Pedestrian Navigation Systems

- **Objective**
  Develop a Pedestrian Navigation System (PNS) on Android smart phone.

- **Development Environments:**
  1. **Hardware**
     - NB or PC (OS: XP, Vista)
     - Android phone (Hero 2.1)
  2. **Programming Environments:**
     - Android SDK
     - Eclipse
     - JDK
  3. **User Interface**
     - Google Maps on Android phones

- **Project Description**
  In this project, based on the stepping detection techniques developed in Project #1, we are going to extract stride features from the readings of IMU. The tracking of a pedestrian can be recovered from strides features. The tracking information will be further integrated with GPS information by a Kalman filter. The developed system not only can improve the GPS accuracy but also can tolerate the loss of GPS signals for a period of time. The tasks will include:
    1. Design a Pedestrian Tracking System (PTS) in which the stepping, stride length and walking direction are used to recover the tracking of a pedestrian.
    2. Design a Kalman filter to integrate PTS and GPS. In the system, the stepping information is used to predict the new position in the next stage, and the GPS position is treated as the observation that will be used to correct the prediction.
    3. Design a user interface on Android phone by applying Google Maps API to indicate the position of the pedestrian.
    4. Your positioning system should need to tolerate the loss of GPS signals. In other words, the dead reckoning function must be implemented by using stride information.