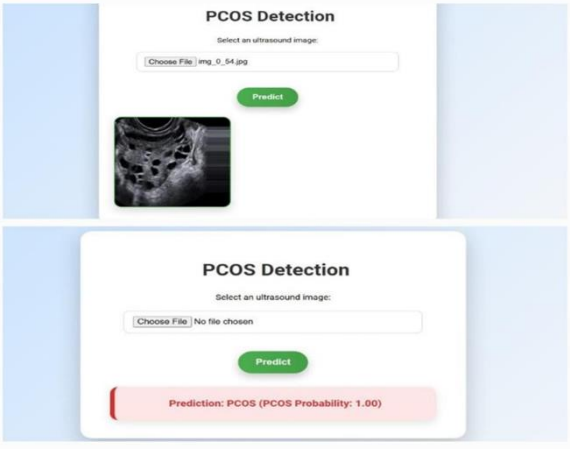

Figure 2: PCO Detection Page

The results include accurate detection of PCOS patterns from ultrasound images using the developed model. The system provides real-time visualization on the web interface for easy understanding. It successfully analyzes ovarian features and displays clear prediction results. The output indicates whether PCOS is detected or not with good reliability. It identifies important patterns such as cysts and irregular ovarian structures. The system performs well for both normal and affected cases, ensuring effective screening.

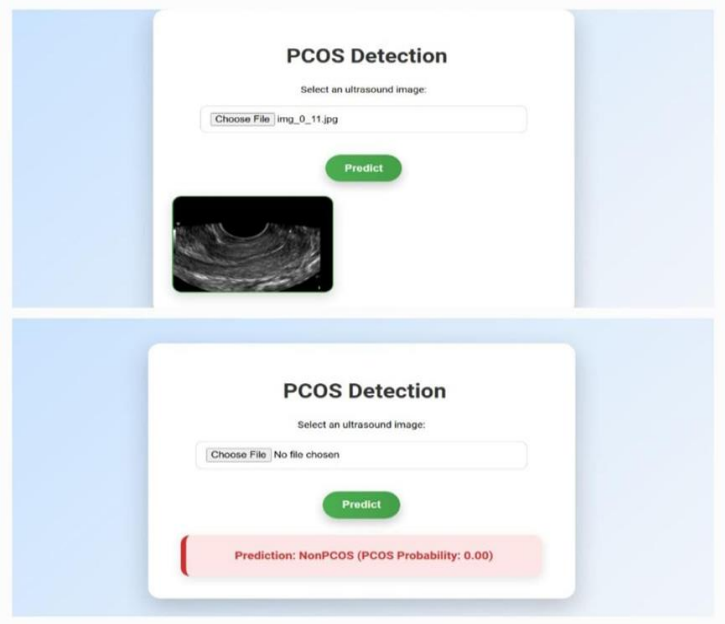

Figure 3: NON PCOS Detection Page

The results include accurate identification of non-PCOS cases from ultrasound images using the developed model. The system provides real-time visualization on the web interface for easy interpretation. It successfully analyzes ovarian features and confirms the absence of PCOS conditions. The output clearly indicates a normal condition with reliable prediction results. It ensures that no abnormal patterns such as cysts or irregular structures are detected. The system performs efficiently in distinguishing healthy cases from affected ones. This supports accurate screening and reduces chances of misclassification. The integration of image processing, trained model, and web interface ensures smooth data flow.

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Future Scope:

1. Integration with Wearable Devices.
2. Multimodal Data Analysis.
3. Predictive Analytics for Risk Assessment.
4. Personalized Treatment Recommendations.
5. Mobile Application with Telemedicine Integration.