

Robot Control by ERPs of Brain Waves

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Abstract : This paper presented the technique of robot control by event-related potentials (ERPs) of brain waves. Based on the proposed technique, severe physical disabilities can free browse outside world. A specific component of ERPs, N2P3, was found and used to control the movement of robot and the view of camera on the designed brain-computer interface (BCI). Users only required watching the stimuli of attended button on the BCI, the evoked potentials of brain waves of the target button, N2P3, had the greatest amplitude among all control buttons. An experimental scene had been constructed that the robot required walking to a specific position and move the view of camera to see the instruction of the mission, and then completed the task. Twelve volunteers participated in this experiment, and experimental results showed that the correct rate of BCI control achieved 80% and the average of execution time was 353 seconds for completing the mission. Four main contributions included in this research: (1) find an efficient component of ERPs, N2P3, for BCI control, (2) embed robot's viewpoint image into user interface for robot control, (3) design an experimental scene and conduct the experiment, and (4) evaluate the performance of the proposed system for assessing the practicability.

Keywords : severe physical disabilities, robot control, event-related potentials (ERPs), brain-computer interface (BCI), brain waves

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