Multi-system-multi-operator localization in PLMN using neural networks

M. Borenović, A. Nešković, D. Budimir

References:


Abstract:

Providing the localization algorithm for context-aware services is the focus of many studies. This paper explores the properties of positioning models based on received signal strength (RSS) in PLMN (Public Land Mobile Network) networks. The effects of using the RSS at a mobile terminal from various systems, such as GSM and UMTS, as well as from multiple operators, have been investigated and discussed. Twenty-two models, based on artificial neural networks, have been developed and verified using the data from an immense measurement campaign. The obtained results show that augmenting the model with additional RSS data, even from systems with poor radio-visibility, may improve the positioning accuracy to as much as a 35m median distance error in a light urban environment. The degradation of accuracy in indoor environments and the complexity and latency of the models were also scrutinized.

Keywords:

neural networks, received signal strength, localization, land mobile radio cellular systems, positioning