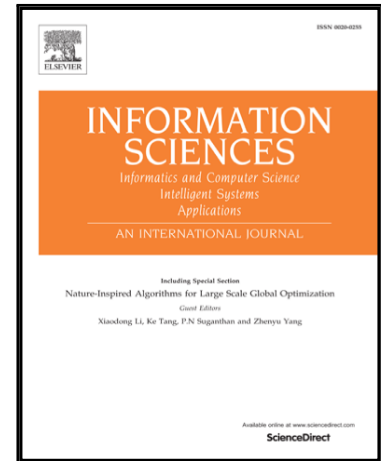


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## Using contextualized activity-level duration to discover irregular process instances in business operations

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### ABSTRACT

Effective time management is one of the most crucial characteristics of a successful business. For most businesses, time management is an area that has much scope for further improvement. Irregularities in the execution duration of business processes impede corporate agility and can incur severe consequences, such as project failures and financial losses. Efficient managers must constantly identify potential irregularities in process durations to anticipate and avoid process glitches. This paper proposed a k-nearest neighbor method for systematically detecting irregular process instances in a business using a comprehensive set of activity-level durations, namely execution, transmission, queue, and procrastination durations. Moreover, because agents, customers, and other variables influence the progress of processes, contextual information was presented using fuzzy values. The values and corresponding membership functions were used to adjust the durations of each activity. This proposed method was applied to the system logs of a medium-sized logistics company to identify irregularities. Experts confirmed that 81% of the identified irregular instances were abnormal.

*Keywords:* Activity-level duration; Fuzzy set; Process instances; Process irregularities; Workflow

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