عنوان مقاله:

An Implementation of the AI-based Traffic Flow Prediction in The Resilience Control Scheme

محل انتشار:

نشریه بین المللی مهندسی حمل و نقل, دوره 8, شماره 2 (سال: 1399)

تعداد صفحات اصل مقاله: 14

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خلاصه مقاله:

Today, often a reliable and dynamic sensor system is found to be necessary to control intelligent transportation systems. While these dynamical sensor systems are often found to be useful for the ordinary situations, the resilience-control-related issues are not yet fully addressed in the literature. The traffic flow is an important resource, which if found to be disturbed by a malicious threat it may cause further insecurities, e.g. if the sensor data is not accessible due to a malicious sabotage of the on-the-road sensors. Furthermore, often centers for the data gathering and prediction are suffering from data-loss because of imperfections of the data gathering itself. To overcome the resulting difficulties, a prediction engine is required to estimate the traffic flow, with the ability to compensate for the lost sensors. In this paper, a traffic flow prediction engine is proposed in which the artificial-intelligence-based methods are used to perform the optimization task. This method is implemented for the test in the real-world situation and its efficiency in traffic estimation is proved to be reliable. The Adaptive Neuro-Fuzzy Inference System (ANFIS) is trained with the particle swarm optimization (PSO) algorithm and the Artificial Neural Network model (ANN) is used to predict the flow. In addition, The Principal Components Analysis (PCA) method is adopted to reduce the dimension of the features. The results show the method's efficiency in predicting the traffic flow. This prediction engine can be practically implemented and used as a replacement for the sensors to predict the traffic flow.

کلمات کلیدی:

intelligent methods, Traffic Estimator Engine, Reliable Sensor System, principal components analysis