

Application of SVR with Genetic optimization algorithm in urban traffic flow forecasting

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Abstract:

Forecasting of inter-urban traffic flow has been one of the most important issues globally in the research on road traffic congestion. Due to traffic flow forecasting involves a rather complex nonlinear data pattern; there are lots of novel forecasting approaches to improve the forecasting accuracy. This investigation presents a short-term traffic forecasting model which combines the support vector regression (SVR) model with Genetic Optimization algorithms (SVRGA) to forecast inter-urban traffic flow. Additionally, a numerical example is employed to elucidate the forecasting performance of the proposed SVRGA model. Finally the results compare and their performance with time series models.

Keywords: Traffic flow forecasting, Support vector regression (SVR), Genetic Optimization algorithms (GA)

1. Introduction

Accurate short-term traffic flow forecasting has become a crucial step in the overall goal of better road network management. A wide variety of forecasting approaches has been applied to forecast the traffic flow of inter-urban motorway networks. Those employed approaches could be classified according to the type of data, forecast horizon, and potential end-use [1] including Kalman state space filtering models [2].

This paper discusses the application of support vector machine (SVM) to predict the traffic flows in an urban street network, which one of streets of Shiraz city, location on The Cinema Saadi junction. Support vector machine (SVM) were purposed Vapnik [3] originally developed to solve pattern recognition and classification problems. Recently, SVM generalized to regression (SVR) and time series prediction, such as financial time series (stocks index and exchange rate) forecasting [4]. The selection of three positive parameters i.e. σ , C and ε of a SVR model is important to the accuracy of forecasting. Therefore, Genetic optimization algorithm (GA) is used in the proposed SVR model to optimize parameter selection. The remainder of this paper is organized as follows. The SVR model, Genetic optimization algorithm and Time series forecasting models are introduced in Sections 2, 3 and 4. A numerical example is presented in Section 5. Conclusions are discussed in Section 6.