

**AVSS 2011 demo session:
Smart Resource-Aware Multi-Sensor Network**

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1. The SRSnet Project

The Interreg IV project "Smart Resource-Aware Multi-Sensor Network (SRSnet)"¹ is coordinated, managed and disseminated by Lakeside Labs GmbH. The project is planned for three years and focuses on the design of a smart resource-aware multi-sensor network capable of autonomously detecting and localizing various events such as screams animal noise, tracks of persons and more complex human behaviours. The project's research areas include (i) collaborative audio and video analysis, (ii) complex event detection and (iii) network reconfiguration. The SRSnet will be demonstrated in a biologically sensitive environmental, namely in the Nationalpark Hohe Tauern.

In this project the Lakeside Labs GmbH (lead partner) is working with Alpen-Adria-Universität Klagenfurt (Pervasive Computing Group and Transportation Informatics Group) as sub-partners. The research of the "Pervasive Computing Group" focuses on the development of the sensor node platforms and the network reconfiguration. The Transportation Informatics Group is work package leader for the complex event detection and the case studies. The two Italian partners in the project are Eye-Tech and infoFACTORY. Eye-Tech focuses on audio and video data processing for the detection, classification and tracking of relevant targets within the monitored environment. infoFACTORY works on the design and development of a specific digital archive storing multimedia files acquired by the sensors. The archive will contain both audio/video files and their semantic description using a specific ontological knowledge representation. Furthermore, infoFACTORY will analyse semantic retrieval technologies in order to develop a system for the semantic retrieval of events.

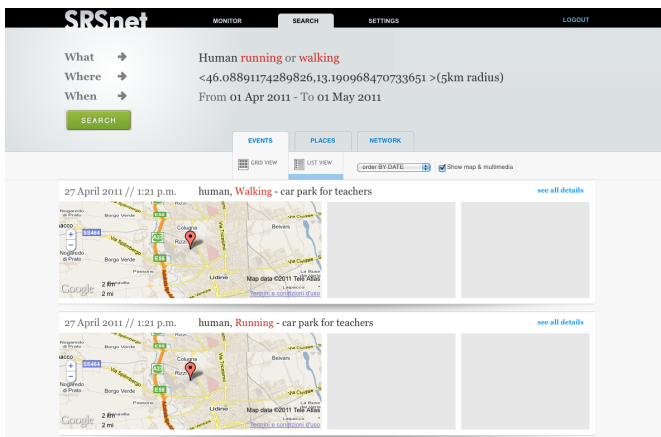
¹<http://SRSnet.lakeside-labs.com>

SRSnet is a multimedia sensor network consisting of smart cameras and audio sensors. The sensors are connected via a low-power, wireless channel. The sensor nodes process audio and video data onboard. The audio/video processing component extracts simple events from the sensor information. This component is also responsible for operating PTZ enabled cameras. This is done by an algorithm that maximizes the coverage for a set of PTZ cameras using an expectation maximization approach along with activity maps created from the detected events.

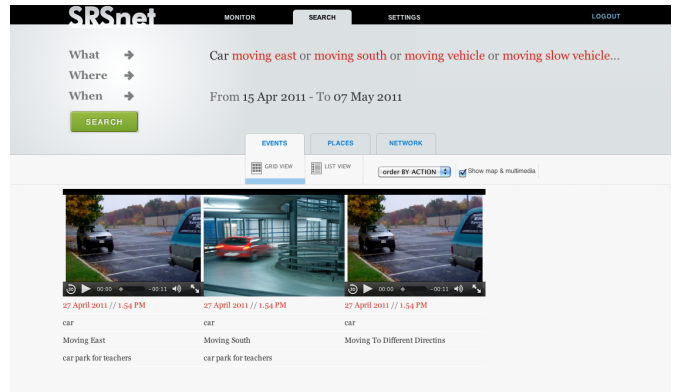
A complex event detection engine collects simple events from multiple nodes and fuses the simple events to complex events. This fusion takes the spatial and temporal context of the simple events into account. This component also determines if detected complex and simple events are relevant to the users of the system.

Relevant events detected by the network are stored in an online multimedia data warehouse. This data warehouse is designed to archive detected events as well as relevant multimedia data. It also provides the key interface between the SRSnet components and the intended users. Using this interface, various classes of users may configure the system and query the warehouse for interesting events.

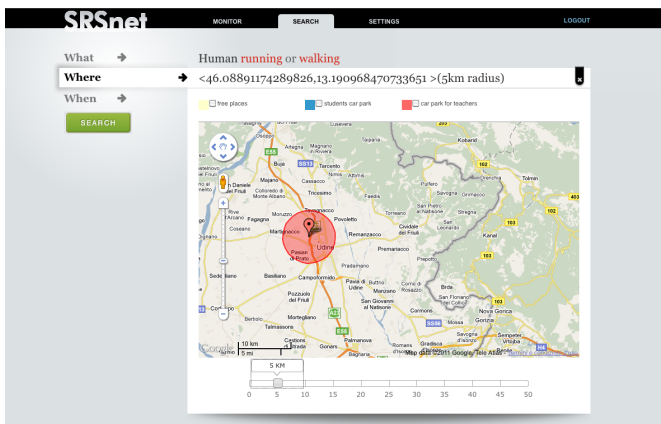
SRSnet aims at providing high surveillance quality at minimal energy consumption to prolong the network lifetime. Thus, communication and processing must be done in an energy saving manner. This includes shutting off nodes that are not needed as well as selection of optimal operation modes of sensors and processing instances. A specialized network reconfiguration component takes care of finding optimal task allocations and sensor configurations at runtime.



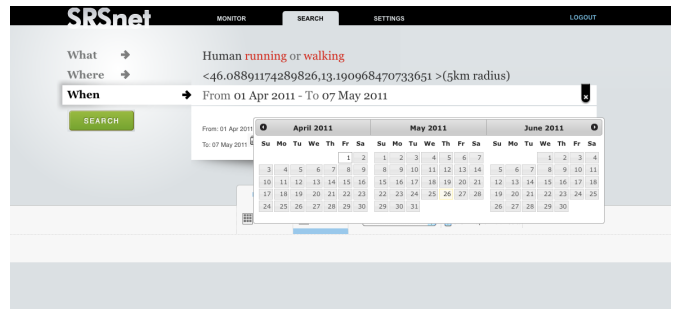
(a) Events matching a certain query



(b) Multimedia entries matching a certain query



(c) Searching for events in a certain area



(d) Searching for events in a time span

Figure 1. Screenshots of the data warehouse user interface.

2. Demonstration

At the "Industrial Surveillance Day" we plan to demonstrate the current state of this project. In this demonstration we will focus on user interface and the multimedia data warehouse which stores detected simple and complex events as well as multimedia data such as images and short audio/video sequences. We will show real data generated during a prototype deployment of our network in the Nationalpark Hohe Tauern in Austria. From the data that is gathered and processed within the sensor network, SRSnet filters events that are relevant to users and inserts them into the data warehouse via a web service interface. Via a convenient interface, users can query for specific events in the data warehouse. Figure 1 shows screenshots of our current user interface.

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