

# CST3390 UG – Final Report

Exploring the Integration of Elon Musk's Neuralink  
with IoT, Smart homes & Neurorehabilitation: “A  
Journey into Brain-Computer Interface Technology”

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# Agenda

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- Wireless Brain Machine Interface (BMI)

The objective is to use fewer wires for transmitting and monitoring brain activity.

Model of User Interface: Visual elements to start open-source programs.

Real-time visualisation of brainwave data, allowing for numerous user interfaces (desktop and mobile).

- Eco-friendly Interface

An easy-to-use interface for communicating with the device is to provide the user interface model.



# Introduction/Problem Definition

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- Neuroscientific concepts combined with home automation is more than merely a mash-up of two disciplines.
- This innovative method opens the door for the development of intelligent systems.
- This investigation highlights the significant influence that combining concepts from neuroscientific concepts with home automation.
- In scope of Wireless EEG, considering the methods that could improve training or recovery programmes' efficacy.

# Literature Review

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- Elon Musk has put a total of \$100 million into his neurotech business, 'Neuralink', with the goal of creating an implanted gadget [1]
- There is no certainty that such device like Neuralink will be adopted by consumers in general [1]
- Zero risk-free means of embedding a recording device into a person's brain.
- Invasive & Non-Invasive Devices [2]
- The industry for brain computer interfaces is expanding mainly in part to this non-invasive brain computer interface [2].



# Research Methodology

- Formation of a survey to question issues related to Brain Computer Interface, which is tailored and designed for public views & opinions of the Technology.
- A small scale of survey data collection was used in the data gathering & involving a numerical and non-numerical data analysis.
- Participants chosen in accordance with their preferences and strong interests to technology.
- Researching to comprehend the potential consequences of BCIs and to create policies and regulations that guarantee their ethical and safe use.

## Data Collection

- A greater desire ownership data can be observed in the participants' remarks & full control of the information gathered for home automation [3]
- Market competitiveness can pose challenges for companies looking to set themselves apart from the competition and maintain the trust of their customers [4]
- Motor Imagery signals is in hand recognition, a method that requires a small number of commands. MI models need a lot of learning to get more accurate because BCI literacy rates are connected to "sensorimotor rhythms [5]
- ASSR recording a person's EEG responses to auditory stimuli, can assist those who are blind or unable to utilise their skeletal muscles [6]



# Conclusion

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A thorough grasp of the technical requirements and user needs serve as the foundation for both the device's design and use.

More R&D is required to fully understand and utilise the concept of creating a Non-invasive BCI device.

Anticipation that the government is funding and supporting the research and development of the technology [7]

There is an extensive process of testing for a project that requires clinical study.

- FDA

- IRB

Neuralink's first Patient showed significant capabilities but is yet to determine the long-run consequences of such device [8]

Questions?





# Referencing & Sources

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- Image 1
- Image 2
- [1] (Fiani, B., Reardon, T., Ayres, B., Cline, D., & Sitto, S. R., 2021)
- [2] (Precedence Research, 2022)
- [3] (Wexler, A., 2021)
- [4] (Skyquest, R., 2023)
- [5] (Birn, R. M., 2012)
- [6] (Vallabhaneni A. et al., 2005)
- [7] (Center for Devices and Radiological Health, 2021).
- [8] (Knutson, J. and AXIOS, 2024).