**ALGORITIHIM FOR BINARY SEGMENTATION OF MEDICAL TOOL USING UNET ARCHITECTURE,**

SECTIONS

1. CONVOLUTIONAL NEURAL NETWORK
2. COMPUTER VISION ALGORIHIM
3. DATASET
4. PREPROCESSING.
5. POSTPROCESSINGS.
6. FUTURE ADVANCEMENTS.

CONVOLUTIONAL NEURAL NETWORK.

A Convolutional Neural Network (CNN) is a type of Artificial Neural Network Designed for tasks involving visual data, such as image recognition, image classification, and object detection

CNN ARCHITECTURE.

1. Convolutional Layers are Responsible for being building blocks of the Architecture, detecting Edges, Textures, & Complex Patterns convolved by kernels that are slide over the matrix representation of processing image and producing the features maps of the different aspects of object.
2. Pooling Layers are Responsible for Down Sample the spatial dimensions of the input volumes reducing the computational complexity and the number of parameters, based on MAX AND AVERAGE.
3. Activation Functions ReLu and Gelu responsible for conversion of linear process to non-linear.to the model.
4. Fully Connected Layers connect every neuron in one layer, typically used towards the end of the network to make final Predictions based on the High-level features learned by earlier layers.
5. Flattening as known as turn multi-D feature maps into single D vector, done to transition from the spatial hierarchies subtle by CNN to 1d format for the FCN layers.
6. Dropout is Regularization technique used to prevent overfitting randomly drops a certain percentage of neurons during training
7. SoftMax function applied to the output layer to conversion of raw scores like in decimal to probabilities allow model to selecting the classes with highest probability.

**Computer Vision Algorithm** applied in this project have certain steps

Selecting unet architecture for classification between background as 0 and the biomedical data as 1 or upper classes, dataset is preprocessed and split in to training and testing phase and then by applying certain hyperparameters train the model for certain periods of epochs over given batch size, with a learning rate and gradient optimizer, and filter by some classifier loss functions.

PREPROCESSING.

Preprocessing based on applied image processing techniques applied over the datasets or as a part of computational photography, image processing applied on the dataset for cleaning and segregating the best fine data for training purposes.

Dataset is available from my previous clients,

512 x 512 medical tool endevis and ground truth is available manually

POSTPROCESSINGS

After the model is done predicting the outputs, but by the chance predicted output is not by far is okay hence again clean and image processed the data to train again with increase in datasets amounts.