



## Kidney Stone Detection using Fuzzy Clustering Mean Algorithm

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**Abstract:** - In kidney stone detection, Due to the presence of noise, there are inaccuracies in the classification of kidney stone. Kidney stones have become common nowadays due to various factors. In the proposed methodology nephrolithiasis in the MRI (Magnetic Resonance Image) image is preprocessed using DWT (Discrete Wavelet Transform). A data set of 50 test data containing normal and abnormal kidney CT images are classified using Convolutional method of Neural Network (CNN). A Fuzzy Clustering Mean Algorithm (FCM) is used for successful segmentation of kidney stones.

### I. INTRODUCTION

Kidney stone is formed when salts and certain minerals such as calcium and uric acid are accumulated in urine. It is caused by inadequate intake of water. It mainly occurs when our body lacks fluid and accumulates a lot of waste. Diabetes, high blood pressure and obesity are some of the major causes, which lead to kidney stones in an individual. There are various methods for the diagnosis of kidney stones such as urine test, blood test, CT scan, MRI scan etc. By human inspection and operations, it is impossible to obtain large amounts of data. Here an automated classification of kidney stones is processed using CT images through deep learning and CNN.

In this paper, we aimed to investigate the diagnostic accuracy of a cascading DL system for urinary stone detection on unenhanced CT images. In addition, we evaluated the effect of transfer learning by using pretrained models enriched with labeled CT images to assess whether the performance of the pre-trained model is consistent across scanners.

With the help of this paper, investigate the diagnostic accuracy of cascading convolution neural network (CNN) for urinary stone detection on unenhanced CT images and to evaluate the performance of pre-trained models enriched with labeled CT images across different scanners.

We started working on this system to implement deep learning based kidney stone detection, which helps to many medical systems for finding stone from the kidney. This system gives maximum accuracy than previous systems.

The term paper organization refers to the style of coordination, communication, and management the paper team uses throughout a paper lifecycle. By applying paper organization, you optimize resources, provide clear communication about roles and responsibilities, and reduce potential roadblocks. Paper managers use paper organization to align team members before and during a paper. The process minimizes disruption to your workflow and conflict among team members, as well as leads to maximum productivity among team members involved in a paper.

A cascading convolution neural network model, enriched with labeled CT images, detected the presence of urinary tract stones on unenhanced abdominopelvic CT scans with high accuracy (area under the receiver operating characteristic curve

### II. LITERATURE SURVEY

1. S Surya v, P.V.Sumanth "Kidney stone detection using machine learning algorithm", *paiduma journal*, 5 May 2021.
  - Most of methods present in past days will detect the kidney stones when they are heavily effected. Now we came up with the better method called back propagation network this process will detect the stones in kidneys in early days and it is mostly working on the machine learning algorithms.
2. Vinayagam.P, Sreemathi.M, Jeevitha K, Sandhya S "Kidney stone detection using neural network", *IJAER*, (6 November 2019)
3. In the proposed methodology nephrolithiasis in the MR Image is preprocessed using DWT Venkatasubramani.K, K.ChaitanyaNagu, P.karthik, A.LalithVikas "Kidney stone detection using neural network" (08 may 2021) There are

inaccuracies in the classification of kidney stones due to presence of noise.

- Artificial intelligence approaches based on neural network have shown impressive results.
4. M.Akshaya, R.Nithushaa, N.Sri Madhya Raja, S.Padmapriya "Kidney stone detection using neural network" (23 December 2020).
    - Segmentation method using Fuzzy C-mean (FCM) clustering algorithm..
    - Feature extraction is done by using BPN Algorithm.
  5. AnushriParakh,MD, HyunkwangLee,MS, Jeong Hyun Lee,MD"Urinary stone detection on CT images using deep convolution neural networks " (6 August 2019).
    - A cascading model of CNNs can detect urinary tract stones on unenhanced CT scans with a high accuracy.
    - Performance and generalization of CNNs across scanners can be enhanced by using transfer learning with datasets enriched with labeled medical images.

### III. BLOCK DIAGRAM

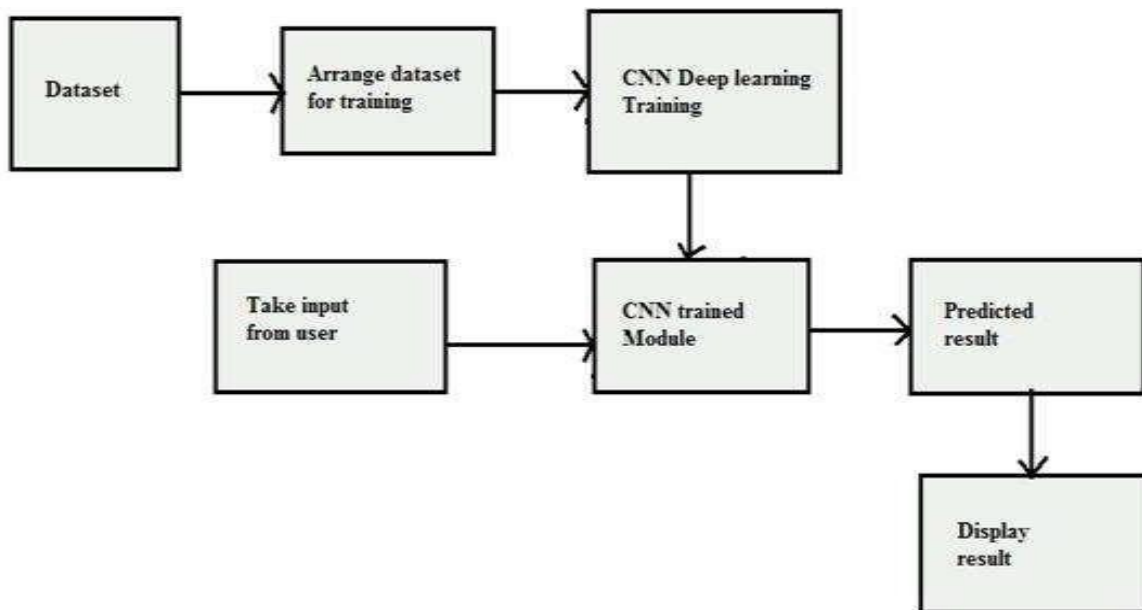


Fig 1. Block Diagram.

Figure shows block diagram of the kidney stone detection. Two stage process help to obtain the normal kidney image and abnormal kidney image. Initially the training mechanism with a known data set helps to train. Further, when a subjecting a sample image, based on a feature extraction using GLCM method initial level classification is possible. The classification accuracy is improved when is subjected preprocessing before extraction of features. Image preprocessing is commonly used term to operate the images at the lowest level of abstraction. Its input and output are intensity images. The objective of preprocessing is to improve the image data that reduce the unwanted distortions or enhances few image features, which are mandatory for feature processing. After the conventional neural network classification of input image, the result shows whether the input image is a normal or abnormal image. The application will be at hospital & sonography center.

The advantages of the system will be, It suppresses then undesired distortions and enhances certain image features significant for further processing and stone detection. This method is it can separate the stone region from the image rightly, suitable to classify the kidney stone image for precise detection and early detection. Speckle noise is present in most ultrasound images, which cannot remove by humans.

### IV. CONCLUSION

In this work, CNN is used to detect stones in MR images of a kidney. The two stages detection process namely features extraction and classification has eventually detected the stone in the kidney. This qualitative analysis helps to find the position of the stone in a kidney even as the size of stone is small. Conventional Neural Network gives precise classification when compared to other methods based on neural networks. The advantage of this method are it can separate the stone region from the image rightly, suitable to classify the kidney stone image for precise detection and early detection.

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