

Gait Tracking and Monitoring

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One Page Overview:

The main idea of this project is to develop a hardware/software system that will gather and process data from a person's gait or walking motion. Using this data, a neural network or artificial intelligence can evaluate a person's health based on their gait. This idea would be a useful tool in the medical field, specifically ortho and physical therapy. The system would not only have to gather, present and process data gathered from the person it is attached to, but also keep track of previous attributes and compare with current values. This way the AI, can evaluate progress or report that patients' health is regressing. The system would be comprised of several components. First a hardware device attached to a patient's lower body or legs that will contain an inertial measurement unit and possibly a unit that will measure the roll, pitch and yaw of the body. The unit would have to be small and out of the way so it itself will not affect a person's normal gait. The device will also need a Bluetooth module so it can communicate wirelessly This unit would then send this data to a computer, server or application that will then process this data using a neural network. Data visualization would be a very important aspect as easily read and identifiable patterns as well as changes will be important to both patients and medical professionals. The neural network will also need a dataset to be trained. To keep the system accurate the data will need to have data from individuals with varying levels of health, size (height, weights, etc.) and age. Since this will likely require a large amount of storage for the data, a database would have to be used, however several online services exist to provide this.

Key Challenges:

- Developing a device to monitor people accurately and efficiently
- Using machine learning to train the device to visualize movements and changes
- Training the device to recognize when someone is moving versus when they are at a stand still
- Tracking gait of people of all different types and sizes
- Keeping device compact so it is not cumbersome

Key Technologies:

- Motion Capture Camera for capturing targeted features such as joints in motion.
- Electro-goniometer (EGM) for measuring the angle of joint movements.
- Inertial Measurement unit
- Microprocessors
- Neural networks and machine learning