Gesture Recognition

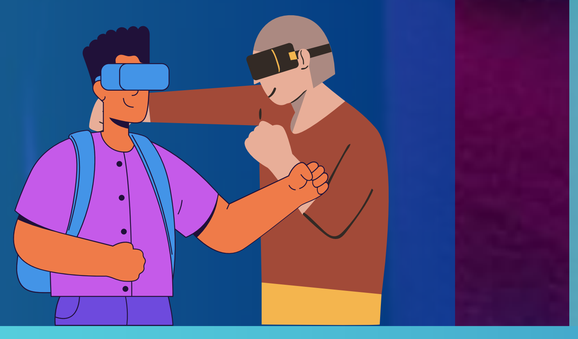
iAI

Abstract

EMG signals are generated by the electrical activity of muscles during voluntary contractions. They reflect the activation patterns of muscles, making them a suitable modality for capturing hand movements and gestures. By analyzing these signals, it is possible to infer the intended hand gestures and translate them into meaningful commands or actions.

Methodology

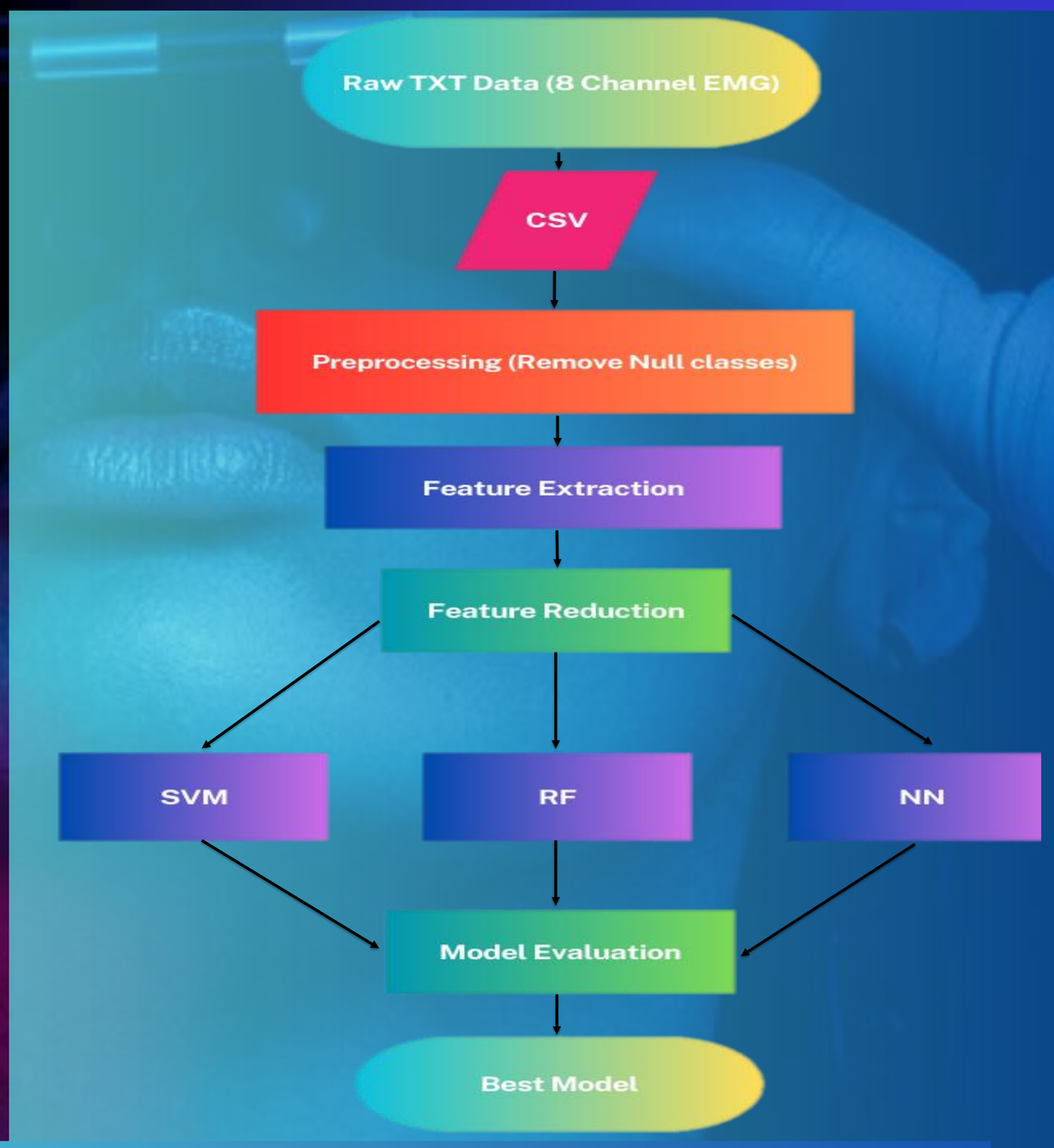
Raw EMG data was recorded by MYO Thalamic bracelet for 36 subjects, each subject performed two series, each of which consists of six basic gestures. Each gesture was performed for 3 seconds with a pause of 3 seconds between gestures, for each gesture performed by each subject extract the 12 features for the corresponding 8 channels and then select the best features to create your model. We used 3 classifiers & used the evaluation metrics to compare between them.



Results & Discussion

Metric	Classifier	SVM	RF	MLP
Accuracy (%)		95.45	93.18	95.45
Precision (%)		96.0	94.49	95.45
Recall (%)		95.45	93.18	95.45
F1 score (%)		95.47	93.46	95.45
Root Mean Squared Error		0.213	0.564	0.213

Flow Chart



Application

EMG-based gesture recognition systems have several advantages. They are non-invasive and can be captured using surface electrodes placed on the skin surface above targeted muscles. This makes them accessible and easy to use. Furthermore, EMG signals can provide real-time feedback, enabling interaction with devices and interfaces, making it a strong tool for surgiacal assistance & virtual rehabilitation to provide interactive and engaging therapy experiences.

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