Graduation Project – Visual Analytics

GRADUATION PROPOSAL

About SynerScope

SynerScope pioneers the next class of fast and flexible sense-making technology for the Hadoop era. SynerScope has extensive experience with data-driven visualization, analysis and also practical experience in the insurance, critical infrastructure, and energy branch. SynerScope combines scientific research results from the TU/e visualization group with advanced knowledge of data science, GPUs, and big data technology. This enables our solutions to handle a large variety of data formats both structured and unstructured (numbers, text, geo-spatial, images) in one unified framework that also links easily with the IT infrastructure already present.

The data sources (structured and unstructured data) are indexed and cross correlated using SynerScope Ixiwa. This data pre-processing is executed continuously creating a single data quality and value oriented view. The available information is stored in a self-service analytical data lake. The information in the data lake is indexed and cross referenced to allow for rapid search, collaboration, similarity, linking and fast retrieval. Next, the data is analyzed in SynerScope Iximeer; the visual user interface for understanding this rich contextual structured and unstructured data in a single-pane-of-glass. The combination of human domain knowledge, interaction, and visualization produces insights and enables real-time analysis.

Predictive Analytics

The SynerScope tooling is generic, but it is used in various specific domains, e.g., insurance / finance, critical infrastructure, health, and, cybersecurity. These domains generally rely on big datasets that contain complex correlations. Typically, these complex correlations are not discovered with just visualization; visualization has its limits, for example due to limited screen space. Likewise, for automated methods, such as machine learning models, we need to know upfront what models to build or what specific questions to ask. Also, data is often heterogeneous, combining many data sources (numbers, text, images) that all need a specific targeted analysis method, while true insight comes from combining these sources. The combined data provides different perspectives and creates a context for the items of interest. To fully support sense-making we need an exploratory approach...
that enables users to freely ask questions combined with a system that keeps up with the speed of thinking.

We would like to extend the SynerScope solution (Ixiwa, Iximeer or both) to incorporate interactive automated methods (such as machine learning, predictive analytics, and, deep learning) to better close the feedback loop. For example, on the most basic level the results of the automated method can be visually explored in Iximeer. Furthermore, it can be combined with external data of any format: structured such as temporal, network, and geo-spatial, or unstructured data such as text (documents) and images. With this approach not only the results of the machine learning techniques can be explored but they are also easier to interpret because they are enriched with context, revealing complex dependencies and interconnections. Taken even further this might allow users to interactively explore the parameters of the constructed model or even to compare different models to refine and improve the model performance.

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