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Business process models abstract complex business processes by representing them as graphical models. Their layout, as determined by the modeler, may have an effect when these models are used. However, this effect is currently not fully understood. In order to systematically study this effect, a basic set of measurable key visual features is proposed, depicting the layout properties that are meaningful to the human user. The aim of this research is thus twofold: first, to empirically identify key visual features of business process models which are perceived as meaningful to the user and second, to show how such features can be quantified into computational metrics, which are applicable to business process models. We focus on one particular feature, consistency of flow direction, and show the challenges that arise when transforming it into a precise metric. We propose three different metrics addressing these challenges, each following a different view of flow consistency. We then report the results of an empirical evaluation, which indicates which metric is more effective in predicting the human perception of this feature. Moreover, two other automatic evaluations describing the performance and the computational capabilities of our metrics are reported as well.

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