

Position Estimation Based on MEMS Inertial Sensors for the Use as Pedestrian Navigation

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SUMMARY

The research for pedestrian navigation is still an interesting field. Pedestrian navigation in GNSS shaded areas helps to close the route of outdoor navigation. There are a lot of possibilities to realize position estimation without GNSS. Different technologies are used, e.g. Wi-Fi, Bluetooth, inertial sensors, cameras. In this paper a classification is used, which helps to find the differences in the main technologies. The technologies for position estimation in buildings can distinguished in image based, infrastructure based and hybrid/autonomous methods. Subsequently favor inertial based position estimation is presented. This approach is based on particle filter and uses routing graph and map of the test building to correct the pedestrian dead reckoning position. The effort only to use inertial sensors results in a low effort in realizing a navigation solution. Test runs and results made in a controlled test scenario are shown. The differences to reference coordinates are smaller than 5 meters. Additionally 46 data sets were made by 23 persons, which used the application first time. In these results nearly 70 % of all data reach the quality in the controlled test scenario. This paper closes with the discussion of the actual results and gives short outlook.

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