Yiwen Fan

Project Title: Super component for EKG Monitor

Project Description:

This project is to develop EKG super component and implement an algorithm to monitor if there is a heart attack condition occurred and send out the alert. The procedure is as follow:

1) Build up the super component using the test bed.
2) Obtain two kinds of data samples. One sample pool is for healthy people with no heart attack condition. The other sample pool is for people with heart attack.
3) Algorithm (The implementation of algorithm is depend on the complex of the data sample)
    a. Possible algorithm 1: (One channel EKG data)
    One simple solution is to find a threshold, any data input lower than the threshold can be recognize as heart attack signal.
    b. Possible algorithm 2:
    (If the EKG data is detected with several channels)
    Using the PCA (Principle Component Analysis) to reduce dimension of the data, and get the useful data sample channels.
    Extract the features such as peak value, means or variance, est.
    Using and train the data using leave-one-out cross-validation method to train the SVM kernel Method classifier. And then a find a kernel function as a linear or non-linear classifier.
    c. The two different kinds of data (people with heart attack / healthy people) falling to the different sides of the classifier. Send out the alert if the result falling into the people with heart attack side of the classifier.

Deliverables:

What might be accomplished at MS2:

The test bed and the first algorithm will the first simple algorithm will be finished.

What might be accomplished at Project Demo:

The second algorithm approach will be finish.

Plan B:

If the EKG signal data is not enough or can not be implemented correctly, I will build up a EEG or ECG signal data to extract two different kinds control signal using the same kind of algorithms described above. And the EEG control signal can be used as a gesture to send the alarm to the hospital.
If time is not enough, I will finish only the first algorithm approach.