**DATASET Description**

Chronic kidney disease, often called chronic kidney failure, is a steady decline of renal function. Some of the most common reasons for kidney failure are cysts, stones, and tumors. There may be no symptoms of chronic renal disease in its first stages. However, It’s possible to have kidney disease and not know it until it’s too late. Fortunately, various neural networks have been shown to be beneficial in early disease prediction as machine learning and computer science have progressed. I have used 3 CNN classification methods that are based on watershed segmentation and make use of deep neural networks (DNN) to classify 4 types (cyst, normal, stone, tumor) of kidney CT images. There are two stages to our work. We have first segmented the region of choice in CT images by the watershed algorithm. The segmented kidney data was then used to train a variety of classification networks, which includes EAnet and the transfer learning-based pre-trained neural network: ResNet50, and a customized CNN model. The models were trained using the CT Kidney Normal , Tumor and Stone dataset that was made public on Kaggle.

The CT KIDNEY DATASET is a publicly available dataset containing 12,446 high-resolution CT images of the kidney. The dataset is labeled by experienced radiologists, ensuring the accuracy of the labeling. The dataset includes images of patients of different ages, genders, and ethnicities, making it diverse and representative of the general population. The images in the dataset are divided into three categories: Normal(5,077 images), Tumor(2,283 images), and Stone(1,377 images). The Normal category includes images of kidneys with no visible abnormalities. The Cyst category includes images of kidneys with one or more cysts, which are fluid-filled sacs that can form in the kidneys. The Tumor category includes images of kidneys with one or more tumors, which can be either benign or malignant. The Stone category includes images of kidneys with one or more stones, which are hard deposits that can form in the kidneys and cause pain and other complications. The CT KIDNEY DATASET is a challenging dataset, as it contains images with subtle variations in the appearance of the kidney, making accurate classification challenging even for experienced radiologists. The dataset is divided into a training set of 11,201 images and a test set and validation set of 6,223 images each, ensuring that the model is evaluated on unseen data. The use of the CT KIDNEY DATASET in this study enables the evaluation of the proposed CNN-based model in accurately classifying CT images of the kidney into different categories. The accurate labeling of the dataset by experienced radiologists ensures that the dataset is representative of real-world scenarios and enables the evaluation of the model's performance on challenging and diverse images. The CT KIDNEY DATASET could also be used by other researchers to evaluate the performance of their models or to develop new models for the classification of CT images of the kidney.