Project Information

CELTIC
Telecommunication Solutions

HuSIMS - Human Situation Monitoring System

The HuSIMS project aims to improve security in densely populated places by providing a dense mesh of intelligent visual sensors that is sensitive to irregular behaviour patterns in the monitored area. Detection of anomalous events will trigger the appropriate emergency action and provide visual notification - without compromising personal privacy.

Main focus

The HuSIMS project aims to develop a system that can improve safety and security in city centres, train stations, office buildings etc. This will be achieved by improving the effectiveness and timeliness of response to irregular situations. Respect for personal privacy is one of our key considerations.
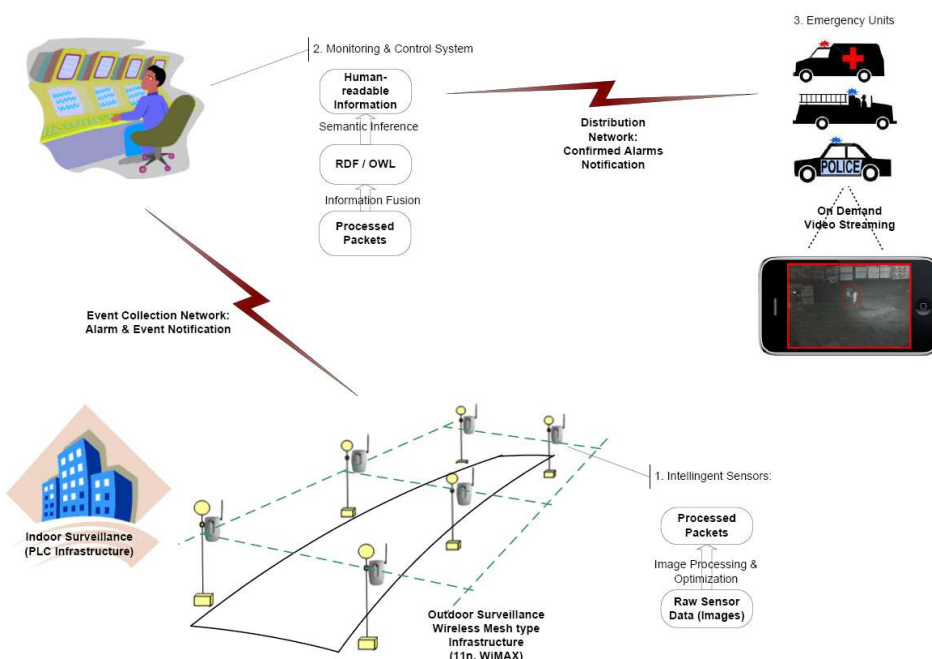
Intelligent visual sensors will be deployed in a city all along the streets. They are small and unobtrusive, and communicate wirelessly with the Monitoring and Control System (MCS) located somewhere in the city. The low optical resolution does not allow recognizing faces or people, but does allow automatic determination of scene parameters. Using advanced analysis algorithms, the MCS analyzes these parameters and makes a decision on whether that activity in the street is normal - or the recorded activity merits a second look from a controller in the control room or a security officer on the scene.

Approach

Development of HuSIMS proceeds in three main directions.

First, developing **new intelligent sensors**. These will include camera, processor (running thin, intelligent algorithms that analyze continuously a complex visual scene and extract relevant semantic information) and communication interface. After a short learning period, each sensor will autonomously characterize the scene, and send a compact digital description to the MCS analysis engine.

HuSIMS

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Closure date: 13 December 2012

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Alvarion, Spain

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C2TECH, Turkey

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Project Website

www.celtic-initiative.org/projects/husims

Second, **the network** components that will be used as infrastructure for building a surveillance network will be developed.

Two different networks will be designed and deployed:

♦ A data collection network that will connect the sensors to the MCS and will include mesh type components, for indoor and outdoor deployment, and will be based on WiMAX and on PLC/HomePlug technologies.

♦ The alarm distribution network that will connect the MCS with the mobile users who will be on charge of providing the first and quick intervention.

Third, **the monitoring and control system (MCS)** that will handle large amounts of data received from numerous intelligent sensors. The MCS will analyze scene descriptors provided by the sensors and will provide usable alert information in real-time for the system users - both to the control room and to mobile users.

Finally, the individual software and platform components developed will be integrated, tested and validated, both in laboratory and in a real-life field test pilot installation.

Main results

This following is the list of the main results that are expected:

♦ A platform that demonstrates how HuSIMS helps improve se-

curity in densely populated places.

♦ Intelligent sensors that can analyze complex visual scenes and extract significant scene descriptors.

♦ Statistical analysis engine that can autonomously distinguish between normal and abnormal behaviour patterns

♦ Middleware API and theoretical model for the semantic characterization of scene analyzer outputs in "ordinary human language"

♦ Predictive analytics algorithm for vectors and for almost real time processing.

♦ Hundreds of typical normal behaviour patterns, which will be data base for other projects as well.

♦ Indoor control room application that allows end users to control and monitor the system.

♦ Mesh wireless networks based on WiMAX with self-configuration and self-healing features.

♦ Support for enhanced transport of video streaming in the Mobile WiMAX equipment.

♦ Distribution of the alarm' raw video and attribute data to authorized forces, according their location and availabilities.

Impact

Our main claim is that there is a great need for improvement of safety and security in public places, that is not covered by current technologies. Once HuSIMS proves to be effective and affordable, we believe it will find wide use internationally as well as a significant business in the market of video surveillance, a market that is growing annually at a rate of 15% in spite of the global economic crisis.

HuSIMS technology will help European companies move a step beyond current technology in the physical security market. Companies selling products in this market as well as companies in the IT market will be able to market and deploy similar systems wherever there is a public need for improved safety and security.

We will communicate with PSIA (Physical Security Interoperability Alliance) and determine whether we can suggest new standards for security of public places.

About Celtic

Celtic is a European research and development programme, designed to strengthen Europe's competitiveness in telecommunications through short and medium term collaborative R&D projects. Celtic is currently the only European R&D programme fully dedicated to end-to-end telecommunication solutions.

Timeframe: 8 years, from 2004 to 2011

Clusterbudget: in the range of 1 billion euro, shared between governments and private participants

Participants: small, medium and large companies from telecommunications industry, universities, research institutes, and local authorities from all 35 Eureka countries.

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