

Response: Pseudo Code is attached here

Input:

EEG_Data_HC: 19-channel EEG signals from 12 Healthy Controls (each 60s, 256Hz)

EEG_Data_SCZ: 19-channel EEG signals from 12 Schizophrenia patients (each 60s, 256Hz)

Sampling_Rate: 256 Hz

Begin

1. Combine all samples into Dataset: EEG_Data_HC U EEG_Data_SCZ

2. For each EEG_Sample in Dataset:

a. Preprocess EEG_Sample:

- Apply band-pass filtering (e.g., 0.5–70 Hz)
- Remove artifacts (wavelet denoising)
- EEG segmentation (segment each EEG in 10s of epochs)

b. For each EEG_Channel in EEG_Sample:

i. For each Frequency_Band in [Delta, Theta, Alpha, Beta, Gamma]:

- Apply wavelet decomposition (5-level)
- Compute spectrogram using Short-Time Fourier Transform (STFT)
- Convert spectrogram to image format (e.g., 224×224 RGB)
- Label as 'HC' or 'SCZ' based on group
- Store image in Band_Specific_Dataset [Frequency_Band]

3. For each Frequency_Band in Band_Specific_Dataset:

- a. Split data into training and testing sets (10-fold & 5-fold)
- b. Train ResNet-18 model on spectrogram images
- c. Evaluate model: Compute Accuracy, Sensitivity, Specificity
- d. Store results

4. Identify most significant bands

Observed: Delta band achieves highest accuracy, followed by gamma and beta band.

5. Perform Region-wise Analysis:

a. Define brain regions (e.g., Frontal, Temporal, Central, Parietal, Occipital)

b. For each Region:

- i. Select EEG channels from that region
- ii. Create a region band combination

c. Compare regional performances

6. Identify Best_Region: Region with highest classification performance

Observed: Posterior region with Delta band gives best result

Output:

- Best performing band: Delta
- Best region: Posterior
- Trained ResNet-18 model for schizophrenia classification

End