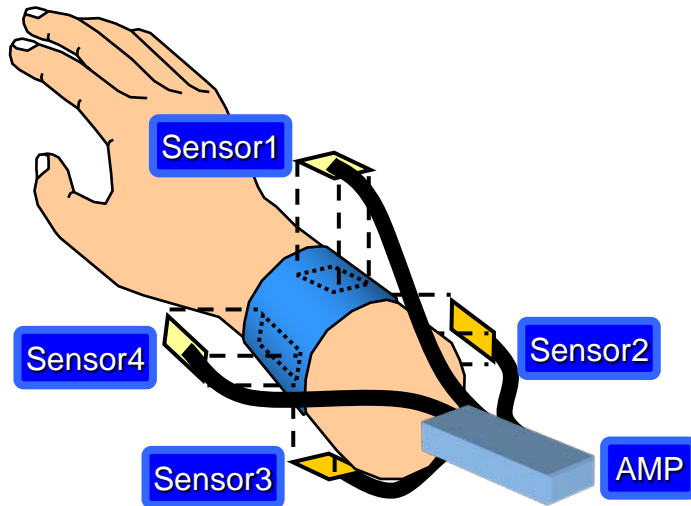




Hand motion recognition using wrist EMG

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(a) Wrist EMG measurement



(b) On-line recognition of rock-paper-scissors

Content:

In this research, finger motions are recognized by EMG (electromyography) signals measured using dry-type electrodes attached to wrist. Target behaviors to be recognized are four finger motions that the Janken, “rock”, “paper”, “scissors” and when not doing anything “neutral”. EMG signal measured in wrist is unstable and noisy compared to forearm and upper arm. However wrist EMG can be applicable to control of wearable devices.

On the one hand, we developed the Simple-FLDA (approximated version of Fisher linear discriminant analysis), which resolved three drawbacks in matrix-type FLDA. This algorithm allows a statistical on-line learning of approximated eigenvectors for the high-dimensional EMG signals. We can obtain a high recognition accuracy for hand motions using these eigenvectors.

In the next step, we try to recognize every wrist and finger motion and develop a total control system for wearable devices using wrist EMG, including the use of deep learning.

Keywords: EMG, Simple-FLDA, Statistical learning

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