



**SIES (NERUL) COLLEGE OF ARTS, SCIENCE AND
COMMERCE PROJECT PROPOSAL**

**ON
POLYCYSTIC OVARY SYNDROME(PCOS) DETECTION**

**PROJECT WORK SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENT FOR THE
AWARD OF THE DEGREE OF MSc.
(COMPUTERSCIENCE)**

**SUBMITTED BY
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SIES (NERUL) COLLEGE OF ARTS SCIENCE AND COMMERCE

NAAC ACCREDITED 'A' GRADE COLLEGE

(ISO 9001:2015 CERTIFIED INSTITUTION)

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THIS IS TO CERTIFY THAT THE PROJECT TITLED

POLYCYSTIC OVARY SYNDROME(PCOS) DETECTION

IS UNDERTAKEN BY

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Seat No: 01

**In partial fulfilment of MSc - IT / CS Degree (Semester III Examination
in the academic year 2021-2022 and has not been submitted for any other
examination and does not form part of any other course undergone by the
candidate. It is further certified that he/she has completed all the required phases
of the project.**

Project Guide

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PROJECT PROPOSAL
POLYCYSTIC OVARY SYNDROME(PCOS)
DETECTION

INTRODUCTION

PCOS is a menstrual problem which is faced by many women in teenagers or middle aged women.

PCOS is a condition that affects a woman's hormone levels. Women's with PCOS produce higher than normal amount of male hormones. This hormone imbalance causes their body to skip the menstrual cycle/periods and makes it very difficult for them to get pregnant or conceive.

PCOS also causes hair growth on face and body which results in baldness. It can contribute to long term health problems such as diabetes and heart diseases.

PCOS affects a woman's ovaries, the reproductive organs that produce estrogen and progesterone hormones to regulate the menstrual cycle. The Ovaries also produce a small amount of male hormones called Androgens.

Symptoms: Irregular Periods, Facial Growth, Growth of Acne, Weight Gain, Women has to face a lot of difficulties like sleep disorder and regular health issues.

The idea behind building this Project is that PCOS is a Problem in most of the women and they are not aware about it and if they are aware but they feel uncomfortable to check by the doctor (Gynaecologist) as most of them think that they have to go through lot of tests but in reality it is not true as early diagnosis and treatment can reduce the risk of long term health issues. PCOS affect 1 out of every 10 women. To eradicate the serious problem I have built this project to predict and help the women to acknowledge their condition whether they are suffering from PCOS or not. This Platform takes input from user then predicts the result.

PCOS doesn't just affect a selected group of individuals. Nearly 6 to 12% of women have PCOS. PCOS affects women of all backgrounds, and sizes. It affects models and athletes to populations, 16-year-old girls to 45-year-old women. Women with cysts who are infertile and experience physical side effects. Heavy menstrual bleeding and other irregularities, could be caused by a range of conditions, such as uterine fibroids, bleeding disorders, in addition to PCOS.

Women with PCOS are at a higher risk for insulin resistance, high blood sugar, obesity, high cholesterol, high blood pressure, Diabetes, and other

cardiovascular diseases. One of the biggest issues with PCOS is that no one woman with PCOS looks or even experiences the same things as another. There are different phases they are: Menstruation, Follicular Phase, Ovulation, Luteal Phase.

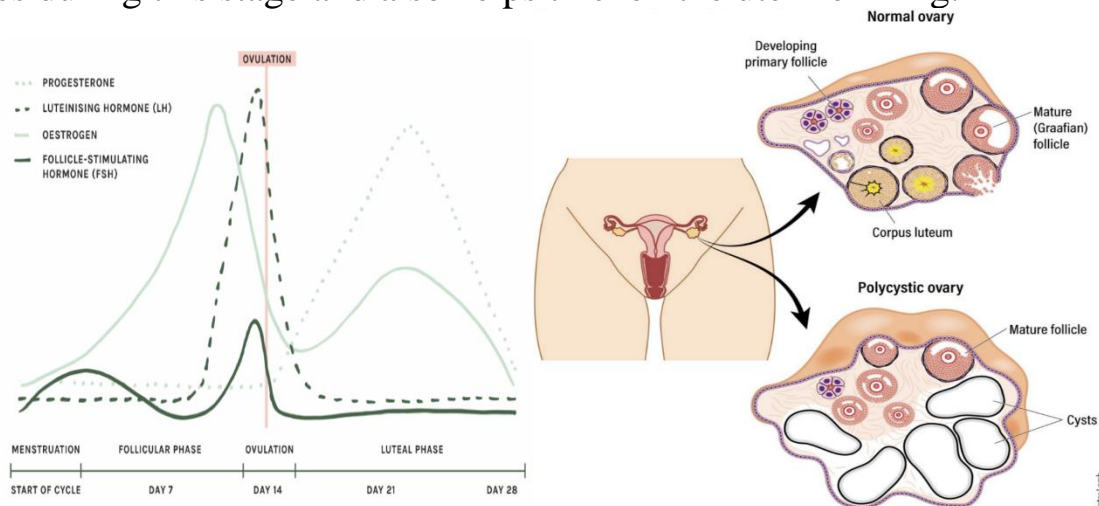
Phases:

1. Menstruation: The 3–7 days of your period, in which the top layers of the endometrium (lining of the uterus) are shed. During menstruation, levels of all four hormones are at the lowest levels.

2. Follicular Phase: The 7 to 10 days between the start of the menstrual cycle (with the onset of menstruation) and ovulation. The production of the Follicle Stimulating Hormone is slightly increased, which stimulates the growth of 3 and 30 follicles. As the Follicle stimulating hormone (FSH) declines later in the phase, only one follicle (the dominant follicle) continues to grow and soon starts to produce estrogen, which begins to prepare the uterus and initiate the surge of luteinizing hormone (LH).

3. Ovulation: The release of an egg from the ovaries, traveling through the fallopian tubes. Takes place in 3–4 days following the follicular phase. The LH surges and stimulates the dominant follicle to rupture, releasing the egg. Egg release occurs randomly between both ovaries.

4. Luteal Phase: The 10–14 days between ovulation and the start of menstruation, assuming that the egg has not been fertilized. The ruptured follicle closes after releasing the egg and forms a structure called a corpus luteum, which produces increasing quantities of progesterone. The progesterone causes the thickening of the uterine lining. The estrogen also rises during this stage and also helps thicken the uterine lining.



RELATED WORK

The Work done in Paper “Study and detection of PCOS related diseases using CNN (1)” The Study in this research work is done in the detection of Poly Cystic Ovarian Syndrome related diseases. Deep learning algorithms were performed in this area. Convolutional neural networks, classification, image segmentation, and feature extraction are performed. Joseph, Carolina, and Arnauet al., proposed a study on the application of a convolutional neural network (CNN) to segment medical X-rays suitable for small data sets . Its application provides an overall accuracy of 92%, F1 0.92, and AUC 0.98, bypassing traditional image processing techniques such as aggregation and entropy methods while preserving the existing neuron networks used for segmentation in non-medical environments.

They developed a fully automatic method for segmenting medical radiograms using a small set of data. They have also presented a two-module decoding architecture as a compromise between a deep network for extracting high-level features and subtle details and a network that avoids excessive transformation into small data sets. S. Khazendar, et. al., a proposed automatic model which characterize the ultrasound ovarian tumors images using support vector machine and local binary pattern operator. The input images are first pre-processed and for each 2 x 2 blocks of the input image, the Local Binary Pattern Histograms are extracted. A Support Vector Machine (SVM) was used for training by using cross-validation with random sampling.

This procedure was repeated 15 times and 100 images were randomly selected in each round. If the training performed on multiple masses improves test performance and this test is maintained during external validation, this machine intelligence can be incorporated into a program of ultrasound instruments that describes ovarian mass characterization. Pim, Jelmer M., was carried out the deep learning research on multitasking segmentation of medical images with multiple methods .

The CNN network was trained to divide six tissues on the MRI image of the brain, the pectoral muscle in MR breast image, and the coronary artery in CTA of the heart. The results show that for training the CNNs, a single CNN structure can be used that can obtain accurate results for images from different methods and show different anatomical structures. Furthermore, it

is possible to train a single unit of CNN that cannot segment multiple tissue categories into a single anatomical structure, but also multiple structures. However, the algorithm for classification of cysts may be implemented which are not suitable for all kinds of cysts. This classification is based on segmentation, feature extraction using the CNN algorithm which is an emerging and useful technique in the medical field.

Another Paper Named “PCOS Detection and Prediction using Machine Learning Algorithms”(2) From 1 in 10 women suffering from PCOS worldwide to currently 3-4 in 10 women, PCOS is now exponentially increasing among women due to an unhealthy lifestyle. The literature says that 1 in every 5 women in India suffers from PCOS. PCOS symptoms differ in every patient. The major diagnosis includes scanning for follicles, their number and sizes using Ultrasound imaging. In the existing literature, several various techniques have been used to analyse and detect PCOS.

We need to refer to the categories of PCOS standards to gain complete understanding of what PCOS is. Even though it is called Polycystic Ovary Syndrome, it is not essentially described by ovarian cysts. It is defined by examining at least two of three diagnostic criteria. These criteria which are used for diagnosis have been evaluated multiple times separately 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) (popularly known as the Rotterdam criteria). In 2012, the 2003 Rotterdam criteria were endorsed by NIH for PCOS. Table 1 illustrates the criteria used for diagnosis of PCOS which have been set as a standard by NIH.

For an accurate PCOS diagnosis, disorders that have specific signs and symptoms that match with those of PCOS must be dismissed. Hyperprolactinemia, Cushing's syndrome and non-classic congenital adrenal hyperplasia are few examples. [Zhang, 2018] have used different machine learning algorithms like K-nearest neighbour (KNN), decision tree and SVM with different kernel functions to predict PCOS from the identification of new genes. [P. Mehrotra, 2011] have used machine learning algorithms like Bayes and Logistic Regression (LR) to develop an automated system that will act as an assisted tool for the doctor for saving considerable time in examining the patients and hence reducing the delay in diagnosing the risk of PCOS by using metabolic and clinical factors in a feature vector. [Norman, 2007], have done a comprehensive study on the

disorder and its three diagnostic criteria in depth giving us insights on not just PCOS but also abnormalities of insulin, gonadotropin and folliculogenesis. [Essah, 2006], have discussed how there exists an overlap between the metabolic syndrome and the polycystic ovary syndrome (PCOS).

That article discusses the existing data regarding the familiarity, characteristics, and treatment of the metabolic syndrome in women with PCOS. Amsy Denny, 2011, have proposed a system for the early detection and prediction of PCOS from an optimal and minimal but promising clinical and metabolic parameter, which act as an early marker for this disease. Dewailly, 2013 have illustrated in their literature how the diagnosis of PCOS depends on biological, clinical and morphological criteria. As ultrasonography has technologically advanced, the excess follicle has become the primary criterion of polycystic ovarian morphology (PCOM). Since 2003, most investigators have used a threshold of 12 follicles (measuring 2–9 mm in diameter) per whole ovary, but that now seems obsolete [A. Saravanan, 2018]. The fluctuations in the quantity of ovarian volume or area may also be considered as accurate markers of PCOS Morphology, yet their utility compared with excess follicle remains a puzzle.

Data Pre-processing: The dataset found was cleaned. Hence, no data pre-processing was required. The dataset contains columns which have continuous as well as discrete observations. So, let us see if we can derive any useful insights from the columns which have continuous values. These Kernel Density Estimation Plots demonstrate that patients who had PCOS have similar trends as the patients without PCOS. These distributions are not useful from the point of view of finding features that can help us differentiate between a patient who is diagnosed with PCOS and a patient who is not

Random Forest Classifier: Random Forest Algorithm is another example of Ensembling methods. It combines result from many decision trees to derive a conclusion. Used for solving problems based on both Regression and Classification.

Support Vector Classifier: Support Vector Machine algorithms are supervised machine learning algorithms which are used for regression,

classification and outlier detection problems. In SVM, it basically plots the data as points in an n-dimensional space, where n is the number of features. The algorithm tries to find a hyperplane which can separate the plotted points into the required or identified number of classes. Logistic Regression: Logistic Regression is a classification algorithm. It is a supervised machine learning algorithm. It uses sigmoid function to perform its hypothesis. The outcome of the hypothesis is the estimated probability. It is in terms of binary i.e. will it happen or not basically 1 or 0 respectively.

KNeighbours Classifier: The KNN algorithm assumes that similar data if plotted would exist nearby. We first load the data and choose how many classes we want the algorithm to classify the data into and The algorithm first calculates the distance of K number of neighbours using distance formula, then it takes the K nearest neighbours according to the distance we calculated. Among these classes, it counts the number of data items for each class. It then allocates the new data points to that class, where it has the greatest number of neighbours.

Comparison of Models: After implementing the machine learning algorithms, the following observations and results were obtained - Table 3 and 4. These have been generated in Jupyter Notebook using Scikit Learn Library. Table 3 describes the K Fold cross-validation scores of each algorithm on training data and Table 4 describes the precision, recall and Fscore for each model on testing data. From the tables 3 and 4, Random forest Classifier is seen to perform better than the respective others. Hence, Random Forest Classifier is used for our final hypothesis which will predict results using test data.

Table 3. K Fold Cross Validation Scores

	Fold 1	Fold 2	Fold 3	Fold 4	Fold 5	Mean Accuracy
Random Forest Classifier	0.895349	0.930233	0.872093	0.918605	0.929412	0.909138
Logistic Regression	0.918605	0.918605	0.872093	0.872093	0.917647	0.899808
Linear SVM	0.895349	0.883721	0.872093	0.848837	0.905882	0.881176
Radial SVM	0.941860	0.883721	0.813953	0.883721	0.882353	0.881122
KNeighbors Classifier	0.883721	0.883721	0.837209	0.883721	0.894118	0.876498
Gaussian Naive Bayes	0.895349	0.906977	0.779070	0.848837	0.917647	0.869576

Table 4. Classification Report

	Precision (Class 1, Class 2)	Recall (Class 1, Class 2)	Fscore (Class 1, Class 2)
Linear SVM	(0.911, 0.850)	(0.911, 0.850)	(0.911, 0.850)
Radial SVM	(0.855, 0.906)	(0.955, 0.725)	(0.902, 0.805)
Logistic Regression	(0.888, 0.888)	(0.941, 0.800)	(0.914, 0.842)
Random Forest Classifier	(0.891, 0.941)	(0.970, 0.800)	(0.929, 0.864)
KNeighbors Classifier	(0.820, 0.866)	(0.941, 0.650)	(0.876, 0.742)
Gaussian Naive Bayes	(0.923, 0.813)	(0.882, 0.875)	(0.902, 0.843)

Another Paper “Awareness about PCOS and the Likelihood of Its Symptoms in Adolescent Girls in a Semi-Urban Set-Up: A Cross Sectional Study”(3) The study is a cross-sectional study conducted. Girls aged between 14-17 years were included in the study.

A probable case of clinical PCOS was defined as a girl with menstrual irregularity or hirsutism or both. Girls who reported a menstrual cycle longer than 35 days or who had variable cycles/irregular cycles were considered to have menstrual irregularity.

Clinical hyperandrogenism was considered in adolescent girls presenting with unwanted hair growth in a male like pattern, moderate to severe inflammatory acne and /or menstrual irregularities. Hirsutism was estimated with a modified Ferriman-Gallway score assessment that was given with the questionnaire. Hirsutism was considered when the total score was > 8 according to the Ferriman-Gallway chart.

The BMI was calculated as the ratio of weight (kg) and height squared (m²). The responses from the participants were collected and the data analyzed. The prevalence of the indicators of PCOS was quantified. Girls showing the indicators of PCOS were counseled and advised to seek a clinical opinion.

Another Paper Named “Self-Administered Questionnaire to Screen for

Polycystic Ovarian Syndrome”(2)The Study of PCOS is associated with a myriad of poor health outcomes for women,as well as their offspring. In addition to poor health outcomes, women with PCOS have lower markers of quality of life, both physically and psychologically when compared to age-matched controls. It is estimated that PCOS costs the United States health care system \$4.4 billion dollars throughout a woman’s reproductive lifespan. However,only 2% of this cost is spent on initial evaluation.Furthermore, the diagnostic process for many women with PCOS is inefficient and unsatisfactory.

Gibson-Helm-et-al found that more than 2 years and health professionals were needed for accurate diagnosis of PCOS in more than 33% of cases.In a large Australian cohort of women with PCOS, quality of life was associated with perceived quality of information given about their diagnosis.Gaps in physician knowledge about the risks of PCOS and delays in diagnosis result in missed recommended screenings, such as blood pressure, cholesterol, and hemoglobin.Given the significant delay in diagnosis and impact on quality of life and long-term health, identification of women at risk of PCOS is vital.

However, these examinations are cumbersome and frequently prohibitive in epidemiological studies.In addition,when women used epilatory techniques to remove hair, accurate evaluation by a physician may not be possible. Compared to more objective measurements of hirsutism, such as photographic scoring or hair measurements.

In 2005, Wild-et-al asked 21% of women with PCOS to score themselves and be scored by three trained professionals. They found considerable variability in scoring and concluded that self-scoring was not clinically useful.However,all scores were significantly higher than 6, indicating that all observers were in agreement that the women met criteria for hirsutism.

More recently, Pedersen-et-al sought to validate a questionnaire for use in the diagnosis of PCOS and noted that a history of in-frequent menses, hirsutism, obesity, and acne was strongly predictive of a diagnosis of PCOS and developed a four-item questionnaire that yielded a sensitivity of 77% and specificity of 94%. However, in contrast to our study presented here,

they recruited women with menstrual irregularity, hirsutism, and infertility, which limit generalizability. They also used the National Institutes of Health (NIH) diagnostic criteria for PCOS, which requires oligo-ovulation or anovulation and clinical or biochemical hyper androgenism for diagnosis, which differs from our study.

While self-evaluation may be less accurate than evaluation by a trained professional, this study demonstrates that women can accurately determine whether they have hirsutism. As a solution for high variability in scoring, Cooketal introduced the simplified FG method, which reduces the number of body regions evaluated, while still accurately diagnosing hirsutism.²⁴ In our study, we used the sFG to designate hirsutism; however, we asked patients to evaluate themselves. Given that 37% of generalists are unaware of the diagnostic criteria for PCOS, self screening questionnaires may be able to improve targeted referrals to specialists.

Another Paper Named “ Polycystic ovary syndrome Validated questionnaire for use in diagnosis”(5) In this Study We have constructed and validated a simple casefinding tool that can help physicians diagnose PCOS and can guide them in treating menstrual irregularity, infertility, and cosmetic concerns. This tool can also alert clinicians to screen for associated and potentially devastating comorbid conditions.

This tool has been developed among women whose primary complaint is infertility. Many clinical symptoms among these patients have substantial overlap. For example, women with hyperprolactinemia often present with secondary amenorrhea as do women with PCOS. This selection bias in the referral patient population is likely also reflected in similarity of fertility rates between women with PCOS and without PCOS. Despite similarities in clinical presentation among women, however, this questionnaire was still able to discriminate between various disease processes with high sensitivity and specificity. Although this tool has not been formally validated in a family medicine clinic, it could discriminate between PCOS and no PCOS even better among women in this population, where primary complaints are often more heterogeneous than in a

reproductive endocrinology clinic.

This model includes a history of obesity as a predictor of PCOS, as a history of obesity was strongly predictive of PCOS in our patient population. Although obesity is prevalent among women with PCOS and exacerbates the clinical manifestations of PCOS, it must be emphasized that obesity is not essential for the diagnosis of PCOS. Polycystic ovary syndrome is a disorder of excessive androgen production, which is often aggravated by associated insulin resistance. Although insulin resistance is closely associated with obesity, it can also manifest clinically in lean patients. The prevalence of obesity among PCOS women ranges from 30% to 75%. In our population, 52% of women with PCOS were obese.

OBJECTIVES

1. The principal objective of this study is to increase awareness about PCOS in women of all age groups specially in teenagers.
2. This study was aimed to assess the prevalence of PCOS in adolescent girls aged 14-17 years.
3. It is also aimed at pinpointing the specific deficits that we need to address when it comes to imparting Comprehensive Sexuality Education (CSE). Often genetic disorders are ignored while teaching the students about the reproductive tract.
4. Finally, since a full clinical screening of every girl is difficult due to lack of infrastructure and societal norms and beliefs, this study can help identify possible cases of PCOS and then those girls can be advised to take a medical opinion.
5. Suggest/Discuss the best practices to assist women in making lifestyle changes.
6. Summarize the Existing lifestyle Modification for women with PCOS.

Hence the goal is to work on following hypothesis :-

1. What types of health issues may cause in patients?
2. What does public think about this disease?
3. To understand the problem of the patient and predict the accurate results.
4. What Diet and Exercises may be recommended?
5. How Helpful is this analysis or prediction of the disease?

METHODOLOGY

Research methodology is a process that includes a number of activities to be performed. These are then arranged in proper sequence for conducting research. The research study of this project is descriptive where it concerned about how people feel online shopping. It is a master plan specifying the method and procedures for collecting and analyzing needed information. Descriptive Research is used in this study as the main aim is to describe characteristics of the phenomenon or a situation.

As the issue is well understood, it focuses on the development of in-depth knowledge the facts will be used to analyze and evaluate the data.

I Have framed some of the questions for doctors and collected the data from them so here is the collected data as follows:

Evidence/Report collected from Expert Doctors(Gynaecologist)

- Questionnaire which were asked to doctors:
 1. What is the Biggest Symptom?
 2. What Food Should they take or avoid?
 3. What Exercises should be beneficial to them?
 4. What Medication Should be prescribed and how much time they should take the medicines?
 5. How much Percentage it can be healed and how much time it takes generally?
 6. How many Types are there,If any Please mention and what is difference?
 7. What are the different Symptoms?
 8. What is the Biggest Reason of PCOS?
 9. How does Patient Comes to know about the condition?

- Doctor 1 Report/Evidence:

Symptoms:

1. Hirsutism: Unwanted Male Pattern Hair Growth on women's face,chest and back. This Condition can be treated with medications.Hair can also be removed with electrolysis or laser therapy.It results in excessive amounts of stuff and Pigmented hair on body areas.It can result from excess male hormones,called androgens.This may occur with certain medical conditions like PCOS or may also be inherited.

2. Insulin Resistance: A Resistance to the Hormone insulin, Resulting in increasing blood sugar. The Hormone insulin helps control the amount of Sugar in the blood with Insulin Resistance, the body's cells don't respond normally to insulin. Glucose can't enter the cells, so it builds up in the blood which can eventually lead to type 2 Diabetes. It generally does not have any symptoms. It can be healed or reverse the insulin resistance by exercise and weight loss.

3. Fertility Problem

4. Acne

5. Weight Gain

Risks:

1. Anxiety
2. Stress
3. Depression
4. Obesity
5. Other Health issues like Cardiovascular disease and Diabetes

Obesity occurs in 35-70% of PCOS women.

Powerful Medicines: Combination of Mychiro, D-Chiro Inositol.

Types: Obese PCOS and Lean PCOS

Life Style Modifications: Diet, Exercises, Modest weight loss, Prevention of weight gain and Quit Smoking.

Diet:

- Low Glycemic Index and Calorie Restricted food: The Glycemic index measures and ranks various foods by how much they cause blood sugar levels to rise. Low glycemic Index foods are those that score below 55 on the glycemic index.

There are three low glycemic index (GI) ratings are:

- a. Low: 55 or lower/fewer.
- b. Medium: 56 to 69
- c. High: 70 or More/High.

Recommended Food:

- a. Bread: Whole grain, Multi Grain, Sour dough.
- b. Breakfast Cereals: Oats, Multi grain Flakes.
- c. Fruits: Strawberry, Apricots, Kiwi, Peaches, Plums, Avocados etc.

- d. Veggies: Carrot, Broccoli, Cauliflower, Zucchini, Green Veggies etc.
- e. Dairy Products: Milk, Cheese, Yougurt, Coconut Milk, Soy Milk, Almond Milk.
- f. Grains and Legumes: Qunioa, Barley, Semolina, Lentils, Chickpeas, Kidney Beans, Butter Beans.
- g. Rice and Pasta: Basmati, Brown Rice, Vermiceli Noodles, Rice Noodles, Suji Pasta.
- h. Nuts: Almonds, Cashews, Pistachios and Walnuts.
- i. Herbs and Spices: Garlic, Basil, Rosemary, Salt and Peeper.
- j. Fats and Oils: Olive oil and Herbs Butter.
- k. Non-Veg: Salmon, Tuna, Prawns, Chicken, Eggs.

Main Aim: To achieve weight loss of 5-10% of body weight over 6 months.

Exercise: Daily Moderate Exercise such as walking for 30-40 mins.

Biggest Reason: Exact cause is unknown. It may be Hormonal related Disorder, very common in reproductive age. Early diagnosis and treatment along with weight loss may reduce further complications.

- Doctor 2 Report/Evidence:
 - a. Menstrual Irregularities, Obesity, Hirsutism, Acne.
 - b. Avoid Oily Food stuff and junk food that can cause weight gain. Eat Healthy foods.
 - c. Exercise is a must for better weight control like walking, yoga, swimming, cycling or gym activities.
 - d. Tab Myoinositol, Tab Metformin, NAC, Vitamins and Minerals. Hormonal therapy can be given to regularise the menstrual cycle and may be given for 3-6 months.
 - e. There is no 100% cure as it is hormonal, metabolic disorder. Maintaining Healthy lifestyle is the most important thing to get rid of the condition.
 - f. Obese PCOS and Lean PCOS.
 - g. Infertility, Repeated Abortions which may also lead to diabetes, hyperlipidaemias (A condition in which there are high levels of fat particles (lipids) in the blood) in future life.
 - h. Patient usually presents with irregular menses, weight gain, Hirsutism. After Marriage they may face problems like infertility or repeated abortions.

- Doctor 3 Report/Evidence:
 - a. The Common Symptom is irregular menses.
 - b. They should avoid all sugary and processed food, junk food and should keep a low carb diet.
 - c. Any exercise or any sport of their liking is fine.
 - d. Lot of different kinds of medicines used based on which symptoms are predominant, age of the patient etc. Both Hormonal & Non-Hormonal medicines are used.
 - e. No Permanent cure as it is metabolic disorder and can be kept in check with exercise, diet, Medicines.
 - f. No types as such but variety of symptoms like irregular periods, obesity, facial hair growth, acne, infertility and hoarse voice (Hoarseness (dysphonia) is when your voice sounds raspy, strained or breathy. The Volume (loud or soft you speak) may be different and so may the pitch) etc.
 - g. Absolutely Variable as far as type and duration of treatment is concerned. Estrogen, Progesterone, Andodabetics in small doses, finasteride etc are used only after doctors evaluation.
 - h. Patients come to know when they have any of the above mentioned symptoms and certain tests can be done.

Now I have discussed about the Algorithms which I will be using in my Project are as follows: Logistic regression to classify the model in Yes/No or True/False or 0/1 but instead of giving us exact values it will give us the values in between 0 and 1. Now Random Forest with XGBoost will be used for our final hypothesis which will predict results using test data. Now KNN and SVM, it basically plots the data as points in an n-dimensional space, where n is the number of features. Now Decision Tree will help to decide that which is having higher/more problem in my project.

REQUIREMENTS

- Language:Python
- Software:Google Collaboratory
- Libraries:
 - Numpy
 - Pandas
 - Sklearn
 - Seaborn
 - Matplotlib

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