Brain-controlled Intelligent Assistive and Smart Medical Instrument System: Brain Signal Activities

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Abstract: A brain-computer interface (BCI)-technology-based bio-feedback system as integrated with a brain-controlled robot system is developed. Bio-feedback signals (e.g., visual, audio, haptic and tactile, and olfactory stimulation) indicating the robot's alertness levels and overall state will be transmitted to the user. Using the bio-feedback scheme, the user is also be able to correct the modulated brain activities in performing particular tasks. The BCI-with-bio-feedback system, as complemented by advanced signal processing (i.e., pre-filtering, feature extraction, pattern recognition, and task classification) algorithms, is able to discriminate different complex brain activity patterns. According to patterns such as the user's multiple intensions (commands), his responses to bio-feedback signals, and others, the system can classify brain signals. The performance of the bio-feedback system is examined to determine the most effective means of providing the robot's state information to the user. Our brain-controlled robot with bio-feedback is incorporate high accuracy and reliability. As such, it will be expected to become a leading technology in biomedical engineering applications, particularly in human-assistance and rehabilitation contexts. The integrated technology is then called as brain-controlled intelligent assistive based bio-feedback signal (BIA-BIOS) which means an intelligent assistive systems that are controlled directly by the human brain by using information from the bio-feedback signals such as the senses. Our successful project will proceed to the commercial stage of BCI system development with intellectual property suitably protected for enhanced export opportunities with our brain-controlled robot device.