

Expert system for urban mobility indicators estimation in cooperative environment

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Abstract

In general, urban agglomerations worldwide are unique and specific. They are distinguished by their distinctive features (size, population, shape, local specificities...) but they share common problems in domain of urban mobility. Urban mobility challenges have grown massively in recent years, and have a strong influence on traffic efficiency, traffic safety and overall quality of life.

Key approach for addressing urban mobility issues is the well-founded and comprehensive estimation of urban mobility. Estimation is necessary for determination of key or critical elements of urban mobility systems and for providing an accurate insight in the state of urban mobility. It enables better understanding of urban mobility and identification of weaknesses and strengths of the urban mobility system. Accurate estimate creates a foundation for improvement of existing end creation of new services in urban mobility, especial in context of cooperative systems.

According to definition, while Intelligent Transport Systems (ITS) focus on digital technologies providing intelligence placed at the roadside or in vehicles, cooperative ITS (C-ITS) focuses on the communication between those systems (communicating with another vehicle, with the infrastructure, or with other C-ITS systems). Therefore, data gathered from communication backbone of C-ITS systems (mobile communication network in particular) can be used as input data for urban mobility estimation.

For this purpose, an expert system is created using adaptive Neuro fuzzy Inference System (ANFIS) methodology. It was trained using set of rules that were determined using method of surveying experts (knowledge gathering) in domain of urban mobility. The result is more objective estimation of urban mobility, applicable to all urban environments regardless of their characteristics.

Keywords: Urban mobility estimation, indicators, index, Call Data Records, telecommunications, cooperative systems

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