A Method for Identifying Unusual Transactions in E-commerce Through Extended Data Flow Conformance Checking

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Abstract : The proliferation of smart devices and advancements in mobile communication technologies have permeated various facets of life with the widespread influence of e-commerce. Detecting abnormal transactions holds paramount significance in this realm due to the potential for substantial financial losses. Moreover, the fusion of data flow and control flow assumes a critical role in the exploration of process modeling and data analysis, contributing significantly to the accuracy and security of business processes. This paper introduces an alternative approach to identify abnormal transactions through a model that integrates both data and control flows. Referred to as the Extended Data Petri net (DPNE), our model encapsulates the entire process, encompassing user login to the e-commerce platform and concluding with the payment stage, including the mobile transaction process. We scrutinize the model's structure, formulate an algorithm for detecting anomalies in pertinent data, and elucidate the rationale and efficacy of the comprehensive system model. A case study validates the responsive performance of each system component, demonstrating the system's adeptness in evaluating every activity within mobile transactions. Ultimately, the results of anomaly detection are derived through a thorough and comprehensive analysis.