**Project Proposal**

Application of Machine Learning in Cognitive Load Detection and the Effect of Musical Notes on Reducing It

Background: Cognitive load is the amount of mental effort required to process information while performing a task. High cognitive load can cause mental fatigue and reduce task performance. The detection of cognitive load and the use of interventions to reduce it can have significant benefits for various applications such as education, training, and healthcare. Music has been shown to have a positive effect on reducing cognitive load, but the specific mechanisms behind this effect are not yet fully understood.

Objectives: The primary objective of this project is to develop a machine learning-based system that can detect cognitive load in real-time. The system will use physiological signals such as electroencephalography (EEG), with the help of EEG headsets to classify the cognitive load into high or low categories. The secondary objective is to investigate the effect of musical notes of various genre on reducing cognitive load and the specific mechanisms behind this effect.

Methodology: The project will use a cross-sectional design, where participants will be randomly assigned to a cognitive load task with and without musical notes of different genres intervention. The cognitive load task will be a computer-based memory game, and the musical notes intervention will involve playing music in the background. Physiological EEG will be collected using non-invasive sensors(headsets) during the task. A machine learning model will be trained on the physiological data to classify the cognitive load into various labelled categories. Statistical analysis will be used to investigate the effect of musical notes on reducing cognitive load and also effect of various genres on relieving the cognitive load.

Expected Results: The expected outcomes of the project are as follows:

1. Development of a machine learning-based system that can detect cognitive load in real-time.

2. Demonstration of the positive effect of musical notes on reducing cognitive load.

3. Investigation of the effects of various genres of music on reducing cognitive load.

Conclusion: This project aims to develop a novel approach to detect cognitive load and investigate the effect of musical notes on reducing it. The project has the potential to contribute to the fields of education, training, and healthcare by providing a practical and effective intervention to reduce cognitive load. The results of this project could have significant implications for the design of educational and training programs and the development of new interventions for cognitive load management.