

# A Simplified Map-Matching Algorithm for In-Vehicle Navigation Unit

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## Abstract

GPS has been widely used for land, sea and air navigation. However, due to signal blockage and severe multipath environments in urban areas, GPS alone cannot satisfy most land vehicle navigation requirements. Dead Reckoning (DR) systems have been widely used to bridge the gaps of GPS and to smooth GPS position errors. However, the DR drift errors increase with time rapidly and frequent calibrations are required.

As land vehicles have to be on roads, digital map can be used to constrain the locations of vehicles, known as map-matching, which is an efficient way to improve the performance of positioning systems while working under urban environment. In this paper, a simplified map-matching algorithm is proposed for an in-vehicle navigation unit, as the processing power of in-vehicle processor is limited. Extensive field tests have been conducted in Hong Kong and Macau. The results reveal this map-matching algorithm can improve the performance of the vehicle navigation unit significantly.

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