Keep in mind



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## Abstract

We present a general supervised machine learning methodology to represent the payment behavior of financial institutions starting from a database of transactions in the Colombian large-value payment system. The methodology learns a feedforward artificial neural network parameterization to represent the payment patterns through 113 features corresponding to financial institutions' contribution to payments, funding habits, payments timing, payments concentration, centrality in the payments network, and systemic impact due to failure to pay. The representation is then used to test the coherence of out-of-sample payment patterns of the same institution to its characteristic patterns. The performance is remarkable, with an out-of-sample classification error around three percent. The performance is robust to reductions in the number of features by unsupervised feature selection. Also, we test that network centrality and systemic impact features contribute to enhancing the performance of the methodology definitively. For financial authorities, this is the first step towards the automated detection of individual financial institutions' anomalous behavior in payment systems.