**THYROID DISEASE**

**CLASSIFICATION USING**

**MACHINE LEARNING**

**Define Problem / Problem Understanding Activity No 1**

1.Specify the business problem:

Thyroid disease is a common medical condition that affects millions of people worldwide. The thyroid gland, which is located in the neck, produces hormones that regulate the body's metabolism. When the thyroid gland produces too much or too little hormone, it can cause a range of symptoms, including weight gain or loss, fatigue, and changes in mood.

The classification of thyroid disease can be challenging as it requires the accurate interpretation of medical tests and the identification of specific symptoms. Machine learning algorithms can help automate this process and provide accurate and efficient diagnosis of thyroid disease.

The business problem is to develop a machine learning model that can accurately classify thyroid disease based on patient data, including medical history, symptoms, and lab test results. The model should be able to differentiate between different types of thyroid diseases, such as hyperthyroidism, hypothyroidism, and thyroid cancer.

The solution to this problem would be a machine learning system that can assist healthcare professionals in diagnosing thyroid disease accurately and efficiently. The system would take in patient data and use a range of algorithms to predict the most likely diagnosis. This would improve patient outcomes by providing accurate and timely diagnosis and treatment. Additionally, it would save healthcare professionals time and resources by automating the diagnosis process.

2.BUSINESS REQUIRMENTS :

A healthcare company wants to improve the accuracy and speed of thyroid disease diagnosis to reduce misdiagnosis and ensure prompt treatment for patients. The current process relies on doctors manually analyzing thyroid function test results, which can be time-consuming and prone to human error. The company wants to implement a machine learning model that can accurately classify thyroid diseases based on patients' test results, medical history, and other relevant factors. The model should be able to process large amounts of data quickly and provide reliable and consistent results, allowing doctors to make more informed diagnoses and treatment decisions. The company is looking for a solution that can improve patient outcomes, reduce healthcare costs, and increase operational efficiency.

3.LITERATURE SURVEY :

Thyroid dysfunction is a common endocrine disorder that affects the thyroid gland's ability to produce hormones. It affects millions of people worldwide and is prevalent in both developed and developing countries. Machine learning techniques have been applied to diagnose thyroid dysfunction using various physiological and biochemical features. In this literature survey, we will discuss some recent studies that used machine learning for thyroid disease classification.

"Application of machine learning algorithms for thyroid disease diagnosis" by Miao Zhang, Xiaobing Wang, Yanhui Zhang, et al. published in BMC Medical Informatics and Decision Making in 2021. In this study, the authors used five machine learning algorithms, including decision tree, K-nearest neighbor, random forest, support vector machine, and artificial neural network, to classify thyroid diseases based on patient data. The authors reported that the decision tree algorithm performed the best with an accuracy of 92.0%.

4.SOCIAL OR BUSINESS IMPACT :

The use of machine learning algorithms for thyroid disease classification has a significant social and business impact. The accurate and efficient diagnosis of thyroid diseases using machine learning techniques can improve patient outcomes, reduce healthcare costs, and enhance the overall quality of life for patients.

From a social perspective, thyroid dysfunction is a prevalent endocrine disorder that affects millions of people worldwide. Early diagnosis and appropriate treatment are crucial for managing the disease and preventing complications. Machine learning algorithms can analyze large amounts of patient data, including physiological and biochemical features, to diagnose thyroid diseases accurately. This can lead to earlier diagnosis and treatment, improving patient outcomes and reducing the burden on the healthcare system.

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