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A Big Data-inspired Spatio-temporal Story Model for Forensic Evidence Validation

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Digital Forensic Evidences (DFEs) are more than digitised computer data chunks. They may contain complicated causality relationships within specific timelines and feature domains. Recent developments in forensic science study have shown that DFEs should be treated as part of the concept of “Big Data” formed by the explosively increasing electronic data generated by Internet, social networks, consumer electronics, and public surveillance systems.

Proposed Solutions
This project aims at developing a unified DFE management platform - STV - driven by the Big Data concept. Within a STV model, not only the vital evidences can be stored and tested piece-by-piece, but the very way for establishing their causality can be visualised and examined. The VIV and SFS&CTC research groups have been working closely together in developing methodology and techniques for the STV Story-Model through highlighting DFEs’ spatial feature distribution (for the evaluation of evidence validity, correlation, and interpretation) and establishing the temporal sequences of legal theories (“Stories”) in a dynamic and interactive 3D environment.

Supporting Technologies and Core Theories
- Feature-based Machine Learning, Big Data and Web Crawling;
- Content-based Image Retrieval and Category Theory;
- Augmented Reality and Interactive Visualisation;
- Argumentation and Story Model Theories, etc.

The envisaged contribution from such a platform is that it enables not just the DFE nodes but their spatial-temporal “glue” or “anti-glue” being examined in a computerised and augmented 3D environment. The visual and interactive manner for carrying out such a truth-finding journey will see the story-model construction operations becoming a transparent and validated process.