

Enhancement of the Localization Precision of RTLS Used in the Intelligent Transportation System in Suburban Areas

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Abstract

In this paper, we focus on the problem of the localization accuracy in real-time locating systems (RTLS) that can be used for precise positioning of the autonomous cars on the road. Systems of this type will be based on a concept of ad-hoc networks composed of moving objects (vehicles) and static devices, mounted in the urban / road infrastructure (RSE – road side equipment). The vehicle-to-infrastructure (V2I) communication between the nodes of the network will allow exchanging data, relevant from the safety point of view [1, 2]. It is anticipated that in the future, the V2I technology will become one of the pillars of the, so-called, Intelligent Transportation Systems (ITS) used in Smart Cities, as well as in suburban areas.

In varying road environment, one can expect different densities of the RSE. Spatial distribution of these devices may impact the localization precision of the overall system. In suburban areas, the density will be smaller. As a result, multiple V2I communication sessions will be required, to cross-verify the calculated distances between the vehicles and the RSE devices. In this paper we present techniques that may allow to enhance the estimation of the distances in the presence of different noises. The localization uncertainty may depend on different factors, such as fluctuation of the environment temperature, precision of on-board sensors mounted in the cars, etc [3].

References

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