



Analysis of various techniques for the extraction of the gravity component from measurements of an accelerometer

Description

Data from inertial sensors is broadly used in multiple devices like automobiles, consumer electronics or drones. These inertial sensors measure the movement and rotation rate of an object and can be used for gesture detection, navigation etc.

A broad problem for the measurements from the accelerometer is, that it also always measures the gravity component on earth, which permanently overlays the measured acceleration. This gravity has to be extracted from the measurements in many cases and there exist various techniques to do so.

This work builds up on a previous investigation on the behavior from methods to extract the gravity and goes into more detail about multiple aspects from the used methods.

The task is to implement various techniques for the extraction of the gravity (in 2D and 3D) and evaluate their characteristics. This includes usability for certain applications, resource requirements, precision, drawbacks and advantages and timing and more.

The following tasks have to be conducted:

- Familiarize with the methods that can be used to extract the gravity
- Investigate on the characteristics of the used methods
- Design and conduct tests to evaluate the methods and their characteristics
- Evaluation of the results and illustration of the enhancements
- Discussion and documentation of the results
- (Optional) Design of a new method to combine multiple methods

Prerequisites:

- Experience with Inertial Sensors and Sensor Fusion
- Programming skills to implement the chosen methods

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