

GaitMate: A Gait Monitoring Solution for Pediatric Cerebral Palsy

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Cerebral palsy affects 3 out of every 1000 children in the United States. With spastic cerebral palsy comprising the majority of cases, many of these children suffer from abnormal gait patterns such as toe-walking which lead to future health issues such as stiffened leg muscles. While the current standard of care involves patients attending monthly physical therapy sessions, the relative infrequency of these visits often leads to relapses and therefore minimal progress. To facilitate for more frequent physical therapy for substantial gait improvement, a pressure-monitoring shoe sole has been developed. Four piezoelectric pressure sensors are attached to the top of a sole at strategic points which allow for one to distinguish between gait patterns. The sensors are then hooked up to an Arduino and Bluetooth to transmit data wirelessly to either a laptop or mobile application. After fabricating and testing the prototype, it has been concluded that the device is capable of tracking and recording an individual's gait in real time. It can detect both heel-toe and toe-heel walking and display distinct patterns. The response time of the device is rapid enough to accommodate a normal walking pace and is responsive to a wide range of applied weights. Further testing with a range of pediatric patients will be the next step in finalizing this product to provide the most accurate and comfortable product. Once on the market, the affordability and ease of use of this product will allow for patients to easily conduct physical therapy on a daily basis, increasing the likeliness of improved gait performance.