Smart Sole: A Technological Approach to Accessible Gait Analysis

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Smart Sole is one of the first technologies to make gait analysis readily available for any person seeking to study walking body mechanics from the comfort of their own home. The device is primarily marketed towards runners seeking to improve their speed and running efficiency through optimal form and technique. However, anyone searching for a gait analysis solution would benefit from the product. ?Smart Sole is a wearable electronic device that captures and transmits pressure sensor data from underneath the wearer's foot. The device uses an array of pressure sensors, an onboard microcontroller computer, and a Micro-USB cable to convert foot pressure into numeric data. The data produced from the device can be recorded and used effectively for gait analysis purposes on a user's computer. The device is equipped snugly with a buckle strap system for fastening and a 3D print for encasing circuitry. ?Smart Sole's primary design objectives highlight marketability, portability, user-friendliness, safeness, and versatility of fit. The solutions incorporated in Smart Soles' design reflect these design goals. To test the device, the student researcher equipped the device and walked on a treadmill long enough to collect a reasonable gait sample. The data collected were configured into a visual animation used for gait analysis. The design passed or passed with distinction a majority of the performance-based metrics. Data communication, comfort, and ease of equipment are examples of tests that passed. However, harder tests like pronation identification, and self-sufficient power failed.

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