APPENDIX B

START

Obtain the digitized samples of the EMG signal from graph

Encoder to perform encoding using wavelet-based vector quantization using DCCR mechanism to generate the encoded signal

Store/ Transmit the encoded signal

Call ‘Decoder Module ‘ to perform decoding using Inverse wavelet-based Vector quantization to generate the decoded signal.

Compare the Original and the Reconstructed signal by analyzing the quality factor and the amount of compression

STOP

FIG B-1: EMG SIGNAL ENCODING/DECODING PROCESS
2. WORKING OF ENCODER MODULE

Fig B-2: Flowchart for Encoder module

START

Obtain the digitized samples of the EMG signal.

Calculate DWT coefficients for various resolution scale and wavelets while generating the codebook

Convert the coefficients into a matrix of \( m \) input vectors called Tree Vectors \( \text{ivec} \) where \( m = \text{length}(c) / 2^{\tau(n+1)} \)

STOP

A

Using DCCCR technique, obtain codevector in the codebook for each input vector having minimum quantization distortion.

Update codebook using DCCCR mechanism and use index of the codevector (obtained from above step) in the encoder

Store/transmit the encoded vector along with updated codebook.
3. WORKING OF DECODER MODULE

START

Obtain the Encoded Signal and codebook.

Apply Inverse Vector Quantization’ by performing a table look up in the codebook, and get the approximated set of vectors.

Apply Inverse Tree Vector Formation to get the approximate DWT coefficients.

Apply ‘Inverse of Wavelet Transform’ to obtain the reconstructed signal from the wavelet coefficients.

STOP

FIG B-3: FLOWCHART FOR DECODER MODULE
4. CODEBOOK GENERATION PROCESS

Call the module to create the codebook using LBG method

Fig B-4: Main flowchart for Codebook Generation

START

Initialize the variables - resolution scale(n), wavelet (wname), Codebook Size (N)

Create the Training Vectors.

Call the module to create the codebook using LBG method

Send and store the codebook

STOP
5. CODEBOOK TRAINING USING LBG-ALGORITHM

START

Obtain the training vectors (v) created previously and initialize the variables codebook

Find the vector \( c_b = \text{mean of the vector (v)} \)

Split the vector \( c_b \) in two cells by using a small constant \( 'e' \) and set size of the Codebook (cbsize=2)

Classify the input vectors by finding the Euclidean distance between the vectors and the cells.

Find the mean of the clusters formed and obtain two Centroids.

Calculate the Quantization Distortion: \( D_m \) and the factor
\[
Q = \frac{(D_m - D_{m-1})}{D_m}
\]

Is \( Q < e \) (a small constant)

YES

STOP

NO

A

Next
Fig B-5: Flowchart for LBG Algorithm

1. Split the codevectors in two cells by using a constant ‘ε’
2. Set cbsize = cbsize*2
3. Classify the input vectors to the cells formed in the codebook
4. Find the mean of the clusters formed and obtain the Centroids.
5. Calculate the Quantization Distortion: \( D_m \) and the factor
   \[ Q = \frac{(D_m - D_{m-1})}{D_m} \]
6. Is \( Q < \varepsilon \) (a small constant)?
   - NO
   - YES STOP

Fig B-5: Flowchart for LBG Algorithm