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Thyroid Nodule Segmentation

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ABSTRACT: Ultrasound Imaging is one of the frequently used as diagnosis tool to detect and classify abnormalities of the thyroid gland. In this proposed method thyroid nodule is segmented using anisotropic filtering. Image segmentation is a method of separating the image from background and read the contents. Thyroid nodules are raised areas of tissue or fluid which commonly arise within a normal thyroid gland. Anisotropic filtering (Abbreviated AF) is a method of enhancing the image quality of textures on surface of computer graphics. Finally the nodule part alone is segmented and the Final output will be displayed in a bounding box.

KEYWORDS: Thyroid nodule segmentation, Anisotropic filtering, Bounding Box

I. INTRODUCTION

A thyroid nodule is an unusual growth (lump) of thyroid cells in the thyroid gland. The thyroid is part of the endocrine system, which is made up of glands that secrete various hormones into the bloodstream. The thyroid is a butterfly-shaped organ (or gland) that is located on the front of the neck, just under the Adam's apple (larynx). The thyroid gland, which is made up of the right and left lobes connected to the isthmus (or "bridge"), produces and releases thyroid hormones. Thyroid hormones control functions such as body temperature, digestion and heart functions.

II. CAUSES

Sometimes the thyroid begins to grow (overgrowth), causing one or more nodules to form. Why this happens is not known. **Cancer** is the biggest concern when nodules form. Fortunately, cancer is very rare, it is found in less than 5 percent of all nodules. Nodules develop more often in people who have a family history of nodules, and in people who don't get enough iodine. Iodine is needed to make thyroid hormone.

There are different types of thyroid nodules:

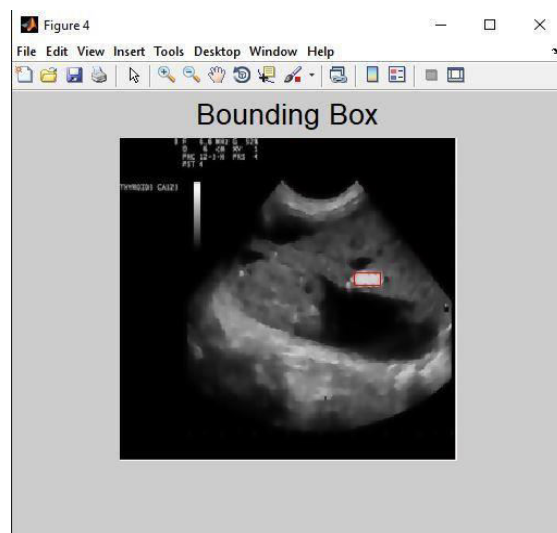
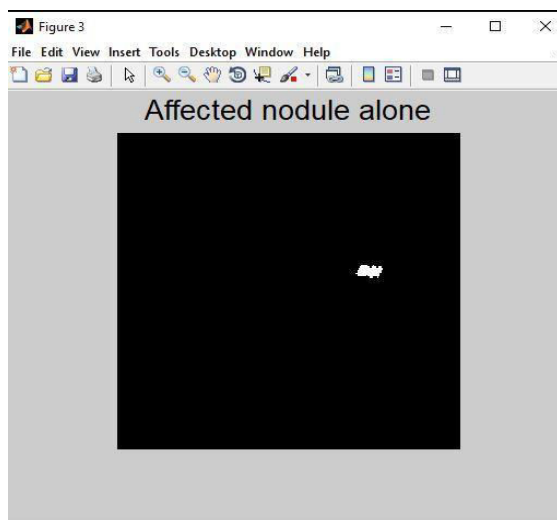
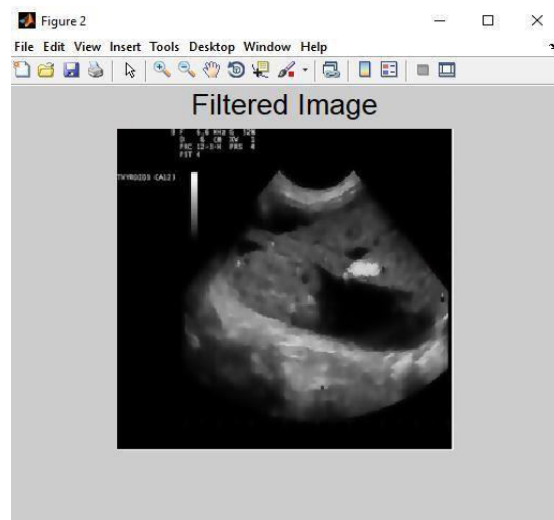
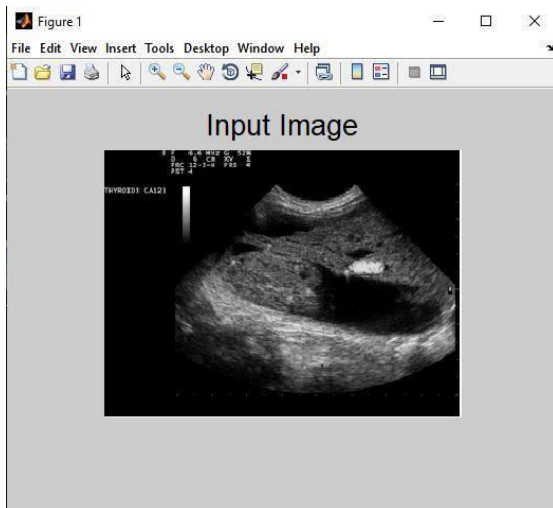
- **Colloid nodules:** These are one or more overgrowths of normal thyroid tissue. These growths are benign (not cancer). They may grow large, but they do not spread beyond the thyroid gland.
- **Thyroid cysts:** These are growths that are filled with fluid or partly solid and partly filled with fluid.
- **Inflammatory nodules:** These nodules develop as a result of chronic (long-term) inflammation (swelling) of the thyroid gland. These growths may or may not cause pain.
- **Multinodular goiter:** Sometimes an enlarged thyroid (**goiter**) is made up of many nodules (which are usually benign).
- **Hyperfunctioning thyroid nodules:** These nodules autonomously produce thyroid hormone without regard for normal feedback control mechanisms, which may lead to the development of hyperthyroidism. Hyperthyroidism can affect the heart and cause such problems as sudden cardiac arrest, high blood pressure, arrhythmias (abnormal heart rhythm), osteoporosis and other health problems.
- **Thyroid cancer:** Less than 5 percent of thyroid nodules are cancerous.

III. PROPOSED METHOD

The aim of this work is to segment the thyroid nodule in ultrasound images. These proposed works are focused more on Segmentation of defects on the Thyroid Nodule using Matlab. Background and objective Thyroid image segmentation is an indispensable part in computer-aided diagnosis system and medical image diagnosis of thyroid

diseases. There are many features of images that are to be extracted, but in our proposed system, somethem are going to be considered. The below system architecture shows the actual work flow of the concept that working on. The main focus of this work is to help the doctors, to easily identify the affected nodule.

IV. EXPERIMENTAL RESULT



V. RESULT AND DISCUSSION

In Result, a new variational model for thyroid nodule segmentation is presented. That allows to optimize the parameters of the model using previous knowledge from the application. One of the Morphological operations regionprops is used to display the result in bounding box on the solidity area.

VI. FUTURE ENHANCEMENT

1. In Future work includes the Detection of cancer cells in thyroid gland
2. Thyroid nodule cancer Detection and classification can be implemented.
3. To calculate the size of Thyroid Nodule.
4. Comparing the size of the nodule with normal range and find whether the cancer will occur or Not.

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