

MOBILE ROBOT SYSTEM CONTROL THROUGH AN BRAIN COMPUTER INTERFACE

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Abstract: This project discussed about a brain controlled robot based on Brain-computer interfaces (BCI). BCIs are systems that can bypass conventional channels of communication (i.e., muscles and thoughts) to provide direct communication and control between the human brain and physical devices by translating different patterns of brain activity into commands in real time. With these commands a mobile robot can be controlled. The intention of the project work is to develop a robot that can assist the disabled people in their daily life to do some work independent on others.

Here, we are analyzing the brain wave signals. Human brain consists of millions of interconnected neurons. The patterns of interaction between these neurons are represented as thoughts and emotional states. According to the human thoughts, this pattern will be changing which in turn produce different electrical waves. A muscle contraction will also generate a unique electrical signal. All these electrical waves will be sensed by the brain wave sensor and it will convert the data into packets and transmit through Bluetooth medium. Level analyzer unit (LAU) will receive the brain wave raw data and it will extract and process the signal using Matlab platform. Then the control commands will be transmitted to the robotic module to process. With this entire system, we can move a robot according to the human thoughts and it can be turned by blink muscle contraction.

1. Introduction

The patterns of interaction between these neurons are represented as thoughts and emotional states. According to the human thoughts [1-6], this pattern will be changing which in turn produce different electrical waves. A muscle contraction will also generate a unique electrical signal. All these electrical waves will be sensed by the brain wave sensor and it will convert the data into packets and transmit through Bluetooth medium. Level analyzer unit (LAU) will receive the brain wave raw data and it will

extract and process the signal using Matlab platform [7-13]. Then the control commands will be transmitted to the robotic module to process. With this entire system, we can move a robot according to the human thoughts and it can be turned by blink muscle contraction [14-22].

2. Existing System

- ☐ No remote control operation
- ☐ Depend on others to operate
- ☐ No muscle contraction sensing

3. Proposed System

- ☐ Brain wave analysis
- ☐ Robot control using human thought
- ☐ Self control and operating facility
- ☐ Bluetooth communication

Block Diagram:

BCI-Brain Computer Interface

Electroencephalogram measure net brain activity through voltage measurements by surface electrode, and also no physical movement needed. It acts as a direct communication pathway between the brain and the external devices. Also known as mind machine interface [23-30].

4. Working Principle

Human brain contains too many brain waves, so we are going to read that brain waves and going to control the robot with the help of the brain wave signals. The few basic signals which we are going to extract are alpha, beta, gamma, and lambda. When the human brain starts to think, the brain will produce millions of neurons. These neurons will produce electric signals. With the help of these signals, we are going to control the robots. All these electrical waves will be sensed by the brain wave sensor and it will convert the data into packets and transmit through Bluetooth medium. Level analyzer unit (LAU) will receive the brain wave raw data and it will

extract and process the signal using Matlab platform. Then the control commands will be transmitted to the robotic module to process. With this entire system, we can move a robot according to the human thoughts and it can be turned by blink muscle contraction.

Application

- ☐ Automotive applications
- ☐ Industrial applications
- ☐ Home applications
- ☐ Remote control application
- ☐ Monitoring application

5. Conclusion

The signal generated by brain was received by the brain sensor and it will divide into packets and the packet data transmitted to wireless medium (blue tooth).the wave measuring unit will receive the brain wave raw data and it will convert into signal using MATLAB gui platform. Then the instructions will be sending to the home section to operate the modules (bulb, fan). The project operated with human brain assumption and the on off condition of home appliance is based on changing the muscle movement with blinking.

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