fir
moving

iir
butter
cheby

wavelet
sym4
db6
db4
...

wiener ve adaptive ile alakal
teorik bilgi

Sample Project Topics for Biomedical Signal Processing Course

1. Denoising applications for biomedical signals

   Info:

   - Noise
     - Random (noise due to thermal fluctuations leading to waveforms that are not predictable)
     - Structured (pre-determined waveform – 50 to 60 Hz power line)
   - Interference due to the other physiological signals
     - ECG signals interfered into EMG signals (back muscles)
     - EMG signals of inter-costal muscles in the ECG signals from chest leads

   Some Examples:

   - Comparisonal FIR/IIR filtering of ECG or other biomedical signals
     - Considering different parameters (filter types, lengths, phase types, different window functions etc.)
   - Comparisonal Wavelet denoising
     - Considering different wavelet types, different thresholds.
   - Wiener filtering of ECG or other biomedical signals
     - Using different values for parameters
   - Adaptive filtering of ECG or other biomedical signals
     - Using different values for parameters
   - Also you can make a project comparing all or some of the above filtering methods.
   - Also you can apply other different types of denoising methodologies.

2. On a bunch of sample biomedical signals such as ECG / EEG / EMG compare the spectrums obtained via FT, STFT, Wavelet Transform, Periodogram, and Modified Periodogram (Bartlet and Welch's methods).

3. Machine learning applications on Bio-signals:
   - Examples: Studies on arrhythmia and abnormality detection or diagnosis of diseases in/from biomedical signals (ECG/EEG/etc.).

4. A specific project subject: What are all the features extracted from ECG signals in the literature (both in time or frequency domains or other domains)? How they are calculated / extracted? What are the methodologies? Explain! Give their equations! Etc.

5. A specific project subject: What are all the features extracted from EEG signals in the literature (both in time or frequency domains or other domains)? How they are calculated / extracted? What are the methodologies? Explain! Give their equations! Etc.

6. A specific project subject: Analysis of human actions (using signals (bio signals or speech or etc.)

Medical Image Processing and Analyzing

7. Medical Image Segmentation
    o Example: Segmentation of organs/tissues (liver, brain etc.) in MR or CT images
8. Medical Image Registration
    o Example: MR → CT Brain image registration
9. Automatic tumor detection on medical images
10. Automatic disease diagnoses on medical images