My honors thesis will focus on designing a new deep learning method (machine learning) to classify a sleeping disorder known as obstructive sleep apnea. This will be done by using EEG, ECG, or both signals from patients in a public physionet database. The general outline will be taking these raw signals and feeding it to a deep learning method of my choosing and learning about/testing the different design parameters to come up with the optimal solution.

This project is beneficial in the current climate because it allows for quicker diagnosis of sleep apnea that is much less labor intensive since it uses a computer algorithm instead of a sleep technician. This would assist people who believe they may have obstructive sleep apnea to seek treatment as soon as they are aware of the problem. The difference between my honors thesis and my senior design plan is the use of a deep learning method with avoids computing and selecting features manually. This is a step that was taken in my machine learning classifier for senior design however after completing that work it is clear that this is a very time consuming and difficult step. By avoiding this altogether it brings a different way of using the raw data directly to feed it through a deep learning method. I will be hoping to achieve an accuracy score of 70% at least using this deep learning method (possibly a convolutional neural network).

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