School of Engineering and Applied Science (SEAS), Ahmedabad University

B.Tech(ICT) Semester IV: Probability and Random Processes (MAT202)

Category : Technical

Area : Large Data Analytics

Group No : 6

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Special Assignment Title : Lane-level GPS navigation

Abstract

In this article, we focus on enhancing GPS with lane-level navigation to facilitate highway driving. Our basic motivation was how to prevent increasing number of highway accidents and deaths all over the world especially in India. The current existing systems are not accurate upto lane level navigation. Even Google maps only stores *a priori* the number of lanes and their directions at each highway exit which is not enough information for drivers to make well-informed lane changing decisions

Not much research is carried out in the field of lane-level GPS navigation systems especially when it is to be used within a smartphone device. One model proposed by Dao *et al.* proposed a Markov-based localization algorithm where vehicles nearby can exchange their motion status. Other model proposed by Toledo *et al.* that contained a GPS, an external odometry, and a gyroscope in order to obtain lane information which when activated, matched the data collected by these devices to an Enhanced map (Emap) which is available *a priori.*

Whether the Canny Edge detection algorithm which is used for lane identification is accurate or not is ensured by plotting true positive rate (TPR) against false positive rate (FPR) and the skyline as the roc curve.

References

[1] Song, Tianyi, et al. Enhancing GPS with lane-level navigation to facilitate highway driving. IEEE Transactions on Vehicular Technology 66.6 (2017): 4579-4591.

[2] H. Aly, A. Basalamah, and M. Youssef, Lanequest: An accurate and energy-efficient lane detection system, in Proc. IEEE Int. Conf. Pervasive Comput. Commun., 2015, pp. 163171.

[3] R. Toledo-Moreo, D. Betaille, and F. Peyret, Lane-level integrity provision for navigation and map matching with GNSS, dead reckoning, and enhanced maps, IEEE Trans. Intell. Transp. Syst., vol. 11, no. 1, pp. 100112, Mar. 2010.