

Estimation of Parameters Affecting Traffic Accidents Using State Space Models

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ABSTRACT

In this research, the state space method has been used to model traffic accidents. This model, which has both a black box section and through the acquisition of basic knowledge, parameters have been estimated. This study deals with the identification of a single input single output state space system. Modeling in state space was used in order to meet stricter restrictions on the performance of control systems, increasing complexity and ease of access to computers. The simple modeling of the complex nonlinear system of traffic accidents was one of the achievements of this method and this study. One of the advantages of this method is that it is possible to introduce a basic knowledge of the system to the model in order to increase the speed of convergence and access to the desired results. The output of the error rate shows that the error increased a little at first, but with the increase of the data, the error starts to decrease and tends to zero. Previous models by various researchers have generally dealt with black box identification methods, which, due to the lack of basic knowledge in these cases, will prolong the data processing time and not achieve proper accuracy. The presented method can predict the probability of traffic accidents with higher accuracy in a shorter period of time, so that the application of the model is more attractive for decision makers in the field of driving safety.

Keywords: Black Box Model, State Space Model, Human Error Parameters, Traffic Accident Reduction