Identification of Regression Models - Application in Traffic

Pavel Dohnal¹

¹ Department of Adaptive Systems Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic Pod vodárenskou věží 4, 18208 Prague 8 Czech Republic

E-mail: dohnalp@utia.cas.cz

Keywords: regression model; model order; intensity of traffic flow; prediction

Abstract: The paper deals with an application of a model identification in the traffic area. Majority of cities has problem with high density of transportation and roads are congested. This is the reason why the advanced traffic control is being applied. It uses state-space or internal models for description of reality. Ideally, they should be build as physical models. However, some features have no physical representation or they are too complex and must be modelled in another way. This is a good opportunity to use black-box input-output mixture model approach. It needs a lot of data, but we have them. Knowledge of the internal model structure is very important for a correct performance. If it is unknown, it has to be estimated.

Some of advanced traffic flow control systems use regression models to describe the traffic reality, in the longer horizon for example [1, 2]. The typical fixed daily, weekly and seasonal courses of traffic variables, like intensities, can be certainly observed and easily determined but the typical values can often radically change due to actual traffic conditions. Then, the modelling relying on the typical course of the variables can not be accurate.

In the Institute of Information Theory and Automation of the Academy of Science of the Czech Republic an algorithm [3] is developed which estimates parameters of the model, an optimal order of the regression, etc. The algorithm is tested on real traffic data samples and the overall model estimation is done. The paper will present results of this test.

Acknowledgement: The research was partially supported by research center DAR, MŠMT 1M6798555601.

References

- [1] Jitka Kratochvílová, Ivan Nagy: *Bibliographic Search for Optimization Methods of Signal Traffic Control*, Tech. Rep. 2081, ÚTIA AV ČR, Prague, 2003.
- [2] Jitka Kratochvílová, Ivan Nagy: *Traffic control of microregion*, in *IFAC World Congress*, *Preprints*, IFAC, Ed. IFAC, Prague, 2005, accepted.
- [3] Ludvík Tesař, Petr Nedoma, Miroslav Novák: *Mixture learning script Jobcontrol (Program)*, ÚTIA AV ČR, Prague, 2004.