# Low Cost Brain Signal and Accelerometer Control System for the Physically Challenged

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Mitigating the effect of physical disability that faces many people the world over has been the focus of many technological researches. Many devices have been developed with brainwave(EEG) or electromyography(EMG) sensors and some with accelerometers but their scope have been quite limited and their prices are way off the charts! The larger population of the world who live in third world countries like mine live on less than a dollar per day and these devices cost hundreds of dollars. My device uses a combination of the brain signal sensor and accelerometer giving the physically challenged a wider range of functionality at an affordable cost. The brain signal sensor costs less than a dollar, and the accelerometer costs about 20 dollars, there was a deliberate use of open source hardware and software to reduce cost. The Brain Signal devices in the market operate with an intermediary hardware but I have succeeded in bypassing this hardware by connecting directly to the microcontroller with an appropriate algorithm. I had accidentally discovered while toying with a microcontroller that current is generated in the body which the microcontroller can detect. This year I was challenged to work on a device that can help my aged counselor who is confined to a wheel chair due to stroke. I felt I could get the microcontroller to measure brain signals and thus make a cheaper Brain Signal device than those that use a separate hardware (ADC) to interpret the signals before sending to a microcontroller. So I developed an algorithm that is able to detect Brain signals and amplify them while eliminating noise. Tests were carried out using two other types of devices, a brainwave sensor and an EMG sensor and then my device. My device achieved a high level of accuracy compared with them.

**Awards Won:**