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A study on performance assessment of essential clustering algorithms for the interactive visual analysis toolkit InVEx

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Interactive visual analysis tools bring the ability of the real-time discovery of knowledge in large and complex datasets using visual analytics. It involves multiple iterations of data processing using various data handling approaches and the efficiency of the whole chain of the analysis process depends on the performance of chosen techniques and related implementations, as well as the quality of applied methods. Stages, where data processing includes intellectual handling (i.e., data mining and machine learning), which are the most resource-intensive, require a distinct attention for evaluation of different approaches. Clustering is one of such machine learning techniques that is commonly used to discover groups of data objects for further analysis. This work is focused on evaluation of clustering algorithms within the interactive visual analysis toolkit InVEx (Interactive Visual Explorer).

InVEx represents a visual analytics approach aimed at cluster analysis and in-depth study of implicit correlations between multidimensional data objects. It is originally designed to enhance the analysis of computing metadata of the ATLAS experiment at the LHC for operational needs, but it also provides the same capabilities for other domains to analyze large amounts of multidimensional data. The experiments and evaluation processes are carried out using operational data from the supercomputer at the Lomonosov Moscow State University. These processes include benchmark tests to assess the relative performance between chosen clustering algorithms and corresponding metrics to assess the quality of produced clusters. Obtained results will be used as guidelines in assisting users in a process of visual analysis using InVEx.

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