A Brain-controlled On-screen Assistive Keyboard

Project Plan

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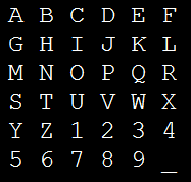
Outline

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**Project**

Description

In this Project, we will make on-screen keyboard. But instead of using mouse to click on wanted characters, brain waves will be used. A 6x6 grid - as in the “Figure” below - will be displayed on screen to the user, thus there will be 12 rows and columns combined (6 each). Each of those will light up with RGB color while the others will remain black. When the row or column has the character the user wants, the brain triggers a pulse (peak at 300ms) that will be captured by the program. After the row and column with the pulse captured, the character the coincides the two is the one wished by the user (A machine learning model will be used to determine the chosen character). After the constitution of words with selection of characters, the final sentence will be passed to natural language processing unit within the program to determine the action to be taken such as surfing the web or sending an email, in order to be more user friendly.



Figure

Working Process

First of all, a ML (Machine Learning) model must be made and has accuracy over 70%, as anything less than that will make it unusable. After that, a GUI (Graphical User Interface) will be designed in order to be used for both training more subjects and used for the future program. For the training GUI, a certain word will be designated and store the brain waves values of subjects to be used later in training the ML model, given that the noise will be removed from the stored values of each trail. After both the ML model and GUI are done, they will be integrated to be used. An NLP (Natural Language Processing) Unit will be used to map the sentences to do actions such as mentioned above.

**Timeline**

Description of Milestones

Each milestone will be consisted of units where each unit will be 3 days. From Saturday to Monday and from Tuesday to Thursday. After each milestone, there might be a free unit to finish any unmet deadlines. There will be 1 dummy milestone which revision over machine learning will take place, and 5 milestones. The 5 milestones are ML model programming, GUI programming, Integration of ML and GUI, Training & Testing and finally NLP programming & integration.

Schedule

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Milestone #** | **Milestone’s**  **Description** | **Unit #** | **Unit’s**  **Description** | **Deadline** |
| **0** | Revision on ML | 1 | Revision on Supervised ML | 21 / 2 |
| 2 | Revision on Classification of Supervised ML | 25 / 2 |
| **1** | ML Model Programming | 1 | ML Model Programming | 28 / 2 |
| 2 | ML Model Enhancement | 4 / 3 |
| 3 | - | 7 / 3 |
| **-** | **Report 1** | **-** | **-** | **10 / 3** |
| **2** | GUI Programming | 1 | GUI Programming 1 | 14 / 3 |
| 2 | GUI Programming 2 | 18 / 3 |
| 3 | - | 21 / 3 |
| **3** | Integration of ML & GUI | 1 | Integration of ML & GUI 1 | 25 / 3 |
| 2 | Integration of ML & GUI 2 | 28 / 3 |
| 3 | - | 4 / 4 |
| **4** | Training & Testing | 1 | Training | 8 / 4 |
| 2 | Testing | 11 / 4 |
| **-** | **Report 2** | **-** | **-** | **14 / 4** |
| **5** | NLP Programming & Integration | 1 | NLP Programming | 18 / 4 |
| 2 | NLP Integration | 22 / 4 |
| 3 | - | 25 / 4 |
| **-** | **Thesis** | **-** | **-** | **26 / 5** |
| **-** | **Presentation** | **-** | **-** | **8 / 6** |
| **-** | **Amended Thesis** | **-** | **-** | **4 / 7** |

\*Note: in case of a heavy load on the device provided by the university due to limited devices, Milestone 2 can be moved to be in place of milestone 0 or 1.