



WHOLE THYROID

**Project Title :- Thyroid Disease Detection**

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**Name of Department :- Healthcare**

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**Technologies :- Machine Learning Technology**

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## 1. Abstract:-

There are many thyroid diseases affecting people all over the world. Many diseases affect the thyroid gland, like hypothyroidism and hyperthyroidism. Thyroid in efficiency can cause severe symptoms in patients. Effective classification and machine learning play a significant role in the timely detection of thyroid diseases. This timely classification will indeed affect the timely treatment of the patients. Medical images have evolved into one of the most valuable and consistent data sources for machine learning generation. In this paper, various machine learning algorithms like decision tree, random forest algorithm, KNN, Naïve bayes, SVC, Logistic Regression and Linear Regression. on the dataset create a comparative analysis to better predict the disease based on parameters established from the dataset. Also, the dataset has been manipulated for accurate prediction for the classification. The classification was performed on both the sampled and unsampled datasets for better comparison of the dataset. After dataset manipulation, we obtained the highest accuracy for the random forest algorithm, Which is equal to 99% accuracy .





## 2. Introduction:-

Machine learning is implemented in many fields today. But most significant improvements are made in the field of medicine. To detect thyroid disease, blood tests and medical imaging are performed (ultrasound). Awareness about thyroid disease is necessary as it will play a significant role in the early detection and curing of this problem. The thyroid is an organ in the human body. It produces the hormone required by the human body. The hormones travel in the bloodstream, and it affects the metabolism and growth of humans. It is located below Adam's apple. Thyroid functionality is used for the interpretation and diagnosis of the disease. The thyroid gland produces hormones that control the growth and metabolism used for the body's energy purposes. The thyroid gland also contributes to development in children and adults. The thyroid gland also maintains body temperature. One of the most definitive ways to diagnose a thyroid problem is through blood tests. Thyroid blood tests are used to tell if your thyroid gland is functioning properly by measuring the amount of thyroid hormones in your blood. These tests are done by taking blood from a vein in your arm. Thyroid blood tests are used to see if your body makes too much thyroid hormone, you can develop a condition called Hyperthyroidism. If your body makes too little thyroid hormone, it's called Hypothyroidism. Both conditions are serious and need to be treated by your healthcare provider. The thyroid gland produces two main hormones—triiodothyronine (T3) and thyroxine (T4).



### **3. Load the library and data:-**

These some libraires have to very important to execute for load the data. You cannot execute difference types of python function without some python libraries. After load the python libraries then load the dataset (Thyroid Disease Detection), in which have to 30 columns features there. Then I tried to more got the info about from this data. Which has more got a problem.





#### 4. Data pre processing and Exploration:-

This part is more carefully when you go to prepare the model. Remove an unwanted thing which is use for my prediction data. Like this used Drop\_duplicates function, Rename function, Get dummies function and also used other methods. Then after explore the data with visualization. In this I have taken various types of features columns and visualize with seaborn library (countplot) and used the correlation heatmap function.



## 5. Data modelling:-

When your data has cleaned then go to the modelling process. Before prediction modelling process is necessary. That's why I have taken two step

A. defining the features (x) and target (y) variables:

when your data is cleaned then you build a training and testing data which is x and y.

B. Splitting the data into training and testing:

When you data is built after that you have to take splitting a data for training and testing and set the test data which is my prediction.



## **6. Import ML algorithms and accuracy score library:-**

in this you do try to some machine algorithm. For whom I have done some import ML algorithms libraries

Like a Decision tree, Random forest classifier, Linear regression, SVC, KNN, Naïve bayes and Logistic regression. I have executed each algorithm with score and as well as execute plot confusion matrix. After that I have don't have clarity with accuracy. Actually somewhere score little bit closed each other. That's why I have confused then I used this some accuracy score model library like a accuracy score balance, accuracy score, cohen kappa score, precision score, recall score, f1 score, roc curve, roc accuracy score.





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## 7. AUC- ROC Curve and prediction:-

Still don't have given clarity that which one is best algorithm? I think so, that's why I have used ROC-CURVE method. only these types of algorithms I have used for ROC Curve method. after that you will have to got clear through the roc figure and as well as roc accuracy score. Then you can say my best fit algorithm Random forest classifier and roc accuracy score 99% even more than 99%.



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## 8. Conclusion:-

The thyroid disease is defined as the "powerhouse" of our body: if something in this gland fails, the whole body suffers as well. Therefore, the early diagnosis of a possible malfunction plays a fundamental role, as well as the prediction of the course of treatment of a patient with **hypothyroidism** and **hyperthyroidism**, which can be of great help for doctors who have patients under treatment. In this study we proposed an approach to predict the thyroid disease treatment. If earlier we would use this type of random forest classifier algorithm technology that give a predicted thyroid is there or not.