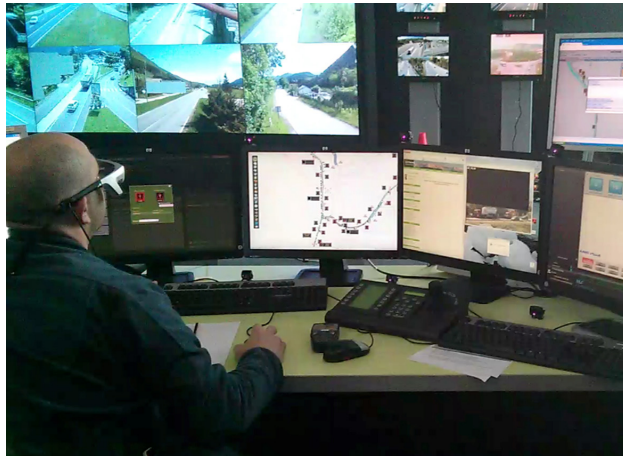# SPEEDD Project

The effectiveness of the SPEEDD solution is being evaluated in:

• **Proactive traffic management**, aiming to forecast traffic congestions and, as a result, act in order to attenuate them.

• **Proactive credit card fraud management**, aiming to significantly improve fraud detection accuracy, without compromising detection efficiency, and forecast various types of fraudulent activity, which are constantly evolving, in order to mitigate the effects.

The Consortium

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SPEEDD

Scalable ProactivE Event-Driven Decision-making

February 2014 - January 2017

http://speedd-project.eu

Aims

SPEEDD is developing a suite of systems that are capable of processing extremely large and noisy event streams and historical data, in order to recognise and forecast opportunities and threats, make decisions to capitalise on the opportunities and mitigate the threats. Through user-interaction, the systems will help human operators to facilitate correct decision execution.

The SPEEDD methodology for proactive event-based decision-making comprises the following steps:

1. Big Data is continuously acquired from various types of sensor and fused in order to recognise, in real-time, events of special significance. To allow for sub-second recognition, SPEEDD minimises communication volume by moving as little data as possible from one place to another.

2. The events recognised are correlated with historical information to forecast problems and opportunities that may take place in the near future.

3. The forecast events along with the recognised events are leveraged for real-time operational decision-making.

4. Visual analytics tools prioritise and explain possible proactive actions, enabling human operators to reach and execute the correct decision.

Achievements
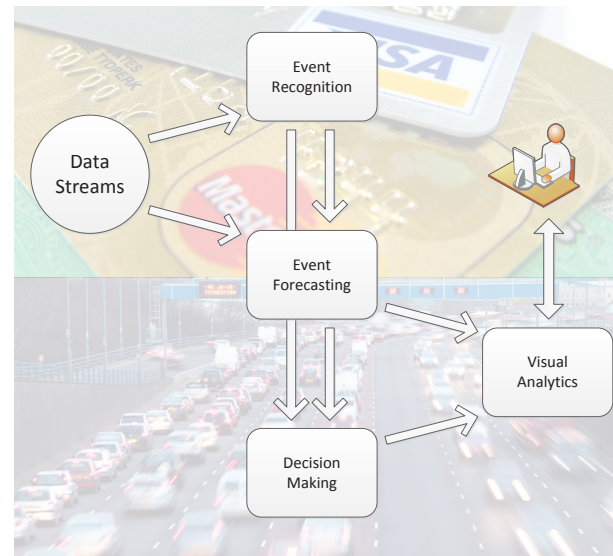
In the first year of the project, the first prototype of the system was developed, incorporating the following innovations:

Advanced event processing technology

- A tool for incremental learning of event patterns.

- Weight learning methods for estimating the confidence values of event patterns.

- Extended version of the IBM Proactive Technology Online (Proton) CEP engine to deal with uncertainty.

Proactive event-driven decision-making

- New theoretical results about the optimality of traffic flow modeling were obtained.

- Implementation of a fully distributed decision-making algorithm.

- Adapted stochastic programming methods for the identification of fraudulent credit card transactions.

- Computationally efficient randomized optimization algorithms.

- A connection between randomized optimization methods and machine learning that allowing us to develop new randomized decision-making algorithms.

Visual analytics for real-time interaction with Big Data and proactive decision-support

- User Interfaces addressing detailed user requirements, and based on a theory of work and decision making.

- Systems view of decision-making in the use cases, using Cognitive Work Analysis.

Highly scalable data monitoring

- Developed novel computation-scalable and communication-scalable algorithms to support highly scalable proactive event-driven decision making.

http://speedd-project.eu