IntelliCane™: Instrumented cane for diagnosis and evaluation of gait behavior in individuals with mobility issues

VANDERBILT UNIVERSITY
CTTC Center for Technology Transfer & Commercialization

Summary

An Instrumented cane for the objective evaluation of gait characteristics in individuals with mobility issues.

Addressed Need

Physical therapists perform functional gait assessments to monitor the progress of rehabilitation therapy for individuals with mobility issues. A significant component of this assessment is the assignment of subjective scores based on observation of the individual while performing a series of mobility tasks. The disadvantages of this approach are:

- low degree of intra-rater and inter-rater consistency
- non-objective measures of timing and cane placement
- Gait assessments typically limited to within a setting

Technology Description

Vanderbilt engineers have developed a gait assessment tool utilizing a modified standard walking cane with an embedded instrumented system to provide objective and quantitative data. The associated software system can analyze the generated data to provide measures of variables such as timing and speed of cane placement, angular acceleration of the cane, and amounts of weight borne by the cane.

This system is designed to assist physical therapists:

- collection of objective data during gait analysis,
- facilitate appropriate assistive gait device prescription,
- provide patients and therapists feedback during gait training, and
- reduce wrist and shoulder injuries with cane usage.

In addition to this, with the data obtained from this cane, automated gait analysis and gait pattern classification can be performed to understand a patient's walking performance.

Technology Development Status

- Lab prototype fabricated
- Software (acquisition, analysis and GUI) in refinement stages
- Communication protocol finalized
- Pilot study published in Robotics and Automation (ICRA), Design and implementation of an instrumented cane for gait recognition, Wade et al., 2015 Link: http://ieeexplore.ieee.org/document/7140026/
- Short informational video available at this link: https://youtu.be/3yybF_pUdJ4

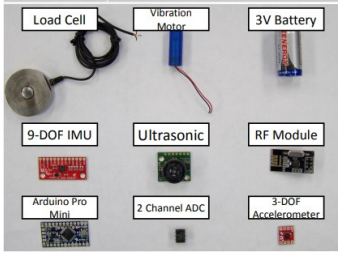
Intellectual Property and Commercialization Status

- Issued US Patent (United States Patent 10,799,154)
- Copyrighted Software

Commercialization Status

Vanderbilt is seeking a commercialization partner to conduct the commercial development of a product and undertake the manufacture, marketing and distribution of the product via technology licensing from Vanderbilt.

Sensor	Data
Accelerometer	Linear acceleration from handle and base
Gyroscope	Rotational velocity
Force-sensing resistor	Grip pressure on handle
Load cell	Weight borne on cane
Ultrasound Emitter	Obstacle detection



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VU REFERENCE: VU15097

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