**Paralyzed Can Do**

**Abstract:**

Autonomic Dysreflexia (AD) is a condition in which your involuntary nervous system overreacts to external or bodily stimuli. The condition is most commonly seen in paralyzed people with spinal cord injuries above the sixth thoracic vertebra, or T6. The Autonomous Nervous System has two branches namely, Sympathetic Autonomic Nervous System (SANS) and Parasympathetic Autonomic Nervous System (PANS). The SANS and PANS operate in opposite ways to maintain the balance of the involuntary functions in your body, which is when the SANS overreact to the external stimuli, the PANS mitigate it. AD interrupts both SANS and PANS signals and disrupts the regular functioning of the body. AD causes an imbalanced reflex sympathetic discharge, leading to potentially life-threatening situations like an imbalance to control hypertension, which could cause cardiac arrest. To overcome this problem, we plan to develop a Human Cognitive Interface which fetches the signals from the brain, interprets those signals and sends an appropriate signal to the PANS which are responsible for handling the situation.

**Team Information:**

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| **Member Name** | **Role & Responsibilities** | **Background** | **Expertise** |
| Kunal Deora | Researcher and DBA | **Undergrad:** Bachelor of Technology in Electronics and Communication.  **Experience:** 2.5 years of experience in Software Development. | Database Development |
| Manasi Laddha | Researcher and DBA | **Undergrad:** Bachelor of Technology in Electronics and Communication.  **Experience:** 2.5 years of experience in Software Development. | Enterprise Content Management Systems |
| Neelesh Saxena | Researcher and DBA | **Undergrad:** Bachelor of Technology in Computer Science.  **Experience:** 3 years of experience in Software Development. | Java TIBCO |
| Vasanti Mahajan | Researcher and DBA | **Undergrad:** Bachelor of Engineering in Information Technology.  **Experience:** 2 years of experience in Quality Assurance. | Requirement gathering and analysis |
| Yashodhara Pandit | Researcher and DBA | **Undergrad:** Bachelor of Engineering in Information Technology.  **Experience:** 1.5 years of experience in Software Development. | Automatic Data Capture Applications in Java |

**Project Objective, Scope and Deliverables:**

**Objective:**

The objective of our project is to alleviate the sufferings of paralyzed human beings and provide control over their bodily functions. When the autonomic nervous system overstimulates, the SANS increase the heart rate and blood pressure which causes hypertension. By using an electroencephalogram (EEG), we fetch signals sent by the brain via small electrodes which are attached to the patient’s scalp. These electrical signals are sent to the computer which decodes the brain waves and sends appropriate signals to PANS, which bring the patient’s human body to normal condition.

**Scope:**

The scope of the project is to act on the following tasks:

* To be able to fetch the appropriate brain signals and successfully interpret them
* Map the signals to the corresponding body organ
* Alleviate the sufferings of the paralyzed patient by acting on those signals

**Deliverables:**

The deliverables are as follows:

* Requirement Definition
* Enhanced Entity Relationship Model
* Developing a database schema
* Application prototype
* Test case reports
* Analysis report

**Assumptions and Constraints:**

Following are the assumptions and constraints for our project:

* We have an EEG device which can fetch the electrical signals
* A prompt screen which displays the analog and digital signals monitoring the patient’s conditions

**Integrated Master Schedule/Milestones:**

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| **Integrated Master Schedule/Milestones** | | | | |
| **Steps** | **Category** | **Tasks** | **Time Period** |  |
| 1 | Research | Identity appropriate devices, Identify electric signals and Interpret them | 1 week |  |
| 2 | Research | Analyze the interpreted signals and identify their mapping with the body parts | 2 week |  |
| 3 | Design | Identity Actors & Use Cases and generate ER and EER model of the application | 3 week |  |
| 4 | Implementation | Create database schema in MySQL | 4 week |  |
| 5 | Programming | Formulate logic by procedures, triggers, functions and views on database schema | 5 week |  |
| 6 | Simulation | Gather the data from different source points & import them from loader | 6 week |  |
| 7 | Testing | Generating test cases for the application and perform testing | 7 week |  |
| 8 | Data Visualization & Reporting | Report generation of the application and showing the expected result using TABLEAU | 8 week |  |

**Reference:**

<http://www.healthline.com/health/autonomic-hyperreflexia#Prevention6>

<http://emedicine.medscape.com/article/322809-overview>

<http://www.livescience.com/52285-paralyzed-walk-brain-waves.html>