



# BIMODAL REHABILITATION FOR THE VOICE AND MOVEMENT IMPAIRED USING BRAIN SIGNALS

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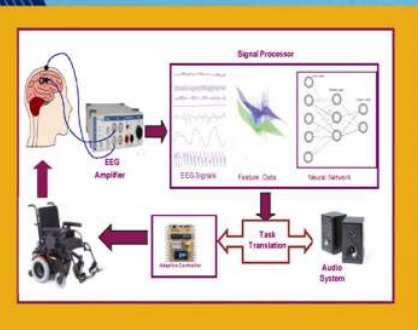
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### PROBLEM STATEMENT

- Partial paralytic patients can be rehabilitated through the non-paralysed muscles or nerves.
- However this is not possible in total Paralysis, caused by motor nerve disorders (MND) and stroke which leaves the individuals immobile for life. MND does not affect the five senses: sight, hearing, taste, smell and touch, also does not affect the mind, heart and bladder.
- 20% of MND patients live five years or more. 10% will survive more than ten years.
- Rehabilitation through voice and mobility will help elevate their living conditions.
- Our product is targeted at this special group of people who need a device to communicate and control a wheelchair using their thought. Rehabilitation to help them to achieve some level of **communication and mobility** independently is crucial in these modern days.



### OUR PRODUCT

- The **Bimodal Rehabilitation for the Voice and Movement Impaired using Brain Signals** is a device which can help the paralyzed patients to communicate through a digital voice and also to drive a robot chair within their Homay Di, using their brain signals.
- Our product makes use of the active brain functions of the patient to convert their thought signals into voice and control signals to speak and to move the robot chair.
- This is accomplished by using a brain interface.
- The interface captures the brain signal (EEG motor imagery) from the motor cortex region of the brain, processes these signals and translates them into voice or control signals.

### NOVELTY

- Bimodal Rehabilitation for the Voice and Movement Impaired using Brain Signals is the only product that provides rehabilitation for communication as well as mobility using the robot chair.
- Even untrained (naive) users can steer the robot chair using our interface.
- Comes with safety features to ensure accident free driving.
- Can be used safely by individuals with total paralysis.
- Helps care givers to understand their patient needs.

### INVENTIVENESS

- Only two electrodes are required against traditional 6 to 32 electrodes. Hence less electrode application time.
- Simple protocol using only imaginary hand movements and simple words – easy to remember by users.
- User has total control of the robot chair's movements.
- The bimodal rehabilitation is the first of its kind neuroprosthetic rehabilitation.

### COMMERCIAL POTENTIAL

- The bimodal interface can be easily custom designed for a patient and his environment.
- Our device can also be easily interfaced with any commercial powered wheelchair.
- The Bimodal Interface is cost-effective compared to the cost of hiring care givers or other rehabilitative devices which require expensive sensors and instrumentation.

### PAPER PUBLICATIONS

#### BOOK CHAPTERS

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