



TRAFFIC FORECASTING

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ABSTRACT

Due to its paramount relevance in transport planning and logistics, road traffic forecasting has been a subject of active research within the engineering community for more than 40 years. In the beginning most approaches relied on autoregressive models and other analysis methods suited for time series data. More recently, the development of new technology, platforms and techniques for massive data processing under the Big Data umbrella, the availability of data from multiple sources and an ever-growing need of decision makers for accurate traffic predictions have shifted the spotlight to data-driven procedures. This paper aims to summarize the efforts made to date in previous related surveys towards extracting the main comparing criteria and challenges in this field. A review of the latest technical achievements in this field is also provided, along with an insightful update of the main technical challenges that remain unsolved. The ultimate goal of this work is to set an updated, thorough, rigorous compilation of prior literature around traffic prediction models so as to motivate and guide future research on this vibrant field.

Keywords: Autoregressive, Logistics, Traffic forecasting, Traffic predictions, Vibrant

1.INTRODUCTION

Traffic forecasting is an essential element of efficient development of road networks of cities, districts and regions at the national level. Development and implementation of a computer model of a transportation system of traffic gravity areas is the basis of traffic forecasting. Simulation of traffic distribution is based on internationally accepted principles of “user equilibrium model”. This principle implies that the time spent on a trip depends on traffic at different sections of the road network, and the driver chooses trip routes considering the time to be spent. Such approach allows taking into account not only the structure of the road network and distances of different routes, but delays associated with traffic intensity [Federal Road Agency (Rosavtodor) of the Ministry of Transport of the Russian Federation (2003).

Traffic forecasting is an essential element of efficient development of road networks of cities, districts and regions at the national level. A forecast may estimate the number of vehicles on a planned road or bridge, the ridership on a railway line, the number of passengers visiting an airport, or the number of ships calling on a seaport. Traffic forecasting begins with the collection of data on current traffic. This traffic data is combined with other known data, such as population, employment, trip rates, travel costs, etc., to develop a



traffic [demand model](#) for the current situation. Feeding it with predicted data for population, employment, etc. results in estimates of future traffic, typically estimated for each segment of the transportation infrastructure in question, e.g., for each roadway segment or railway station. The current technologies facilitate the access to dynamic data, big data, etc., providing the opportunity to develop new algorithms to improve greatly the predictability and accuracy of the current estimations.

In recent decades, toll roads have become widespread in many countries around the world; their number and length increase. Toll road management systems are also being developed. A lot of developing countries pursue programs of construction of toll roads with private investment, so that positive practice of development and implementation of toll road systems expands.

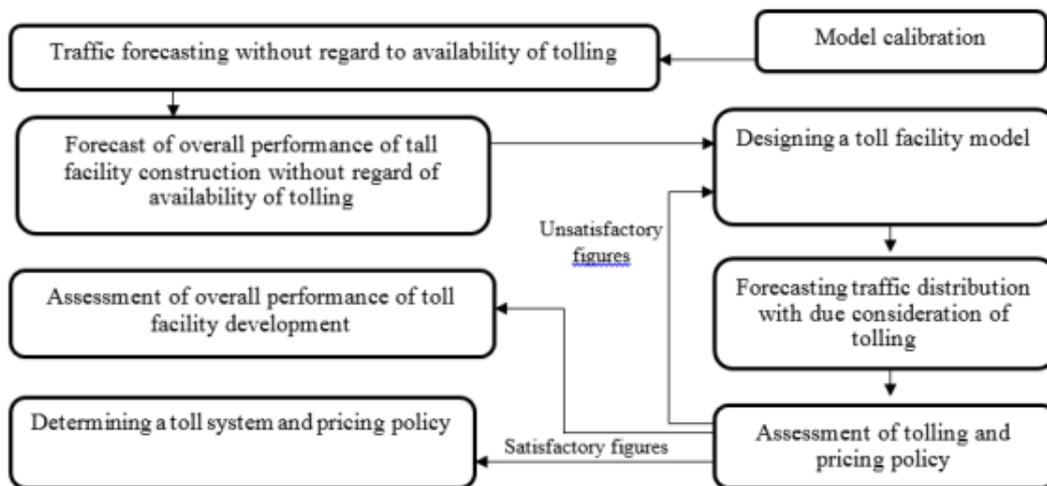


Fig. 1. Scheme of traffic forecasting on toll roads.

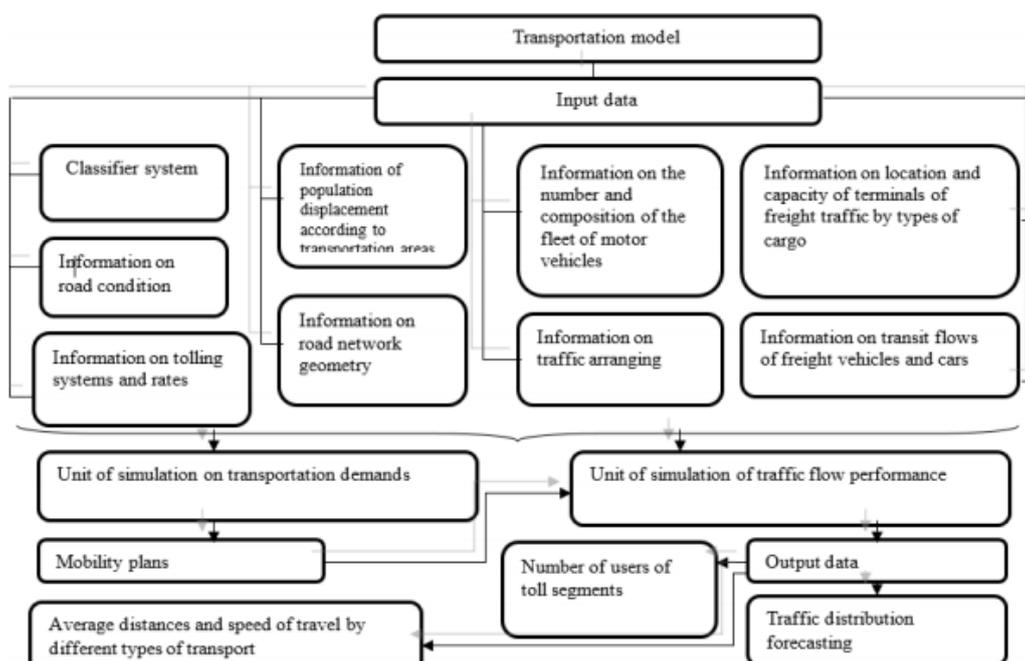


Fig. 2. Structure of a transportation model.



2. METHODOLOGY

Traffic studies or surveys are carried out to analyse the traffic characteristics. These studies help in deciding the geometric feature and traffic control for safe and efficient traffic movements. The traffic surveys for collecting traffic data are also called census.

The various traffic studies generally carried out are:

- a) Traffic volume study.
- b) Speed study.
 - 1) Spot speed study.
 - 2) Speed and delay study.
- c) Origin and destination study.
- d) Traffic flow characteristics.
- e) Traffic capacity study.

A) Traffic volume study

Traffic volume is the number of vehicles crossing a section of road per unit time at any selected period.

Traffic volume is used as quantity measure of flow.

B) Speed study

The actual speed of vehicles over a particular route may fluctuate widely depending on several factors such as geometric features, traffic conditions, time, place, environment and driver.

C) Origin and destination study

An **origin-destination study** is used to determine travel patterns of traffic on an installation during a typical day. They are useful in assisting long-range traffic planning, especially when there are substantial changes anticipated in the installation mission or strength.

D) Traffic flow characteristics

Traffic flow is the study of interactions between travellers (including pedestrians, cyclists, drivers, and their vehicles) and infrastructure (including highways, signage, and traffic control devices), with the aim of understanding and developing an optimal transport network with efficient movement of traffic and minimal traffic congestion problems.

E) Traffic capacity study

Traffic Capacity Studies basic capacity is the maximum number of vehicles(PCU) that can pass a given point on a lane or roadway during one hour under the most nearly ideal roadway and traffic conditions which can possibly be attained.

3. CONCLUSION

For an economic development of our country proper Transportation planning is a must.

In the present stage, there is a lack of statistical or traffic data. So, a traffic study such as Traffic volume study, Speed study, origin and destination study should be conducted throughout the country on a sampling basis to



find out the capacities under different topographic conditions, traffic composition, surface conditions for both rural and urban areas and the existing traffic data should be utilised in an optimum way by proper co-ordination between various modes of transport.

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