Real Time Wearable Device Data Transmission and Response

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Project Description:
Little is known about human movement and physical activity outside of the clinical environment. While the commercially available market of smart pedometers, such as the Fitbit or Jawbone, are providing insights not previously available, they are still very limited in functionality. The future of these devices will be able to analyze such measures as type and quality of gait, not just the number of steps taken in a minute.

The goal of this project will be to build a client server system that includes wearable microprocessors and smart phones that will collect data from a person in their community setting, in real time, and transmit this data to a server which will be able to respond to the smart phone with messages concerning the person's gait or activities.

This project will involve developing the hardware and software system to collect the data, stage data to a mobile phone, and then transmit to the server. There, the server will need to actively perform a series of analyses on the data. This will include such methods as linear regression, support vector machines, and clustering. Some stages of the analysis will also involve development of new analysis methods specific to the task.

Knowledge, Skills, and Expertise Needed: Arduino
Basic soldering and electronics
GNU Linux, with shell scripting
Matlab/Octave
PEAR Web Development
Android or iPhone App Development

Equipment Requirements: Arduino prototyping
(provided at the WIL)   Server development environment
Prototyping parts and tools
Android or iPhone device

Deliverables: Regular progress reports
Regular meetings and demonstrations of project status
Documentation sufficient that future students could continue the project with a minimal learning curve