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# Optimization of Brain Mobile Interface Applications Using IoT

Pervasive Brain-Mobile Interfacing (BMoI) is a new trend that has significantly increased within this decade through the creation of wearable dry contact electroencephalogram (EEG) sensors. Unfortunately, current commercially wearable brain sensors have low accuracy, power limitations and computational restraint based from mobile devices. These limits result in low quality and ineffective devices that do not reach their potential. Therefore, there is an apparent need to optimize BMoI factors to increase their functionality for advanced application.

Researchers at Arizona State University have produced a BMoI architecture or Asynchronous Multi-sensory Model Predictive Control (AMMPC). The system contains wearable EEG and electrocardiography (ECG) sensors. The combinations relaying biometrics to a mobile device. Then, the device utilizes Internet-of-things (IoT) and machine learning (ML) to correspond information for real-time output based on bodily signals. This communication ultimately creates predictive models to predict mental states of the user in the future.

Integrating IoT and ML alongside offloading to a fog server produces real-time responses from brain signals and relates an individual's mental state to an operation. For example, researchers are capable of blurring out video frames based on a physiological response of the user. This novelty is a starting point to where the brain and heart responses of an individual becomes an interactive variable with modern technology.

Potential Applications

- Interactive entertainment
- Prosthetics
- Multi-modal sensing
- Brain-mobile interface

Benefits and Advantages

- Predictive algorithm – Application of EEG and ECG sensors increases accuracy of mental state recognition
- Real-time – Offloading to a fog server reduces execution time by 10 times
- Energy efficiency – Predictive modeling potentially saves up to 51.7% of energy savings
- Lower cost – ECG calibration step allows system to use cost-effective sensors

For more information about the inventor(s) and their research, please see

Dr. Sandeep Gupta's Directory Page