Pedestrian Positioning from Wrist-worn Wearable Devices

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Motivation and Objective

Motivation

Why a wrist-worn sensor?

- Foot-mounted sensors are not very convenient for the users
- Non-constrained way of carrying Smartphones makes the estimation process challenging
- Current availability of Smartwatches and Smartbands
- We all are used to wear devices around our wrists
- Wrist-worn as a sub-case of Smartphone: constrained motion

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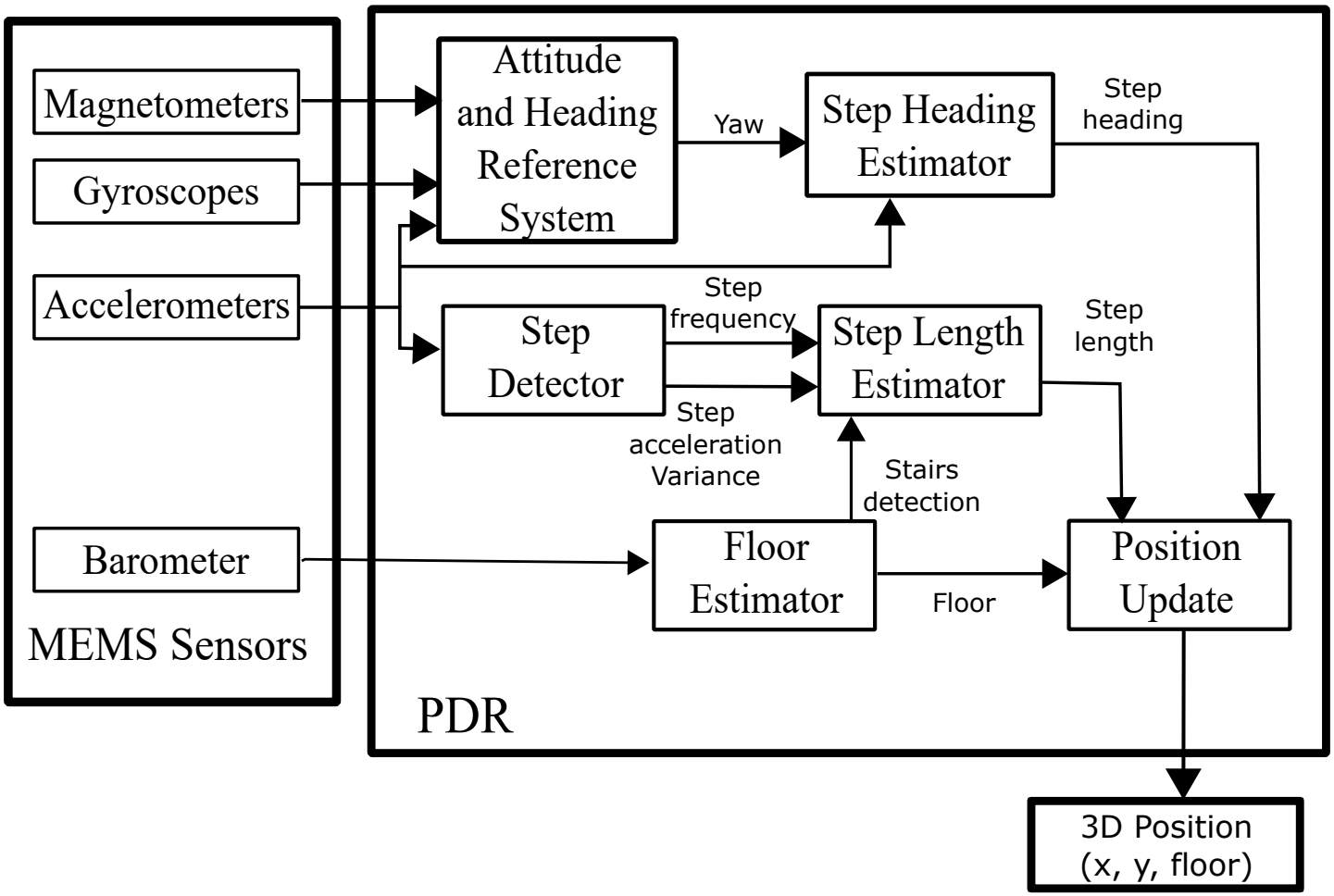
Objective

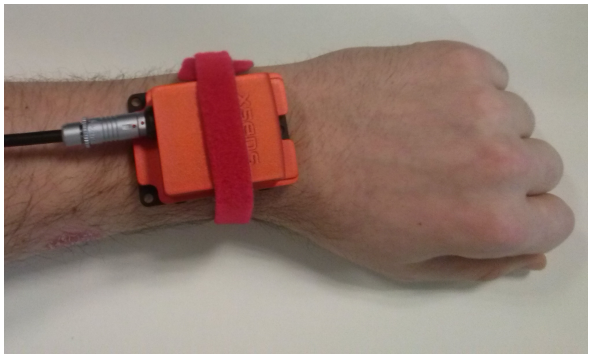
To take advantage of that wrist's constraint of motion to improve the Smartphone's accuracy while using a more convenient sensor location

System block diagram



Hardware description

- Sensor: MTi-300 AHRS IMU from Xsens
  - 3 axis Accelerometer (100 Hz)
  - 3 axis Gyroscope (100 Hz)
  - 3 axis Magnetometer (100 Hz)
  - Barometer (50 Hz)



- Online data processing: Matlab running in a laptop
- Installation: Laptop in a backpack plus a wireless mouse to start/stop the system and record the keypoints.

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Conclusions and Future work

- Our first complete 2.5D wrist-worn PDR system implementation
  - Improvements are needed in every block of the system.
  - It is a starting point to go on working on it.

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  - Improvements are needed in every block of the system.
  - It is a starting point to go on working on it.
- Near-future wrist-worn specific tasks:
  - To reduce false positive steps when there is no real displacement.
  - Better estimation of heading misalingment between device and user.
  - To keep on searching for an advantage from the wrist constrained movements.

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THANK YOU FOR YOUR ATTENTION!!

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