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Adding Covariables and Learning Rules to GAN for Process Units' Suffix Predictions

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A unit circulating in a business process is characterized by a unique identifier, a sequence of activities, and timestamps to record the time and date at which said activities have started. This triplet constitutes an individual journey. The aim of predictive Business Process Monitoring is to predict the next or remaining activities of an ongoing journey, and/or its remaining time, be it until the next activity or until completion. For suffix predictions, generative networks (GAN) have proven to be most efficient (Taymouri and La Rosa, 2020). However, process covariables, such as supplier, client, destination in case of shipment and so on, are generally not taken into account, while they would provide additional, sometimes crucial information for predictions. Therefore, we propose a first, simple method to treat covariables through Factorial Analysis of Mixed Data, and turn the GAN into a conditional Wasserstein GAN to predict unit suffixes conditionally to the treated covariables with increased learning stability. Additionally, we will provide guidelines for early stopping rules and learning rates schedulers for the Wasserstein GAN's critic and generator in order to further ease the learning phase while reducing the risk of overfitting.

Keywords

Process, GAN, Covariables

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