21. Title: Wearable Gait Analysis

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Key words: Gait Analysis, Gait rehabilitation

Domain: Healthcare

Summary: Portable gait analysis system is a crucial requirement for clinical gait analysis in real walking environment. The developed technology can be used for variety of clinical applications for example neurological disease diagnosis affecting ambulation, gait rehabilitation, fall prediction in elderly, control of neural prosthesis etc. The developed system is based on IR based distance sensor which provide highly accurate gait parameter estimation. It estimates the gait parameters with simple mathematical calculations based on 2D geometry and simple trigonometry unlike inertial measurement unit (IMU) based system which requires complex integration and de-drifting calculation to accurately estimate the parameters. This system incorporates sensor position adjustment mechanism in two degrees of freedom facilitating the adaptability of the system to any shoe size. The system is wireless for collecting the data over long walkway and with minimal movement artifacts.
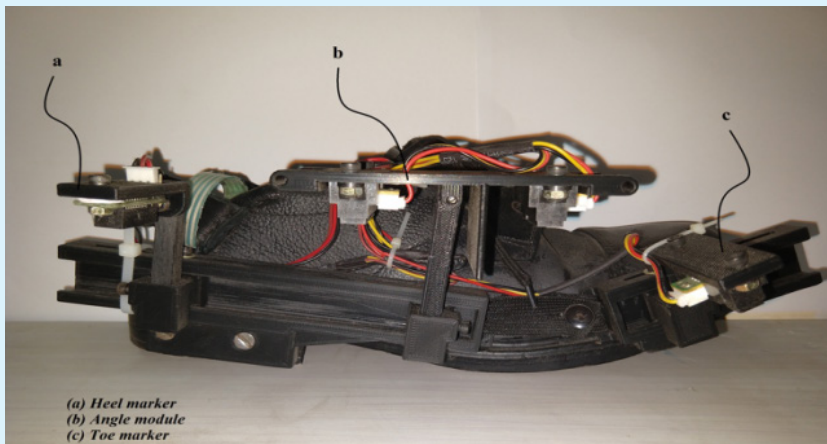

Image: Prototype for Gait Analysis

Advantages:

» This system has provision to estimate of the derived parameters like toe off, heel strike, and most of the temporal gait parameters like cadence, swing interval, stance interval etc.

» This system is wearable and at the same time less prone to movement artifacts and comfortable to use with the body.

» The system is user independent i.e. it can be used by any user irrespective of the size of the shoe.

» It is simple, accurate, inexpensive and consumes less operating power.

Applications: Healthcare and Rehabilitation

Scale of Development: A working prototype system is developed and performance is evaluated in laboratory.

Technology Readiness Level: 5

IP Strength: Indian Patent Application 201811034806