



Sri SAI RAM INSTITUTE OF TECHNOLOGY



An ISO 9001 : 2008 Certified Institution

Sai Leo Nagar, West Tambaram, Chennai - 600 044



INNOVATION AND ENTREPRENEURSHIP DEVELOPMENT CENTRE (IEDC)

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MIND CONTROLLED GAMING FOR THE DIFFERENTLY ABLED



AKSHAY U



ATHREYA S



NAVANEETH P



NIRMALRAJ M

Final year B.E Computer Science and Engineering



Guided By : Dr. B. SREEDEVI
ASSOCIATE PROFESSOR
DEPARTMENT OF COMPUTER SCIENCE
SRI SAIRAM INSTITUTE OF TECHNOLOGY

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1. INTRODUCTION

Mind Controlled Gaming for the Differently Abled” aims to open up the arena of gaming entertainment to those that have special needs. The project is modelled in such a way that it facilitates playing games without the need for physical interaction with the game itself such as operating a keyboard.

Our project uses the capability of the human brain to facilitate this kind of physical interaction less gaming. It uses the principle Of Electroencephalography, an electrophysiological monitoring method to record electrical activity of the brain.

2. PRODUCT DESIGN AND PRACTICALITY

One of the misconceptions regarding brain wave capturing is that there needs to be some kind of device inserted in the head to read the data but, We use noninvasive placement of electrodes along the scalp. EEG measures voltage fluctuations resulting from ionic current within the neurons of the brain which are then mapped to certain activities that can be performed within the games.

An attractive feature of our project is that it can be used with a multitude of games rather being limited to certain proprietary games and it also has further scope for development into a controlling device.

We plan to implement our project in the form a wearable headset that can be worn while using and removed when not in use. It will not block vision or the ability to listen. It also will be portable to be carried around much like a helmet or a headphone and be used with any computer.

3. MATERIALS USED

Arduino UNO



Charger



Step UP



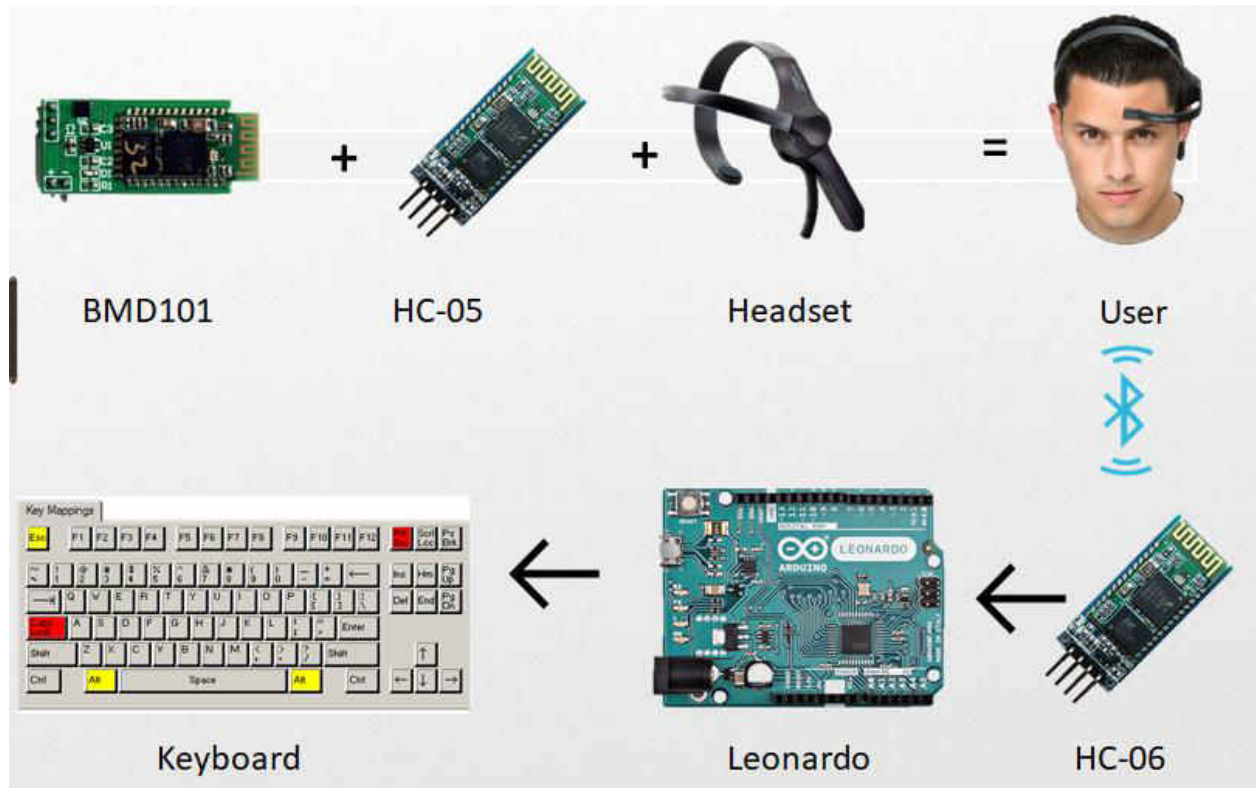
HC-05



BMD 101



4. ARCHITECTURE



COMPONENT 1 : USER MODULE

- BMD 101 is used to gather electrical impulses from the user brain without any penetration in the user's body.
- The HC-05 is a Bluetooth transmitter that is used to transmit the data collected by the chip to an Arduino for further processing.
- The BMD 101 will be fixed in the headset so that it will be easy for the user to wear it.
- The BMD 101 is capable of capturing a wide array of brain waves but does not have the processing power to separate the waves into a set of components which can be distinguished easily by a keyboard driver.

COMPONENT 2 : COMPUTER MODULE

- The waves that are captured by BMD 101 are transmitted via a Bluetooth in the user component to the Bluetooth component in the computer.
- The Bluetooth on the other hand gives the data to the Arduino board.
- The Arduino decodes the data given into a set of 4 input mappings. These mappings decide what key needs to be pressed on the keyboard.
- A simple script that will override the existing windows keyboard driver will be installed in the computer which will allow the computer to accept input from the Arduino and map that to the keyboard.
- A microcontroller such as Arduino is necessary in this setup because even though the data can be directly fed to the computer and the processing can be done there, the interfacing of a Bluetooth to the device depends on the OS that the computer is running. In order to remove this dependency a microcontroller was introduced.

5. SOCIAL IMPACT

- This device will help those with disorders such as Autism, Dyslexia, etc to improve their social interactions.
- The device enables even those people who have lost the use of their limbs to enjoy and benefit from gaming.
- Opens up the arena of gaming to wider sections of people who till now haven't been introduced to this industry.
- Creating a whole new market for developers to make games. Games are becoming too complex nowadays making it harder for differently abled people to play them. Maybe this device can motivate game developers to make games that are simple and fun to play.

6. ENTREPRENEURIAL PROSPECTS

- Though the device is developed with the intent of helping the differently abled there is a huge market for these kinds of devices. These devices can be marketed to gaming enthusiasts.
- Showcasing this device in conferences can bring in more customers. It will also provide an opportunity to enhance this device in a way that will appeal to the customers by these live demo conferences.
- The cost of this device is comparatively low, considering that gamers are spending several hundred dollars for their passion there is a huge audience who are willing to pay the price of this product.
- In addition to help the differently abled people to game it can also be later programmed to control objects that are necessary for them. Eg Wheelchair

7. CONCLUSION

The device will allow differently abled people to experience the wonderful joy that games can bring to one's life. The finished product consists of two modules each of which has a neatly designed printed circuit board and is ready to be used. The computer component will be following Plug n Play mechanic further reducing the user interaction involved while setting up the device.