MAP BASED SENSOR FUSION FOR SECURITY AND SURVEILLANCE SYSTEMS

STATE OF THE ART

Video surveillance produces a large amount of image data that often cannot be monitored 24/7 by human operators. A robust automatic solution for the real-time detection of security related events in large installations with an acceptable false alarm rate is not yet on the market.

Complementary sensors, such as thermal infrared or acoustic detectors, are becoming available for a reasonable price and more and more popular in "multi-sensor" installations in the security surveillance context.

By fusing data from different sensor modalities sensitivity and specificity of event detection can be significantly improved.

SOLUTION

Our highly efficient and automatized system for sensor fusion for situational awareness in security applications allows to

- **integrate** different, complementary sensor technologies, from a simple motion detector to video cameras, thermal cameras, acoustic- and microwave radar sensors and their related detection software(s) **into one surveillance solution**
- represent all sensor detection and alarm notifications for a surveillance area in **a common map and user interface**, based on a common information exchange protocol
- implement a **rule engine for the fusion of sensory information** that is able to trigger alarms based on coinciding detections (time, region, etc.) to further support the operator.
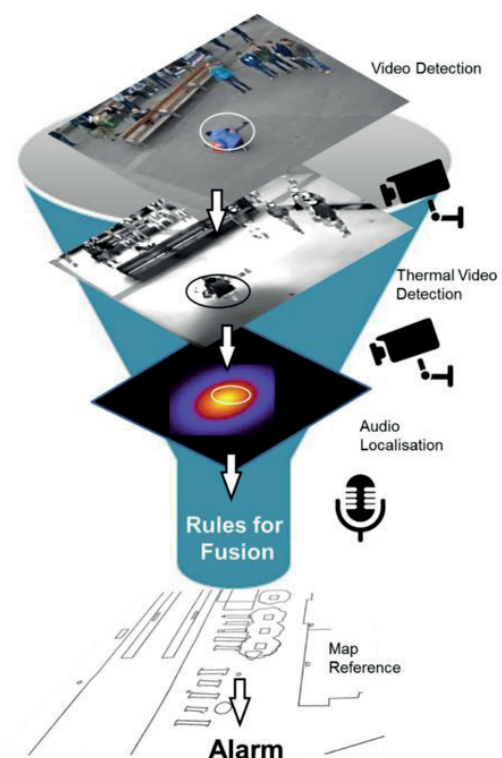
BENEFITS

- Possibility to **integrate any third party sensor type** in a common, automated detection framework: Open for legacy installations and equipment
- **Unified representation of information** even in large installations of different sensor technologies
- Flexible configuration of fusion- and alarming rules
- Reduction of false alarm rates
- **Improved situational awareness** for video surveillance operators due to common map and unified data representation
- Reduction of the number of operators needed for monitoring large surveillance installations

SPECIFICATION OF THE FUSION ENGINE

- Information representation is based on the **standardized common alerting protocol (CAP)** allowing for a unified representation of safety and security relevant events
- Event properties contain geo-information and the description of the affected area, as well as type, urgency, occurrence and validity times, source and probability of an event
- Fusion of the events is done in **geo-referenced "heat maps"** of the surveillance area (see figure)
- Rules can be defined that trigger alarms by combining the information in the maps based on event time or location (or others)

OUR OFFER

- Custom development of map based rule engine (rule features, conditions, etc.)
- **Integration of packaged sensor solutions**, video- or acoustic detection systems into the rule engine via a common protocol
- Development of a **graphical user interface** for locating and configuring sensors and for the definition of rules
- Integration of the rule engine into the operator user interface (display of alarms, events, status of the rule engine in a situation map)
- Validation in **pilot installations**

Green: Presence Map // Blue: Sound Intensity Map // Red: Alarm

//01 Cameras and microphones at public places
//02 Video streams of surveillance area
//03 Data fusion in Heat Maps

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