

# Integration of Advanced third-party Data Analysis Approaches into SDM Systems

Leichsenring, F.<sup>1</sup>, Borsotto, D.<sup>2</sup>, Kracker, D.<sup>3</sup>, Abdelhady, N.<sup>2</sup>, Thiele, M.<sup>1</sup>, Liebscher, M.<sup>1</sup>

<sup>1</sup>SCALE GmbH

<sup>2</sup>SIDACT GmbH

<sup>3</sup>Porsche AG

Using a simulation data management system leads to a complete record of all simulations carried out, over a defined period of time. This record set usually includes all simulation metadata (such as load case, solver version, and components) and the simulation output (raw output and derived secondary results, such as key-results). Having all this data centrally organized and stored in a uniform structure allows further data analysis across multiple simulations. These data analysis solutions can help to extract insights from the data stored in the SDM system, identify patterns and trends, and make data-driven decisions.

In SDM systems, fundamental data analysis and visualization solutions are often integrated or could be integrated relatively quickly, but moderate to complex approaches are more challenging to integrate, which is typically different from the core business of an SDM system vendor.

Some popular third-party options include business intelligence tools and services (e. g. AWS Quicksight), data visualization software (e.g., Dash), and machine learning algorithms (Femalyst, SimExplorer, AWS Sagemaker). Ultimately, the choice of third-party solutions will depend on the specific needs and goals of the business organization using the SDM system.

This presentation will demonstrate the technical approach of SCALE.result - the Add-on concept - for integrating third-party solutions into a SDM system by utilizing Femalyst from SIDACT as exemplary show case.

The tool Femalyst aims to identify anomalies in structural behaviour (outlier or so-called events) and indicate in which area of the structure the simulation result deviates substantially from the previous results. The analysis results of events are provided with a score value, allowing the user to assess the degree of deviation. Each detected event is further visualized by preview animations and 3D sub-models, which allows the user to instantly evaluate the outlying simulation.

The presented Add-on approach enables SIDACT to integrate their third-party tool by extending the SDM System with proprietary frontend and backend parts using SCALE.result and access the simulations within the platform.

In the contribution the integration of the outlier evaluation in a design workflow is highlighted at a structural model provided by the Porsche AG. Based on a rigid wall loadcase from USNCAP car safety program and a DoE of metal sheet thickness, the information gain due to the evaluation of part based outlier detection will be presented in contrast to global performance metrics, such as injury criteria or structural objective quantities.