Weekly Report 03

Question 1: Is your project focused on or directly related to the field of Computer Science and Engineering? How?

Answer: Our project investigates feedback loops in the corticothalamic system (the cortex and thalamus) by using deep learning to analyze brain wave patterns. The corticothalamic system is crucial for many brain functions, and understanding its feedback mechanisms can enhance our knowledge of brain operations and aid in treating brain disorders. Traditionally, EEG (electroencephalography) has been used to identify distinct brain wave patterns corresponding to different feedback loops. In our study, we employ deep learning models, such as convolutional neural networks (CNNs) and recurrent neural networks (RNNs), to identify and classify these patterns more effectively. These models will be trained on EEG data to recognize complex feedback loops with greater accuracy than traditional methods. We anticipate that deep learning will significantly improve the analysis of brain wave data, helping to pinpoint feedback mechanisms in the corticothalamic system, potentially leading to better diagnosis and treatment of brain disorders.

Additionally, we focus on the concept of the refractory period—the duration of the effect of any task on the brain after its completion, which impacts the initiation of new tasks. Our goal is to design a model using a generated formula to predict how much the new task is affected by the refractory period of the previous task. This model will be developed within the scope of our project. Subsequently, we will compare the refractory period dataset with our model-generated dataset and create a new formula to convert between them, as their units are different.