Toward a Decision Support System for Regulation in an Urban Transport Network

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ABSTRACT

In this article, a solution to the problem of perturbation in the urban transport network has been proposed. This solution is based on the multicriteria decision support method, which is an efficient way of identifying appropriate solutions to different perturbations situations. The proposed model should provide synthesis, evaluation and updating of available information in order to facilitate the task of the network monitoring operator. To achieve this objective, the authors propose formal modeling of the perturbation concept through an effective and above all significant decision support system exploiting the diversity of the criteria as well as the decision maker’s subjectivity. This modeling makes it possible to capitalize the knowledge available within a checkpoint and to monitor the process. The authors show how, from the information available on the network, the modeling of the process represented by a perturbation makes it possible to enrich the possibilities of evaluation of the state of the network.

KEYWORDS


INTRODUCTION

Today, a large number of people have to travel daily using urban transport networks. Even the temporary shutdown of transport (strike or other event) disrupts users. The quality of transport is an essential element of competitiveness.

Urban transport is a major challenge for the good functioning of cities; it provides appropriate responses to the travel needs of the urban population.

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The World Bank’s report on the 1986 urban transport strategy emphasized the importance of effective management of existing transport capacities, good traffic management, efficient pricing and minimal regulation and challenged the interest of the urban poor in capital-intensive projects whose cost effectiveness might be problematic in countries with very limited resources. The spontaneous evolution of particular means and public services was to lead to a state of lawlessness illustrated by the asphyxiation of urban centers, the impossibility of ensuring a normal flow of traffic and the deterioration of public transport conditions. In addition, meeting the requirements of some (private means) and others (public means), required the realization of expensive investment that exceeds the financial possibilities of local communities.

The various studies elaborated on transport in emerging countries have, in most cases, been inspired by the growing difficulties of traffic. They almost all agree on the need to give priority to public transport in the cities while proposing measures of organization of the traffic tending to contain the evolution of the number of private cars and to limit the use of them.

Hence the need to develop travel plans to organize the different modes of travel (on foot, two wheels, cars, etc.), and rationalize the use of urban space. Firstly, the collective means of urban transport allow an economy of urban space compared to the automobile. According to a study carried out by transport in Europe in 1978, the road surfaces used “...are in the ratio of 1 to 10, a bus, in rush hour, carrying as many people as 40 private cars...” Similarly, their stops only neutralize a small area.

A Perturbation is any incident that may affect a transport network in a random manner and that results in a discrepancy between the theoretical walk chart and the real walk chart. Thus, it generates irregularities that result in, on the one hand, the non-compliance with the schedules and on the other hand, the irregular intervals between the vehicles which leads to the appearance of vehicle trains and also gaps. The quality of service offered is then deteriorated because of the increase in travel time online, the discomfort resulting from a poor distribution of charges between the vehicles and especially because of the waiting time at stops, where the need for a rapid handling of incidents by the regulator.

In this article, a solution to the problem of perturbation in the urban transport network has been proposed. This solution is based on the multicriteria decision support method, which is an efficient way of identifying appropriate solutions to different perturbations situations.

In order to help the regulator in this task of information analysis, the authors propose a model of decision support multicriteria to unload the regulator of this function.

**RELATED WORKS AND CONTRIBUTION**

There are several incidents that can disrupt the operation of public transit. They can affect the network vehicles that are in circulation, the network personnel, the
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Digital Natives, Work Values, and Computer Self Efficacy
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