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Proactive Event Management using ANN with PSO Prediction in Transport Processes

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Abstract: Proactive event management is part of the complex event processing theory. The main goal of proactive event management is to predict the next phase problems. Transportation processes management is one of the proactive event management applications where several quality attributes need to be accommodated to provide the best service experience. However, transportation companies are facing many challenges related to stochastic events which, in turn, impede the companies' progress. To address these challenges, a prediction model using Artificial Neural Network (ANN) with Particle Swarm Optimization (PSO) is proposed. The model simulates event processing and is applied to the cargo shipments dataset with the objective of minimizing predefined violations. Three methodologies are presented and compared based on the accuracy of the classifier; all data combined, prediction with feature selection, and prediction with clustering. Results show that the prediction with clustering method provides the best performance among the three proposed methods with a prediction accuracy of 99.62%.

Keywords: Business Data Processing, Prediction Modeling, Metaheuristic Algorithms, Failure Analysis, PSO, Forecasting, Neural Network Applications, Transportation.