Clustering Algorithms for Parallel Car-Crash Simulation Analysis

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Abstract: Buckling and certain contact situations cause scattering results of numerical crash simulation: For a BMW model differences between the position of a node in two simulation runs of up to 10 cm were observed, just as a result of round-off differences in the case of parallel computing. An engineer has to measure this scatter, to check whether important parts of the car show such indeterministic behavior and to find the origins. The tool DIFFCRASH compares simulation results and uses data mining technology to cluster those nodes of the car model, which show similar scatter among the simulation runs. For the BMW model the indeterministic behavior could be traced back to a certain part of the motor carrier and was removed by a redesign. In this paper we present the clustering algorithm and illustrate its usage in car crash simulation analysis.

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