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| **MONTH 1** | |
| WEEK1 | |
| 05/07/2021 | Survey paper review on BCI |
| 06/………….. | Survey paper review on BCI |
| 07/………….. | Survey paper review on BCI |
| 08/………….. | Survey paper review on BCI |
| 09/………….. | EEG data acquisition experiment using openBCI ultracortex mark IV headset in 8 electrode configuration mode |
| WEEK2 | |
| 12/07/2021 | Upgraded openBCI ultracortex markIV headset configuration to 16 electrode configuration mode |
| 13/………….. |  |
| 14/………….. |  |
| 15/………….. |  |
| 16/………….. | Visited OAUTHC to familiarize self with PULSR2.0 robot |
| WEEK3 | |
| 19/07/2021 | Carried out research on Brushless DC Moto(BLDC) current and power measurement |
| 20/………….. | Continued Research on BLDC current and power measurement |
| 21/………….. | Researched on BCI experiment cue protocols |
| 22/………….. | Setting up of PULSR2.0 and evaluation of next steps of action for development of PULSR2.0 |
| 23/………….. | Researched on features and capabilities of Nvidias Jetson(TX1,TX2) and nano AI development boards. |
| WEEK4 |  |
| 26/07/2021 | Set-up and familiarized self with Nvidia Jetson(TX1) by running simple codes for controlling GPIO pins of Nvidia Jetson(TX1). |
| 27/………….. | Public Holiday |
| 28/………….. | Public Holiday |
| 29/………….. | Started the development of iteration one PULSR2.0 GUI using python |
| 30/………….. | Continued work on iteration one of PULSR2.0 GUI |

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| **MONTH 2** | |
| WEEK1 | |
| 02/08/2021 | Interfaced LPD380 rotary-encoders with Nvidia Jetson(TX1) board. |
| 03/………….. | Researched on protocols of MCP4725 DAC board |
| 04/………….. | Researched on using Nvidia Jetson(TX1) I2C communication |
| 05/………….. | Preparation for projects exhibition at OAUTHC |
| 06/………….. | Project Exhnibition at health-sciences week, OAUTHC |
| WEEK2 | |
| 09/08/2021 | Reviewd papers on neuroplasticity |
| 10/………….. | Reviewd papers on neuroplasticity |
| 11/………….. | Reviewed papers on neuroplasticity |
| 12/………….. | Reviewed papers on upper-limb-stroke rehabilitation |
| 13/………….. | Reviewd papers on neural substrates of upper-limb movement |
| WEEK3 | |
| 16/08/2021 | Continued development of iteration one of PULSR2.0 GUI |
| 17/………….. | Continued development of iteration one of PULSR2.0 GUI |
| 18/………….. | Completed iteration one of PULSR2.0 GUI |
| 19/………….. | Started development and bottom-up build and test approach of communication protocol between arduino UNO and PULSR2.0 GUI python script |
| 20/………….. | Continued development of communication protocl between arduino and PULSR2.0 GUI.  Significant progress was made with one way communication(arduino to PULSR2.0 GUI) |
| WEEK4 | |
| 23/08/2021 | Investigated pyOpenBCI library. |
| 24/………….. | International BCI workshop with clinical neurotechnology from charite university, berlin. |
| 25/………….. | Implemented pyOpenBCI and pylsl with basic EEG recording using openBCI ultracortex mark IV headset. |
| 26/………….. | Troubleshooted PULSR2.0  Motors were not moving in response to control signals  Motors were stalling in the absence of load |
| 27/………….. | Continued troubleshooting of PULSR2.0 |

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| **MONTH 3** | |
| WEEK1 | |
| 30/08/2021 | I completed testing of Arduino sending data to PULSR2.0 GUI python script. |
| 21/………….. | I started developing and testing the sending of control signals from python script to arduino. |
| 01/09/2021 | International BCI workshop with clinical neurotechnology from charite university, berlin. |
| 02/………… | I Debugged issues with python script sending control signals to arduino |
| 03/………….. | I completed the implementation of python sending control signals to arduino |
| WEEK2 | |
| 06/09/2021 | I switched from using openBCI hardware with its designed sofware to using the pyOpenBCI and pylsl library with openBCI hardware |
| 07/………….. | I used arduino to read from two rotary encoders |
| 08/………….. | I tested, debugged and fixed issues with arduino sending rotary encoder angles to python script |
| 09/………….. | I continued paper review on neural substrates |
| 10/………….. | I continued survey paper review on BCI |
| WEEK3 | |
| 13/09/2021 | I Interfaced arduino control with PULSR2.0 motor drivers |
| 14/………….. | I carried out experiments to determine approximate angular and linear displacement of PULSR2.0 links |
| 15/………….. | I continued the experiments to determine the approximate angular and linear displacement of PULSR2.0 links |
| 16/………….. | I continued the experiments to determine the approximate angular and linear displacement of PULSR2.0 links |
| 17/………….. | I continued the experiments to determine the approximate angular and linear displacement of PULSR2.0 links |
| WEEK4 |  |
| 20/09/2021 | I implemented the generation control signals for arduino from system keyboard using python script |
| 21/………….. | I incorporated keyboard to control signal generation for PULSR2.0 |
| 22/………….. | I troubleshooted PULSR2.0 python script for communication(sending and receiving issues) |
| 23/………….. | I troubleshooted PULSR2.0 python script for communication(sending and receiving issues) |
| 24/………….. | I troubleshooted PULSR2.0 python script for communication(sending and receiving issues) |

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| **MONTH 4** | |
| WEEK1 | |
| 27/09/2021 | I troubleshooted PULSR2.0 motors and researched on troubleshooting and fixing methods. |
| 28/………….. | I continued the troubleshooting of PULSR2.0 motors |
| 29/09/2021 | I continued the troubleshooting of PULSR2.0 motors |
| 30/………… | I continued the troubleshooting of PULSR2.0 motors and reported problems with motors along with possible solutions |
| 01/………….. | I carried out research on BLDC sensorless mode |
| WEEK2 | |
| 04/10/2021 | I researched on BLDC motor operation |
| 05/………….. | I researched on example circuits and codes of electronic speed controller |
| 06/………….. | I started the writing of arduino code for electronic speed controller |
| 07/………….. | I simulated code and generated Bill of Materials |
| 08/………….. | I continued simulation, edited Bill of Materials and ordered required parts. |
| WEEK3 | |
| 11/10/2021 | I placed atmega328p chip on veroboard and started unit testing of arduino code using digitally generated hall signals. |
| 12/………….. | I continued unit testing of arduino code and re-editing arduino code to fix discovered issue. |
| 13/………….. | I completed the debbuging, and unit-testing of arduino code |
| 14/………….. | I started the unit testing of IR2110 gate drivers using atmega328p with digitally generated hall signals |
| 15/………….. | I continued the unit testing of IR2110 gate drivers |
| WEEK4 |  |
| 18/10/2021 | I started testing gate drivers and atemga328p with MOSFET half-bridges |
| 19/………….. | I combined atmega328p, gate-drivers and Mosfet half-bridges |
| 20/………….. | I started testing the six hall sensor state inputs with the designed electronic speed controller |
| 21/………….. | I troubleshooted shorts and open circuits on the board of the developed electronic speed controller. |
| 22/………….. | II troubleshooted shorts and open circuits on the board of the developed electronic speed controller.  I tested the electronic speed controller. |