# Efficient Image Processing Based Liver Cancer Detection Method

Yogita Ashok Deore
PG. Student, Department of Computer Engineering
Sandip Institute of Technology and Research Centre,
Nashik, Maharashtra, India
*Email id:yogitadeore111@gmail.com*

Prof. Namrata D.Ghuse
Professor, Department of Computer Engineering
Sandip Institute of Technology and Research Centre,
Nashik, Maharashtra, India
*Email id:Namrata.ghuse@sitrc.org*

***Abstract-***The hepar is the extensive internal organ in the human body. The liver is the second organ most generic involved by metastatic disease being liver cancer one of the prominent causes of death worldwide. Without healthy liver a person cannot survive. It is life threatening disease which is very challenging perceptible for both medical and engineering technologists. Medical image processing is used as a non-invasive method to detect tumours. The chances of survival having liver Tumor highly depends on early detection of Tumor and then classification as cancerous and non-cancerous tumours. Image processing techniques for automatic detection of brain are includes pre-processing and enhancement, image segmentation, classification and volume calculation, Poly techniques have been developed for the detection of liver Tumor and different liver toM oR detection algorithms and methodologies utilized for Tumor diagnosis. Novel methodology for the detection and diagnosis of liver Tumor.

***IndexTerms****—CT image, computed tomography, segmentation, Image processing and Enhancement, Cancerous , Non-cancerous, Classification.*

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## I. Introduction

Liver cancer is one of the broad death factor in the world and also known as hepatic cancer. Cancer which eventually journey to the liver. There may be cancers which start from somewhere else and end up in the liver those are not primary liver cancers. Cancers that create in the liver are known as primary liver cancers. The most common type of liver cancer is hepatocellular carcinoma(HCC) and it bearings to affect males more than females. Soon detection and accurate presentation of liver cancer is a significant issue in practical radiology. Liver lesions refer to those weird tissue cell that are found in the liver. Liver lesions are an injury in the tissue areas of the body due to harm by a disease. Lesions can be identified in CT scan by a difference in pixel intensity from other regions of the liver. For clinical treat, manual segmentation of this CT scan is flinty and materially time consuming task.Lesion of liver tumours is a sense prerequisite task onwards any medical mediation. Precise and perfect examination of the segmentation allows for sure staging and valuation of the available therapies that can be provided to the patient. In Beyond years' invasive methods are used for diagnosis any disease like cancer. But today medical imaging reason on non-invasivemethods for diagnosis of Tumor. Individualize computer-aided diagnostic(CAD) tool aredesigned anddeveloped for liver Tumor. Sundry types ofimaging technologiesbased on non-invasive approach are CT scan, MRI, X-Ray, Ultrasound and liver scans. These all test not only appoint the size and location of the cancer but also appoint Tumor has reach to other parts of the body.

Liver is the biggest glandular organ in the body and performs many important functions to keep the body pure of toxins and dangerous substances. It is an important organ that supports nearly every organ in the body in some facet. The liver receives about 1.5 quarts of blood every minute via the hepatic artery and portal vein. Liver Tumor is a weird mass found in the liver. So, rumours can be secondary or primary tumours. Tumours of the liver a large organ in the belly that produces proteins and peptic juices stores energy and removes toxins from the body can be not cancerous or cancerous. Segmentation techniques are applied on images of liver then classification techniques are applied on category images to classify tissue into two types normal and abnormal this tissue's image is further investigated for extracting useful information from segmented image with the presence of some noises volume calculation is carried out to identify its size. CT is most commonly used imaging modalities in the diagnosis of liver Tumor.

## II. Literature Survey

Chung-Ming Wu, et al. [1] proposed a texture feature called Multiresolution Fractal (MF) feature to distinguish normal, hepatoma and cirrhosis liver using ultrasonic liver images with an accuracy of 90%.

Yasser M. Kadah, et al. [2] extracted first order Graylevel parameters like mean and first percentile and second order Gray level parameters like Contrast, Angular Second Moment, Entropy and Correlation, and trained the Functional Link Neural Network for automatic diagnosis of diffused liver diseases like fatty and cirrhosis using ultrasonic images and showed that very good diagnostic rates can be obtained using unconventional classifiers trained on actual patient data. Aleksandra Mojsilovic, et al.

[3] investigated the application and advantages of the non-separable wavelettransform features for diffused liver tissue characterization using B-Scan liver images and compared the approach with other texture measures likeSGLDM (Spatial Gray Level Dependence Matrices), Fractal texture measures and Fourier measures. The classification accuracy was 87% for the SGLDM, 82% for Fourier measures and 69% for Fractal texture measures and 90% for wavelet approach.

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E-Liang Chen, et al. [4] used Modified Probabilistic Neural Network (MPNN) on CTabdominal images in conjunction with featuredescriptors generated by fractal featureinformation and the Gray level co-occurrence matrix and classified liver tumours into hepatoma and haemangioma with an accuracy of 83%.

Pavlopoulos, et al. [5] proposed a CAD system based on texture features estimated from

Gray Level Difference Statistics (GLDS), SGLDM, Fractal Dimension (FD) and a novel fuzzy neural network classifier to classify a liver ultrasound images into normal, fatty and cirrhosis with accuracy in the order of 82.7%.

Jae-Sung Hong, et al. [6] proposed a CAD system based on Fuzzy C Means Clustering for liver Tumor extraction with an accuracy of 91% using features like area, circularity and minimum distance from liver boundary to Tumor and Bayes classifier for classifying normal and abnormal slice. The CAD system proposed by Gletsos Miltiades, et al. [7] consists of two basic modules: the feature extraction and the classifier modules. In their work, region of interest (liver Tumor) were identified manually from the CT liver images andthen fed to the featureextraction module. The total performance of the system was 97% for validation set and100% for testing set. Horlick transform and Hopfield Neural Network were used to segment 90% of the liver pixels correctly from the CT abdominal image by John. E. Koss, et al. [8]. However, texture based segmentationresults in coarse and block wise contour leading to poor boundary accuracy.

Chien-Cheng Lee, et al. [9] identified liver region by using the fuzzy descriptors andfuzzy rules constructed using the features like location, distance, intensity, area, compactness and elongated-ness from CT abdominal images.

## III. System Overview

*3.1 Problem Statement*-Worldwide cancer is the fifth reason for death therefore detection and treatment ofcancer having great significance because of wide spread episodes of diseases, reoccurrence after treatment and high death rate. There are different types of cancer in which liver cancer is at third position for death factor. This cancer is also known as hepatic cancer. This type of cancer is starting from the liver and thengrowing further if the not diagnosed early. The cancer which is started from some other organ and travels to liver is not treated as liver cancer. Liver cancer is consisting of the malignant hepatic growths called tumours over liver or inside liver. Therefore, early detection of liver cancer is challenging task in practical radiology. There are number of computer aided diagnosticmethods designed using image processing terminologies for early detection accurately. Early stage detection of liver cancer helps to prevent it completely through the proper treatment. The major issues with image processing based techniques are efficiency, processing time and accuracy of detection. Designing time efficient, highly accurate and simplemethod for detection is main research problem.

The Choice of cluster and threshold values and the images are justifying by checking if the threshold falls within the same range estimated for each image. This contributes by providing a computer aided diagnostic system for the diagnosis of the liver cancer using theimages framed through the CT scan of certain patients. Proposed system is used to segment the Tumor with remarkable satisfaction. Results are evaluated with radiologists. In this paper liver lesion andenhancement is done using CT images.

3.2 *Proposed System*-There are different types of cancers to cause the death, among them liver cancer is stands on third place. The hepato-cellular carnoma (HCC) is most common liver cancer type and it tends to affect male's candidates. There is significant problem in early prediction and proper presentation of liver cancer practically. The abnormal tissues found in liver are nothing but the liver lesions. Such lesions are basically detected through the CT scan process. Early tumour detection accurately is very important for the liver cancer diagnosis and treatment. There are number of computer aided diagnosis solutions presented based on image processing terminologies. However still their concerns of simple, accurate, less processing time and efficient method for liver cancer detection. In this project we are present simple, time efficient and effective method for liver cancer detection. This proposed approach is based on K-means clustering and Haar wavelet transform to find the range values to decide whether inputimage is having cancer or not. Additionally, to improve the accuracy performances we are designing de-noise filtering method to pre-process input image (MRI/CT) before applying k-means clustering. This will help to reduce the processing time and improve the detection performance.

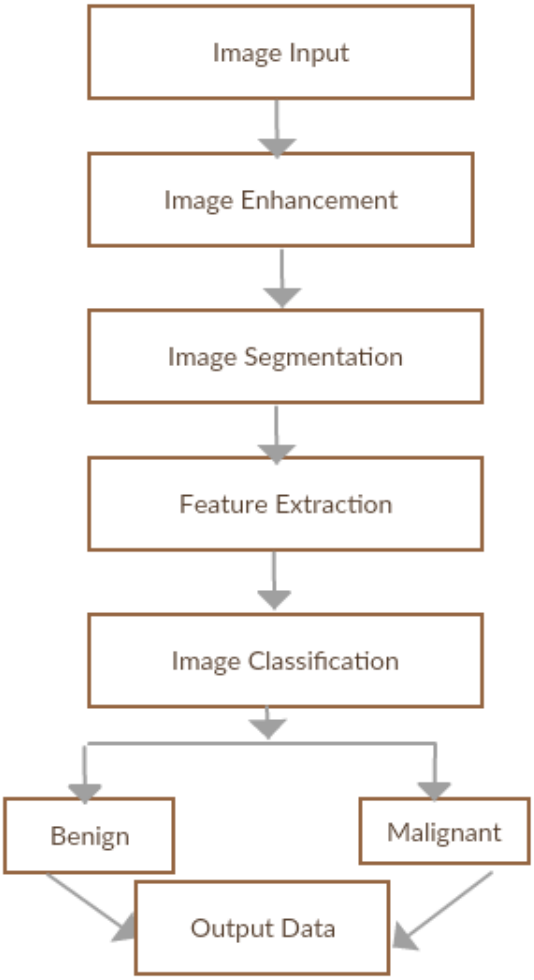


**Fig. 1. System Architecture diagram**

## IV. Conclusion

In this paper liver segmentation and enhancement is done using CT images. The proposed method segments the liver using global threshold and then by identifying the largest area. The proposed method is invariant in terms of size and shape of liver region. Experimental results show that our method performs well in enhancing, segmenting and extracting liver region from CT images.

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