iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** V **Month of publication:** May 2023

DOI: https://doi.org/10.22214/ijraset.2023.52505

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

Thyroid Cancer Detection

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Abstract: ***In the recent world of Digital and Technology,the level of disease rate also increases with time. According to the World Health Organization, the second most common endocrine disorder in the world is relatedto thyroid gland diseases which is next to diabetes. Hypothyroidism or hyperthyroidism is a major issue in India which rises due to non-functional thyroid hormones. This study proposes a machine learning framework to predict thyroid cancer based on our collected clinical dataset. The ten-fold cross-validation, bootstrap analysis, and permutation predictor importance were applied to estimate and interpret the model performance under uncertainty. The comparison between model prediction and expert assessment shows the advantage of our framework over human judgment in predicting thyroid cancer. Our method is accurate, interpretable, and thus useable as additional evidence in the preoperative diagnosis of thyroid cancer.This diagnosis of Thyroid Cancer is very monotonous and tough tasks at early steps with accuracy. The Accuracy prediction can be done through various Machine Learning Algorithms.***

I. INTRODUCTION

The thyroid is a butterfly shaped gland, one of the largest endocrine glands in the body, located below Adam's appleon the front of the neck. It is involved in several body mechanisms such as controlling protein synthesis, use of energy sources and controlling the body's sensitivity toother hormones.

Due to these important functionalities, the thyroid is one ofthe important organs in the human body. However, it is susceptible to many diseases like Graves' (excessive production of thyroid hormones), subacute thyroiditis (inflammation of thyroid), thyroid cancer, goiter (thyroidswelling), etc. In all of the cases, the size of the thyroid changes overtime. So, it is essential to keep track of the thyroid size over time.

Ultrasound (US) imaging has been widely used for thyroid staging, as it is much safer and painless to use for the patients compared to other imaging modalities such as MRI which uses radio and magnetic waves, Computed Tomography (CT) which uses X-rays and Positron Emission Tomography (PET) which uses nuclear imaging technique. Segmentation and volume computation of the thyroid have high clinical importance when it comes to the diagnosis and treatment of thyroid diseases.

In this project we use machine learning approaches which includes deep learning has computer aided diagnosis which has ability to greatly reduce the workload of doctors.

II. LITERATURE REVIEW

1) Deepika Koundal et al. have provided the information about the existing automatic tools which are available to formulate the disease diagnosis part easier with efficient way. Also different performance evaluation metrics are studied. The future developments and trends are also investigated

2) Nikita Sigh and Alka Jindal have concluded that SVM isbetter as compared to KNN and Bayesian. Accuracy of SVM is about 84.62%.KNN found the nearest neighborhood automatically. It represented by graph each vertices having object. Bayesian based on the probability classification which gives the sample data belongs to a class.

3) Edgar Gabriel et al. have proposed two parallel versionsof a code that are used for texture-based segmentation of thyroid FNAC images which is a critical first step in releasing a fully automated CAD solution. An MPI version of the code is developed to exploit distributed memory computer resources such as PC clusters.

4) Preethi Agrawal et al. suggested an automatic segmentation method. They have provided a summary of allthe results obtained either by automatic tools as well as by applying specific algorithm(automatic) segmentation on both lung CT as well as on thyroid US. There are two tools:Analyze 10.0 and Mazda for segmentation of thyroid US images.

5) Eystraints G have suggested a computer-aided diagnosis (CAD) system prototype named as TND (Thyroid Nodule Detector).It is used for the detection of nodular tissue in ultrasound(US)thyroid images and videos acquired during thyroid US examinations.

6) Won-Jin Moon et al. have done in their paper the evaluation on the diagnostic accuracy of ultrasonographic(US) criteria for the depiction of benign and malignant thyroid nodules.

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It is done by using tissue diagnosis as thereference standard. They concluded that shape, margin, echogenicity and presence of calcification are important criteria for the discrimination of malignant from being nodules.

7) S.Yasodha et al. have proposed CACC-SVM techniques which is hybridization of class-Attribute Contingency Coefficient (CACC) and support vector machine(SVM) for classification of thyroid data.

8) The proposed model achieved better accuracy compared to other traditional models Alfonso Bastias et al. have focused on developing an AIS based machine learning classifier for medical diagnosis and investigating the capability of the proposed classifier. The proposed classifiersuccessfully improved the identification process of thyroid gland disease.

9) Gurmeet kaur et al. has proposed an efficient neural network training model for thyroid disease diagnosis. It presents general model for diagnosing any disease. The objective of this paper is to diagnose thyroid disease by using three different neural network algorithm which havedifferent architecture and characteristics.

10) Ali keles et al. aims at developing an expert system for thyroid diagnosis that is known as Expert System for ThyroidDisease Diagnosis (ESTDD). In this expert system authors have used neuro fuzzy rules which could diagnose thyroid diseases with 95.33% of accuracy.

III. PROPOSED MODEL

Thyroid Disease diagnosis is one of the very difficult and tedious tasks, because it needs lots of experience and knowledge. The traditional ways for diagnosis thyroid disease is doctor's examination or a number of blood tests. Main task is to provide disease diagnosis at early stages withhigher accuracy. Data mining plays a vital role in medical field for disease diagnosis. It offers lot of classification techniques to predict the disease accuracy. Hospitals and clinics gathered a large amount of patient data over the years. These data provide a basis for the analysis of risk factors formany diseases.

In the proposed system, we are using advanced machine learning approaches which includes deep learning has computer Aided Diagnosis, which has unified diagnosis standards which has ability to greatly reduce the workload ofdoctors, has become easy to diagnosis. Our system has high image Accuracy, removes speckle noise and reduces time required for diagnosis.

A. Methodology

In the proposed system, we are using advanced machine learning approaches which includes deep learning has computer Aided Diagnosis, which has unified diagnosis standards which has ability to greatly reduce the workloadof doctors, has become easy to diagnosis. Our system has high image Accuracy, removes speckle noise and reduces time required for diagnosis. In proposed system used to extract the features of thyroid and it used to increase the resolution and efficiency level of an input. To find a Thyroid cancer, it is the combined process of a Thyroid feature extraction.

[1] Preprocessing
[2] Feature Selection
[3] Feature Extraction
[4] Classification

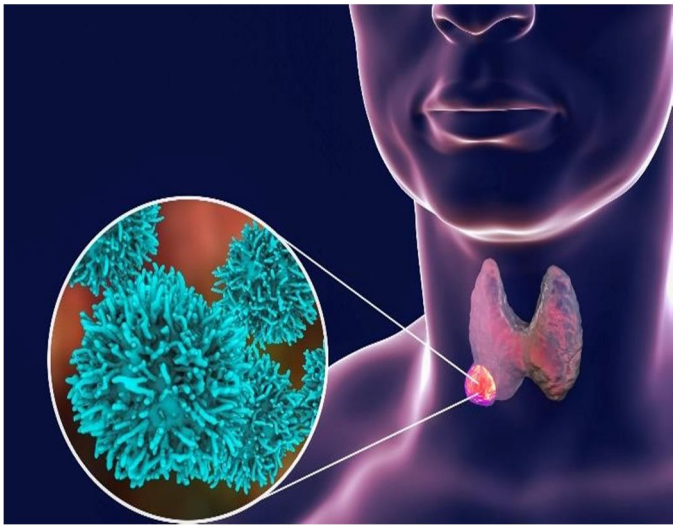


Fig 1: thyroid cancer

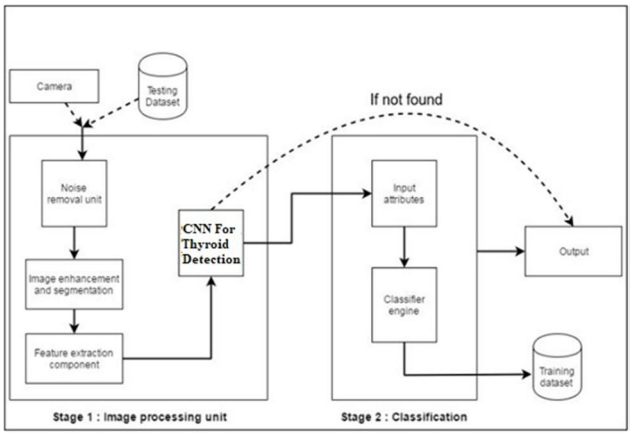


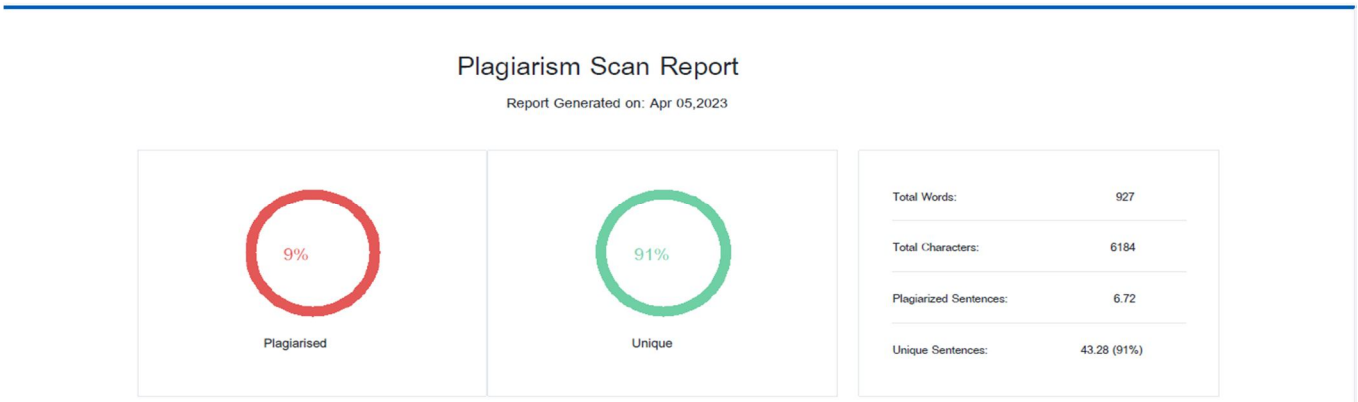
Fig 2: Architecture

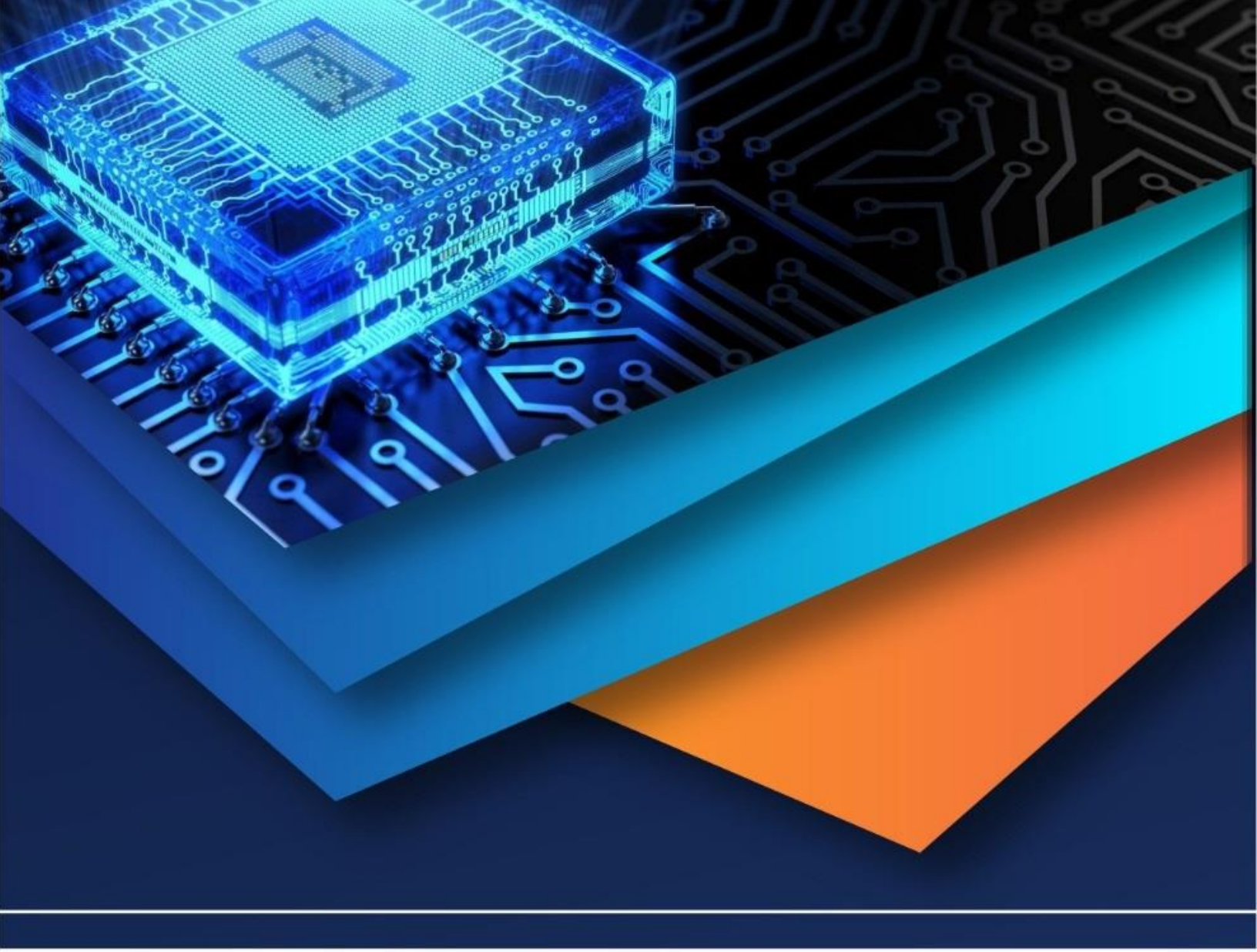
IV. CONCLUSION

Incident rates of Thyroid tumor have been rising since last two decades. So, fast and effective detection of Thyroid paramount is important. If detected at an early stage with the significant changes that deep learning made in the field of computer vision, computer-aided diagnosis, which has unified diagnostic standards and the ability to greatly reduce the workload of doctors, has become a research hotspot in recent years easily if he or she is unfamiliar with the Englishlanguage. In addition, speech recognition systems can be added to handle illiterate users.

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