

# Analysis of Lung Diseases by using Fusion of CT and MRI Images

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**Abstract:** Image fusion is the process of combining relevant information from two or more images into a single image. The resulting image will be more informative than the input images. Image fusion based on wavelet method, a novel CT and MRI medical image are not producing the accurate result. The proposed image fusion algorithm can be developed by using Discrete Cosine Transform (DCT) and Principal Component Analysis (PCA). In this proposed work affine transformation is used for registration purpose. By use of hybrid technique computational time should be reduced. Finally, the fused image has more information than input images.

**Keywords:** Monitoring, MATLAB, CT AND MRI SCAN.

## 1. INTRODUCTION

Image fusion is a device to integrate multimodal images by using image processing techniques. Specifically, it aims at the integration of disparate and complementary data in order to enhance the information visible in the images. It also increases the reliability of the interpretation consequently leads to more accurate data and increased utility. Besides, it has been stated that fused data gives for robust operational performance such as increased confidence, reduced ambiguity, improved reliability and improved classification. Image fusion process combines the relevant information from two or more images into a single image and gives an output image having more informative than any of the input images. In the medical field it is done to analyse and make better judgments about a person's ailments. Image fusion integrates the complementary multisensory, multi temporal and multi view information into one new resultant image containing more information. Multisensory fusion is used to achieve high spatial and spectral resolutions by combining images from two sensors, one of which has high spatial resolution. Image fusion has been used in many application areas, like in remote sensing and in astronomy. Various fusion applications have appeared in medical imaging like simultaneous evaluation of, CT and MRI images. To find out or evaluate changes in the scene and to obtain a less degraded image of the scene the same scene images are acquired at different times. Especially in medical imaging, in change detection of tumors and organs, and in remote sensing for forest exploitation or monitoring land. The acquisition period is usually months or years. This aim requires the different measurements to be much closer to each other, typically in the scale of seconds, and possibly

under different conditions. Image fusion and registration are essential in the daily treatment planning duties of medical dosimeters. The image fusion and registration process involve combining multimodality images to delineate the physiological and anatomical differences from one dataset to other.

### 1.1 MATLAB

MATLAB is nothing but the Matrix Laboratory. When working with images in MATLAB, there are many things to keep in mind such as loading an image, using the right format, saving the data as different data types, how to Display an image, conversion between different image formats, etc. Most images you find on the Internet are JPEG-images which is the name for one of the most widely used compression standards for image. MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation.

Typical uses include:

- ❖ Math and computation
- ❖ Algorithm development
- ❖ Modelling, simulation, and prototyping
- ❖ Scientific engineering and graphics

MATLAB is an interactive system whose basic data element is an array that does not require dimensioning. This allows you to solve many technical computing problems, especially those with matrix and vector formulations, in a fraction of the time it would take to write a program in a scalar non-interactive language such as C.

## 2. EXISTING SYSTEM

In various types of Cancers, the rate of Lung Cancer is increasing gradually. Even after the diagnosis the survival rate of this cancer is less. If the cancer is detected earlier the chances of survival of lung cancer patient is more. This type of lung cancer is depended on the cellular characteristics like non-small nodule and small nodule. To know the correct status of lung cancer we define the four stages as per its intensity. Staging is based on tumour size area and lymph node location. Presently, fusion of CT-MRI is said to be more effective than X-ray in detecting and diagnosing the lung cancer. The earlier the detection is, the higher the chances of successful treatment. Mostly lung cancer causes in males and females, it is caused by

cigarette smoking, alcohol consumption etc. The purpose is to find the early stages of lung cancer and more accurate result by using different techniques like fusion, enhancement and segmentation process.

### 3. PROPOSED SYSTEM

The proposed methodology consists of pre processing and image registration. Pre-processing is used to remove noise by using Median filter and it is used to extract other features of image for further process of image processing. Image registration is done by using Affine transformation. It is used to detect some common features from the CT and MRI image. Discrete Cosine Transform is used for image fusion used to identify the common features between the two images. PCA is used for dimensionality reduction which it take the main features from the largest features. K-means clustering algorithm is used for extracting the tumour part from the fused image.

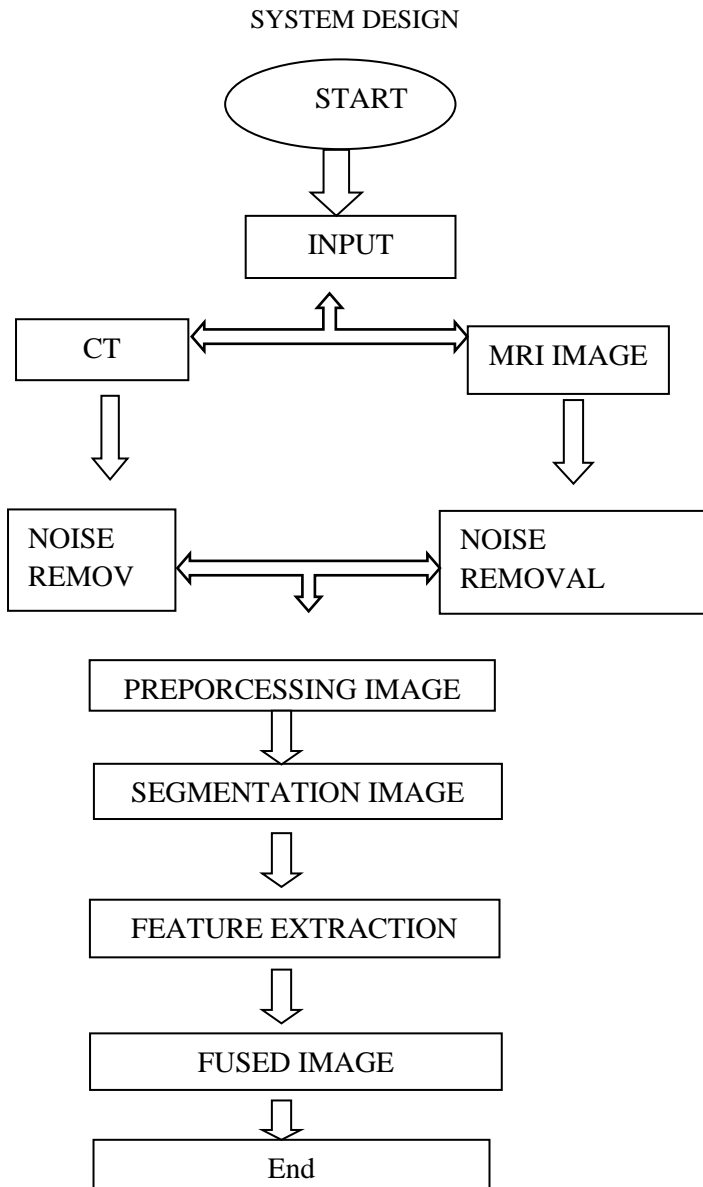


Fig 1: BLOCK DIAGRAM OF CT AND MRI SCAN

## 4. METHODOLOGY

### 4.1 PRE-PROCESSING

The images are corrupted by noises or by some technical interruptions. The image pixels are getting damaged due to these noises. The noise may occur due to transmission errors, malfunctioning pixel elements, faulty memory locations, and timing errors in analogy-to-digital conversion. Then our goal is to remove that type of noise in maximum amount by preserving the main image features. Image processing consists of many filters in order to remove the impulse noises. One of the filters is median filter which is somewhat improved version, and which removes the noise better than another filter.

### 4.2 NOISE REMOVAL

The part of image enhancement involves filtering to enhance details such as edges in the image that are particular to the application and also to eliminate unwanted noise elements. The noise can be removed by using affine algorithm.

### 4.3 IMAGE REGISTRATION

Image Registration is a process of detecting some common features from the CT and MRI image. Take one image as reference image that is also called Fixed image (Ex: MRI image) and apply the transformation functions of another images.

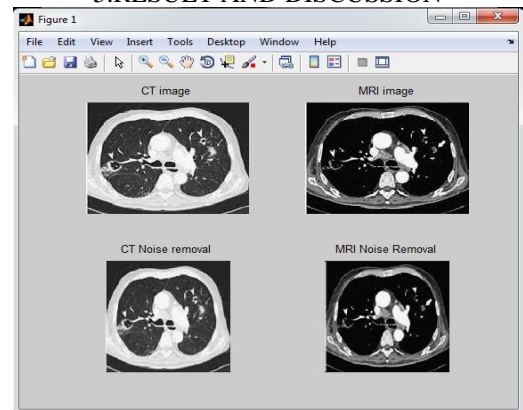
### 4.4 IMAGE FUSION

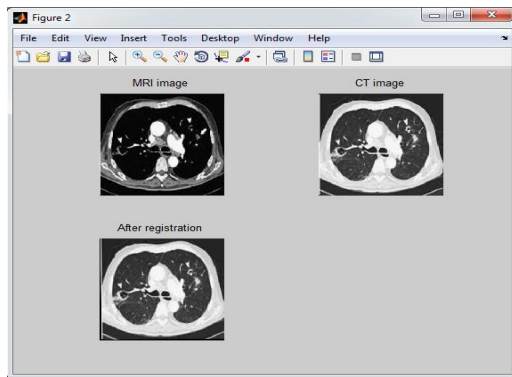
Image is fusion used to identifying the common features between the two images. The Discrete Cosine Transform (DCT) helps to separate the image into parts (or spectral sub-bands). The DCT is similar to the Discrete Fourier Transform. It transforms an image from the spatial domain to the frequency domain. The Discrete Cosine Transform (DCT) represents an image as a sum of Sinusoids of varying magnitudes and frequencies. The DCT2 function computes Two-dimensional Discrete Cosine Transform (DCT) of an image.

### 4.5 IMAGE SEGMENTATION

Segmentation is used to extract the desirable part from the main image. In this segmentation the cancer cells can be found from the fused image. Image segmentation is done by using K-means clustering.

## 5. RESULT AND DISCUSSION





## 6. CONCLUSION

The purpose of acute ischemic stroke is to detect the patients who have suffered from ischemic stroke. In some medical instance, the stroke is diagnosed negative in CT and positive in MRI of a same patient. The developed

system is a semi-automatic system which can identify stroke lesion from fusion of non-contrast CT and MRI images. The system has been successfully tested on patients suffering from stroke of different age groups.

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