Project Results

ViCoMo
Putting the context in the picture

The ITEA 2 ViCoMo (Visual Context Modelling) project set out to find the context of events captured by cameras or image sensors, and model the context so as to establish reliable reasoning about an event. The technology that has been developed contributes to improving healthcare, security and safety, and the public infrastructure in society in general. The project also supports the development of emerging industries in surveillance, healthcare and data mining, concerning data storage, efficient retrieval and usage.

Electronic appliances, devices and equipment are becoming increasingly interactive and intelligent in respect of the environment or conditions in which they have to operate. Such systems and appliances can relieve humans from onerous work and improve efficiency, security and safety in areas like healthcare, lifestyle and surveillance as well as in production and transport system monitoring. Because of the enhanced interaction with users and the environment, the complexity of such systems is increasing rapidly. Current intelligent state-of-the-art systems are just not able to match human decision-making as the context of information on which the adaptive behaviour is based is completely ignored.

GOALS AND STANDARDS
The ViCoMo consortium of 29 companies from 5 countries embraced relevant experience in the domains related to the development of the ViCoMo concepts and services. The rich mix of large high-tech companies, smaller innovative SMEs and relevant research groups and departments from well-known universities and research institutes set out to exploit context modelling in several domains: observation for surveillance and team training, 3D modelling of the real-world environment, observation of human behaviour for system control, and logistics control for traffic and transportation.

While the ViCoMo project did not develop any new standards as such, it did contribute, for instance, to helping to define new specifications for the ISPS (International Ship and Port facility Security) code that aims to improve security conditions in maritime sector. In addition, ViCoMo is a potential contributor to the standards in those sectors in which it is used, such as a new standard to describe behaviour patterns of humans as metadata.

DEMONSTRATING INNOVATION
The ViCoMo work packages produced a number of innovations. The three main innovations – multi-camera and dynamic analysis, 3D environment modelling and the successful integration of new marketing concepts and emerging technologies – were demonstrated in two scenarios, a port terminal and a shopping mall. In the port terminal, the context modelling techniques
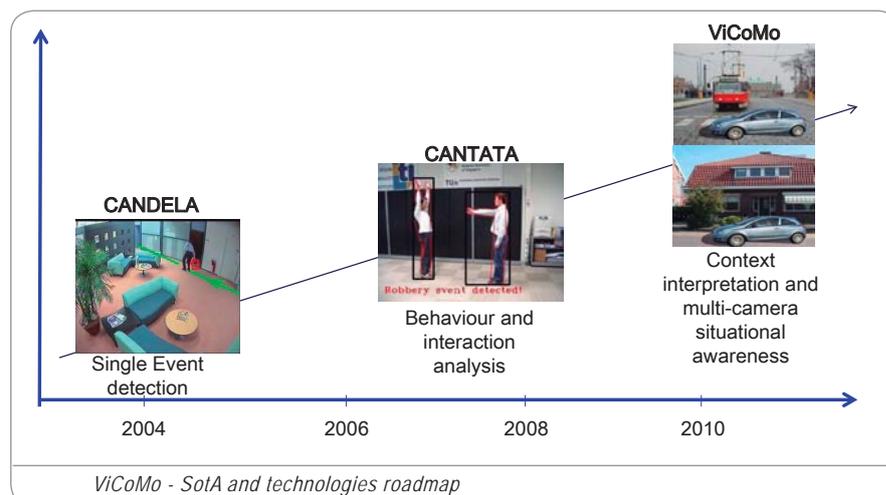
ViCoMo - SotA and technologies roadmap

Project Results

improved the monitoring and tracking of cargo throughout the harbour while visualisation of the 3D modelling improved the logistic operations and control. In the shopping mall, surveillance concerned the behaviour of individuals and groups. In addition, marketing objectives are enhanced by automatically collecting shopping statistics, adaptive advertising and an interactive kiosk. The two demonstrators share a commonality in terms of the common ViCoMo system architecture, the technology used for multi-camera analysis, the similarity of the concepts for modelling the context and the surveillance applications.

EXPLOITABLE RESULTS FOR A BUSINESS BOOST
A brief review of the results achieved with the projects reveals the pay-off attributable to the rich mix of project partners. In terms of observation for surveillance, 3D information and context enabled more faithful reasoning to be achieved for a high-level of semantics while situational awareness was enhanced by combining all camera views into a single visual presentation. In respect of 3D modelling of the real-world environment, the

key achievements here were full automatic infrastructure recognition in geo-referenced images along with autonomous simulation from video inputs. As for observation of human behaviour for system control, this was given a boost through 3D visualisation with augmented reality and the interpretation of human behaviour through the use of 3D modelling of context. Finally, logistics control for traffic and transportation benefited from fully automatic logistics tracking.

By actively stimulating research and cooperation in several of the fastest growing businesses of the coming decennia, theITEA 2 ViCoMo project contributes in a positive way to employment. A broad spectrum of applications and services can be built using the ViCoMo knowledge, models and tools. Not only does the project enable existing companies to gain a new competitive edge, it also provides an excellent springboard for companies aiming to develop new business lines based on the products, applications and services developed and demonstrated in ViCoMo. Finally, it also generates opportunities for starting up new businesses, known for their high job creation potential.

Major project outcomes

DISSEMINATION
- 3 book contributions
- 72 conference papers
- 21 journals
- 11 Expositions
- A ViCoMo seminar on Observation and security

EXPLOITATION (SO FAR)
- 5 new products
- 2 new services
- 3 new systems

STANDARDISATION
- Exploration of areas for standarisation:
  - Philips is contributing to MPEG
  - Acciona is contributing to the ISPS code
- In addition, the following standards are useful:
  - Description of metadata
  - ViPER de-facto standard as used in CANTATA
  - The ONVIF initiative Axis, Bosch and Sony
  - A software plug-in framework
  - ITEA Robocop (as part of the MPEG standard)
  - supervisory control and data acquisition (SCADA)
  - Validation and certification
  - The validation methodology as developed in CANTATA
  - Lids as pursued in the UK (http://www.ilids.co.uk/)
  - TRECVID by the National Institute of Standards and Technology

SPIN-OFF
- A spin-off company from Eindhoven University on Technology on 3-D reconstruction is being pursued.

ViCoMo
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