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ICOM'08

Editors

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CELLULAR RADIO BASED VEHICULAR LOCATION FINDING

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ABSTRACT

Information concerning mobile location is one of the basic requirements that are crucial for implementing a wide range of evolving ITS services. Radiolocation has the potential to serve wide geographical area. This paper reports an investigation regarding the feasibility of utilizing cellular radio for the purpose of mobile location estimation. Basic strategies to be utilized for location estimation are elaborated. Two possible approaches for cellular based location estimation are investigated. Their effectiveness and relative merits and demerits are identified with the help of computer simulation.

Keywords: ITS, GSM, Cellular Radio, DRGS

1. INTRODUCTION

Intelligent Transportation Systems (ITS) is an umbrella term representing an evolving research field that addresses different aspects of road transportation related problems by offering new range of solutions with the help of state of the art information technology and advanced telecommunication facilities. In the context of ITS, information concerning mobile location is one of the basic requirements that is crucial to implement evolving services like DRGS (Dynamic Route Guidance System), Fleet Management, Emergency vehicle dispatching etc. to name a few, although, the requirement for accuracy varies from application to application [1]. In case of Route Guidance and Navigation there is a need for higher accuracy in location data, since guidance or navigation relies on the assumption of availability of reliable location data, otherwise a mobile could easily become lost by following a wrong route or taking a wrong turn. Considering another application where vehicles could act as floating sensors providing information concerning traffic situations it has just experienced, demand for location accuracy could be a bit relaxed. Even less accurate location data could be used for vehicular fleet management system where knowledge about a mobile's present location in terms of a street or road section or even area might be adequate enough depending on the particular demand.

Although satellite based Global Positioning Systems (GPS) can provide accurate positional information for mobile users there is considerable interest in assessing systems which do not have to rely on GPS. It is clear that GSM does have some estimate of the distance of a mobile from its serving base station (BS). The objective of this Paper is to investigate to what extent the cellular infrastructure of the second