NeuroClone

Om, Adit, Vaishnavi, Siddhi, Akshata

|  |  |
| --- | --- |

About

| * ***WHAT***   The project aims at reading Brain Waves and converting them into commands for a robot, thus, giving full control to even a paralysed person just by thoughts.   * ***WHY***   The main motivation was to help out paralyzed people by giving them a *sense* of entering into a new body that they can control completely. We want to give the controller an audio-visual feedback to make the process more realistic   * ***HOW***   We did it via this route:   * + Researched and found the best possible dataset online   + Trained a pre trained model using CNN with some changes   + Used the turtlebot open manipulator and open manipulator-X as the hand robot.   + Learn ROS so that we may get a better understanding of the codes and working of hand robot.   + Combined the Deep learning with ROS to give the output * ***STATUS***   In our project if we give a dataset of EEG recorded during imagining hand movements to the program the bot can do the exact hand movement in a virtual environment. We didn’t achieve exactly what we dreamt of, but were quite close to it.  Link to main doc: [Copy of Final Documentation Template](https://docs.google.com/document/d/1wyCxpuq3fyEu76nOtm9WqmS8MN2ipW44UyA6rehoH64/edit?usp=sharing) |
| --- |

|  |  |
| --- | --- |

Learnings/Key Takeaways/Experience

| Some of our takeaways are mentioned as below::   * **Brain Study**   This was the first thing we did, because we needed information regarding the electrodes, specific parts of the brain that control specific movements etc.   * **Learning Python**   Python was one of the most basic tools and it helped us with the proper formulations and debugging of code.   * **Machine Learning and Deep learning**   We used this in order to interpret the eeg datasets cleanly and noise free.   * **Train a pre trained model**   As a healthy practice and for debugging the real code, we implemented this on a dummy bot.   * **Extract EEG datasets responsible for hand movements.**   Due to the lack of time and experience, we restricted ourselves to searching for EEG datasets for hand motions   * **Configuring ubuntu environment for the first time**   As we were very new to this, we gathered all basic knowledge about it .   * **Dealing with turtlebot and open manipulator-x**   We took turtlebot as our primary bot and open manipulator as a hand robot, So we went through slam, navigation and simulation of bots.   * **Combining Deep learning with working of hand robot**   Our last step was to combine deep learning with the open manipulator, this required a lot of debugging and corrections which improved our understanding of codes.   * **Creation of Github repo**   We also created a github repo which contains all our codes and description of the project. |
| --- |