

CEST02\_268

## HEADING ANGLE ESTIMATION BASED ON PEAK PROMINENCE DETECTION FOR PDR LOCALIZATION

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### ABSTRACT

Heading angle estimation is reported a big challenge task for pedestrian navigation systems (PDR), and it is required to combine different estimation techniques to obtain heading angle accurately. In this paper, we proposed a novel method to accurately estimate the turn direction of the user based on analysis of the tri-gyroscope signals. We used prominence and width of the peaks to measure the walking direction by utilizing the decision tree method. We examined three different turn detection methods and we found that the performance of the step detection using peak detection method is better than zero-crossing methods in terms of accuracy. A machine learning algorithm-that is a decision tree method used as heading angle estimator, Kalman filter, in other hand, is used to fuse the heading angle measurements obtained from direct measurements and the estimated by our technique. The experimental results show that using a proposed method an improvement of localization accuracy have been achieved, compared with the traditional PDR method.

**Keywords:** PDR, Localization, IMU, prominence Detection, Heading Angle.