Mode of transportation and ground property detection using accelerometer and gyroscope data from a Smartphone

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Abstract—The abstract goes here.

1 Project Description

THE goal of our project is to use accelerometer and gyroscope data gathered by an app on an android smartphone to differentiate persons and the way persons carry the smartphone(left/right trouser pocket, left/right jacket pocket) as it has been done before [7], as well as differentiating between different movement types (idle, walk, run, uphill, downhill) which has also been worked on by [8].We will also look into distinguishing different prorperties of the ground the Person is walking on where there is no publications to be found on.

To gather the necessary data we will use an app on a samsung S3 smartphone programmed in Python using Kivy http://kivy.org/#home. The rate of measurement is about 40 measurements per Second. The accelerometer used in the Samsung S3 is the LSM330DLC. The data will consist of a list of timestamps and the according values for the accelerometer and gyroscope values in three dimensions. Since the smartphone can not provide a realtime environment for measurements the measured values will be slightly irregular.

Similiar projects have already been preformed, such as using an wii-remote or custommade accelerometer and gyroscopes with high measurement rates to differentiate between different person gaits with fixed locations of the sensor on the body (mostly legs). Also there is a paper[7] which does not only use hip/leg but can also differentiate the gait in chest-pockets or in hand (on the handle of a suitcase). While most papers use data gathered on flat floors [8] already used a more typical route. Our aim is to gather the data from 1-3 walks over different routes rather than use a predefined setting. And also there seems to be no work on classifications of underground types (asphalt vs. grass) which will be one of our main foci.

Acknowledgments

The authors would like to thank...