

# **THYROID DETECTION USING MACHINE LEARNING**

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## SYNOPSIS

The thyroid gland has one of the most important functions in regulating metabolism. When the function of the thyroid gland is affected, it leads to inappropriate production of the thyroid hormone. Hypothyroidism and hyperthyroidism are two critical conditions caused by insufficient thyroid hormone production and excessive thyroid hormone production, respectively. The “Thyroid Detection Using Machine Learning” project is focussed on detecting and diagnosing thyroid disease.

The performance of three machine learning algorithms such as Random Forest, Logistic Regression, Support Vector Machine are compared to classify Thyroid disease into normal, hypothyroidism, or hyperthyroidism categories.

The dataset is taken from the Kaggle repository. The dataset contains 9172 sample observations and has 31 columns including 1 identifier, 1 class variable and 29 features.

The most significant features, which can be used to detect thyroid diseases more precisely are identified using forward feature selection, backward feature elimination, bidirectional feature elimination, and machine learning-based feature selection. The selected features are then used by the algorithms to build the models. Performance is evaluated and the best model is selected based on accuracy. Among the three algorithms, Random Forest is found to be best in terms of computational time and accuracy score, which make it significant for the proposed approach.

A blood test is one of the ways to diagnose thyroid disease. But after a lab blood test, a medical expert needs to examine the test stats of hormones and other parameters of the patient to diagnose the disease. There is very little difference in the blood test stats, which refer to different thyroid hormone levels. Such minor differences can lead to the wrong diagnosis even by medical experts as human error is expected. Incorrect diagnosis may lead to wrong medication and further complexities. So, an automated system can be very helpful to assist medical experts and even make automated disease predictions without any human mistakes.