PCOSCARE

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ABSTRACT

Polycystic Ovary Syndrome (PCOS) is a condition that causes hormonal disorder among women in their childbearing years. The hormonal imbalance results to an irregular or infrequent menstrual cycle. Women with PCOS significantly experience excessive weight gain, facial hair growth, acne, loss of hair, darkening of skin and infrequent periods leading to infertility issues in rare cases. The existing methodologies and treatments are insufficient for early-stage detection and prediction. To solve this problem, we propose a system which can help in early detection of PCOS and its treatment from an optimal and minimal set of parameters. To detect whether a woman is suffering from PCOS, a machine learning algorithm called Support Vector Machine (SVM) has been used. The dataset used in this project contains all physical and clinical parameters to determine PCOS and infertility related issues. Data used in the project is collected from 10 different hospitals of Kerala, India. This project has also been integrated with a webapp for better user experience. This project will provide appropriate diet and lifestyle recommendations to keep PCOS under control. It includes an intelligent chatbot for all your PCOS queries and provides details of gynecologists near you.

I.   INTRODUCTION

Over the last few decades, technology has revolutionized our universe, influenced our lives and made our daily lives easier. New technologies are changing humanity in many ways. Machine learning is a field of study that enables computers to learn without being explicitly programmed, and plays an important role in medical care today.[1]

Machine learning processes a huge set of data, turning analyzed data into clinical insights to help diagnose a variety of illnesses. Polycystic ovary syndrome (PCOS) is a disease that causes hormonal imbalances in women of childbearing age. PCOS occurs as a result of hormonal imbalances. In this disorder, the ovaries develop small collections of fluid called follicles (cysts) that do not release eggs. As a result, women with PCOS are more prone to complications in conceiving.

Many women have, but do not get diagnosed with it at an earlier stage. In a study, from 69 to 70% of women had not been previously diagnosed. The actual cause of PCOS remains a mystery, but research shows that PCOS is generally inherited. This is a very unpredictable condition as the treatment is uncertain since there is no observable trend for this medical condition. The time and cost of countless medical tests and scans is a burden for both patients and doctors. Therefore, early diagnosis and treatment are important because long-term health risks such as type 2 diabetes and cardiovascular disease can be avoided with simple lifestyle changes. Common symptoms are irregular menstruation, excessive levels of androgens (male hormones), and polycystic ovary. Parameters such as follicle-stimulating hormone (FSH), luteinizing hormone (LH), human chorionic gonadotropin (HCG), follicle-stimulating hormone (TSH), age, cycle length, and cycle regularity are considerrd to formulate the feature vector of the machine learning model Identification of PCOS is difficult due to multiple gynecological, clinical and metabolic parameters involved in the diagnosis. The time required for various clinical tests and ovarian scans, as well as the financial costs, are at the expense of PCOS patients. This is one of the main reasons why women ignore symptoms early on and later suffer from complications caused by PCOS as not everyone can afford these tests and scans. To address this issue, this project can be used to predict the risk of developing PCOS and to advise patients to see a doctor and have tests and scans only when the risk is high.

II.   LITERATURE SURVEY

It provides a comprehensive overview of research on PCOS, supports diagnostics, and provides a variety of image processing and machine learning methods for automation. According to the literature, about 5-10% of Indian women of reproductive age are affected by this endocrine disorder called polycystic ovary syndrome (PCOS). It is an important cause of anovulatory infertility and increases the risk of diabetes, obesity, heart disease and psychosocial disorders.[2,3] There is an interdependence between obesity and PCOS. Recent studies are investigating PCOS-related factors such as obesity[4] and heredity[5].

Gulam Saidunnisa Begu et al. investigated common factors for PCOS such as heredity, fast food diet, participation in physical activity, BMI, and the waist circumference of study participants as possible risk factors for developing PCOS. They found that women with congenital PCOS, fast food eating habits, and obesity were at higher risk of PCOS than participants without these factors. [6]

Amsy Denny et al. This paper proposes a system for detecting and predicting PCOS using a variety of clinical and metabolic characteristics. Of the 23 properties from clinical and metabolic properties, eight potential properties were identified from them using the SPSS V2 2.0 tool based on their importance. The functional set dimensions include principal component analysis (PCA) and various machine learning classification techniques such as naive Bayes classifier, logistic regression, K-nearest neighbor (KNN), classification and regression tree (CART), and random forest. A classifier and support Vector Machine (SVM) apply. PCOS prediction using RFC achieved 89.02% accuracy.[7]

Sharvari S. Deshpande et al. In this article, automatic detection of PCOS is performed by calculating the number of follicles in ovarian ultrasound images and classifying patients into two groups, taking into account clinical, biochemical, and imaging criteria. The number of follicles is detected by image preprocessing such as contrast enhancement and filtering, feature extraction using a multiscale morphological approach, and ovarian ultrasound imaging using segmentation. The support vector machine algorithm is used for classification and inputs all parameters such as body mass index (BMI), hormone level, length of menstrual cycle, number of follicles detected on ultrasound images. The accuracy achieved by this method is 95%.[8]

Palak Mehrotra et al. They have proposed an algorithm that includes the selection of characteristic vectors based on clinical and metabolic characteristics. Also, the statistically significant feature for distinguishing between normal and PCOS groups is selected based on the tests of the two samples. Bayesian and logistic regression (LR) classifiers are used to classify selected functions. Bayes classifiers perform better than logistic regression. The accuracy of the Bayesian classifier is 93.93% compared to logistics regression D. H. 91.04%.[9]

SHRUTHI Mahalingaiah et al. proposed and evaluated the performance of regional classifiers and rising tree models for the classification of automatic feature extraction and polycystic ovarian morphology (PCOM) in parcel ultrasound. The accuracy of the local classifier (RBC) was 97.6% and 96.1% for enhanced tumbling models (GBT).[10]

Survey says that 1 in every 10 women suffer from PCOS worldwide. PCOS is exponentially increasing among women due to an unhealthy lifestyle. PCOS symptoms vary from patient to patient. The significant analysis incorporates filtering for follicles, their number and sizes utilizing Ultrasound imaging. In the existing literature, a few different procedures have been utilized to detect and identify PCOS. We need to refer to the categories of PCOS standards to acquire total comprehension of what PCOS is. These standards which are utilized for conclusion have been assessed on different occasions independently by the National Institutes of Health (NIH, in 1990), by the European Society of Human Reproduction and Embryology (ESHRE) and the American Society for Reproductive Medicine (ASRM, in 2003) (prevalently known as the Rotterdam models). In 2012, the 2003 Rotterdam criteria were endorsed by NIH for PCOS.

III.   PROPOSED SOLUTION

In the proposed system, we have used SVM algorithm for early detection of PCOS. The dataset used contains 28 clinical parameters to predict if a woman has PCOS. This model will also provide appropriate diet and lifestyle recommendations to keep PCOS under control. This project contains an intelligent chatbot for all your PCOS queries and also provides the details of gynecologists in your locality. Support vector machine algorithms are supervised machine learning algorithms used for regression, classification, and outlier detection problems. In SVM, data is basically represented as points in n-dimensional space. Where n is the number of features. The algorithm tries to find a hyperplane that can divide the plotted points into the required or identified number of classes. Logistic Regression: Logistic regression is a classification algorithm. This is a supervised machine learning algorithm that runs the hypothesis using the sigmoid function. The result of the hypothesis is the estimated probability. It is in terms of binary basically 1 or 0.
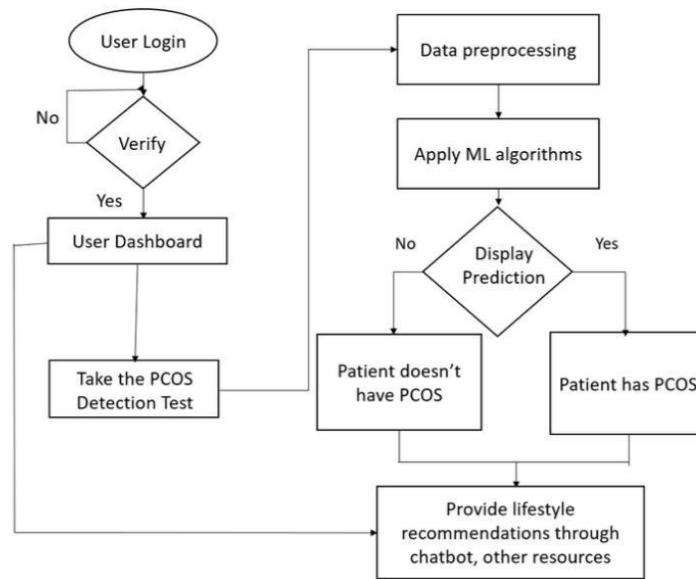
Fig 1

IV.   OBJECTIVES AND FEATURES

The objective of the project is building different classification model for predicting PCOS and analyzing their accuracies to come up with the best of them and using them in further building the ensemble models. To guide woman with little or no information about PCOS as they can get themselves checked on this portal . To develop a cost effective solution which will provide diet recommendations and health tips to keep PCOS in control. One stop for all PCOS related queries and information.

V.   RESULT AND DISCUSSION
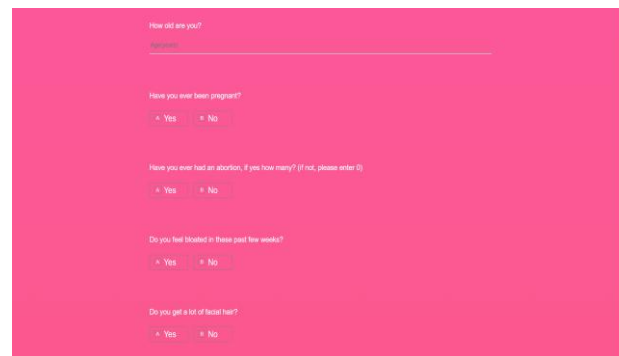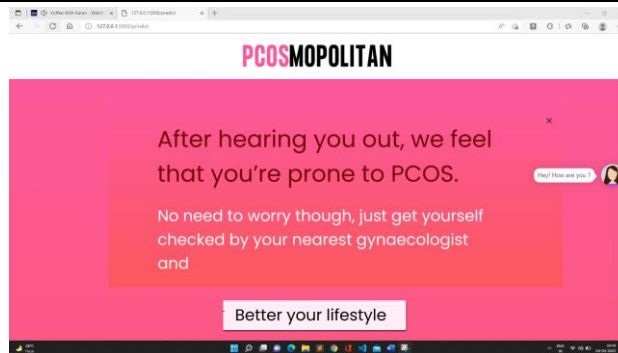

Fig 2: Home Page

Fig 3: Pcos Test

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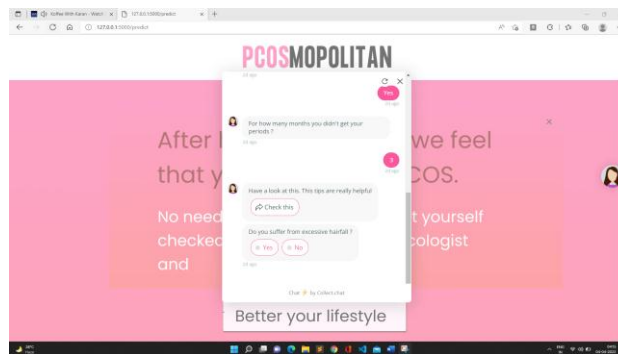
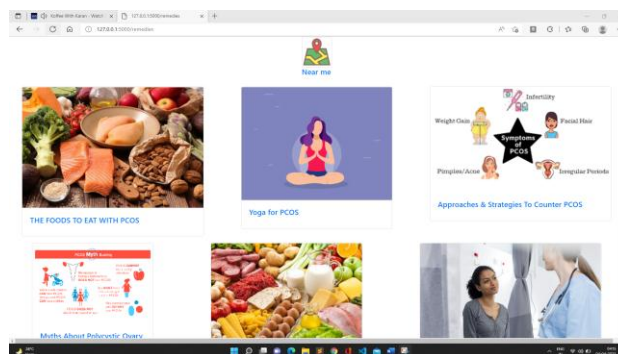**Fig 4:** Result after test

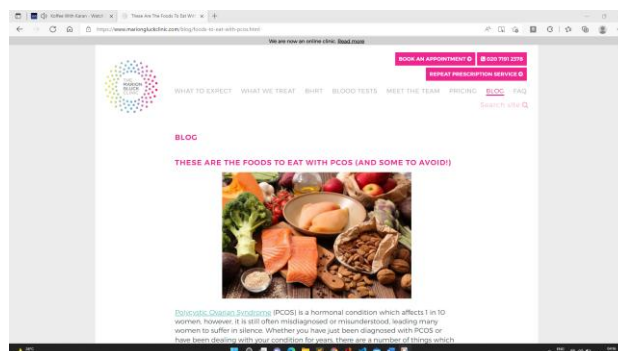
Fig 5: Chatbot

Fig 6: Website links

Fig 7: Webite links

These are the images of the website. Fig 2 is the homepage of the website. Fig 3 is the PCOS test . Fig 4 is the result after test . Fig 5 is the chatbot . Fig 6 and Fig 7 are the website links.

VI. CONCLUSION

In the future, a Period Tracker can be added to monitor the delay in periods. It can also be converted into an interactive platform where users can have appointments with gynecologists or can message them for any queries at the comfort of home. You can choose language of your choice to use the platform. Audio search can

also be implemented as a feature so that it can be accessed by everyone. Polycystic Ovary Syndrome (PCOS) is a medical condition which causes hormonal disorder in women in their childbearing years. The hormonal imbalance leads to irregular or even absent menstrual cycle. Women with PCOS majorly suffer from excessive weight gain facial hair growth, acne, hair loss, skin darkening and irregular periods leading to infertility in rare cases. Our proposed system helps in early detection and prediction of PCOS treatment from an optimal and minimal set of parameters. The Support Vector Machine was found to be the most reliable with accuracy being 95%.

VII.   REFERENCES

[1] https://www.healthline.com/health/ovarian-cysts

[2] https://www.thehindu.com/sci-tech/health/onein-five-indian-women-suffers-frompcos/article29513588.ece

[3] https://www.huffpost.com/entry/frustrating- factsabout-pcos_b_7686030

[4] Sachdeva, G., Gainder, S., Suri, V., Sachdeva, N. and Chopra, S.,2019. "Obese and non-obese polycystic ovarian syndrome: Comparison of clinical, metabolic, hormonal parameters, and their differential response to clomiphene". Indian journal of endocrinology and metabolism.

[5] Zhang, X.Z., Pang, Y.L., Wang, X. and Li, Y.H., 2018. "Computational characterization and identification of human polycystic ovary syndrome genes". Scientific reports, 8(1), p.12949.

[6] Gulam Saidunnisa Begum, Atiqulla Shariff, Ghufran Ayman, Bana Mohammad, Raghad Housam, Noura Khaled, "Assessment of risk factors for development of polycystic ovarian syndrome" International Journal of Contemporary Medical Research2017.

[7] Amsy Denny, Anita Raj, Ashi Ashok, Maneesh Ram C, Remya George. "i-HOPE: Detection And Prediction System For Polycystic Ovary Syndrome (PCOS) Using Machine Learning Techniques" 2019 IEEE Region 10 Conference (TENCON 2019).

[8] Sharvari S. Deshpande ,Asmita Wakankar, "Automated Detection of Polycystic Ovarian Syndrome Using Follicle Recognition", 2014 IEEE International Conference on Advanced Communication Control and Computing Technologies (lCACCCT).

[9] Palak Mehrotra, Jyotirmoy Chatterjee,Chandan Chakraborty, "Automated Screening of Polycystic Ovary Syndrome using Machine Learning Techniques" in 2011 Annual IEEE India Conference.

[10] J. Jojo Cheng and Shruthi Mahalingaiah, "Data mining polycystic ovary morphology in electronic medical record ultrasound reports" in Fertility Research and Practice (2019).