



P-REACT

Petty cRiminality diminution through sEarch and Analysis
in multi-source video Capturing and archiving plaTform

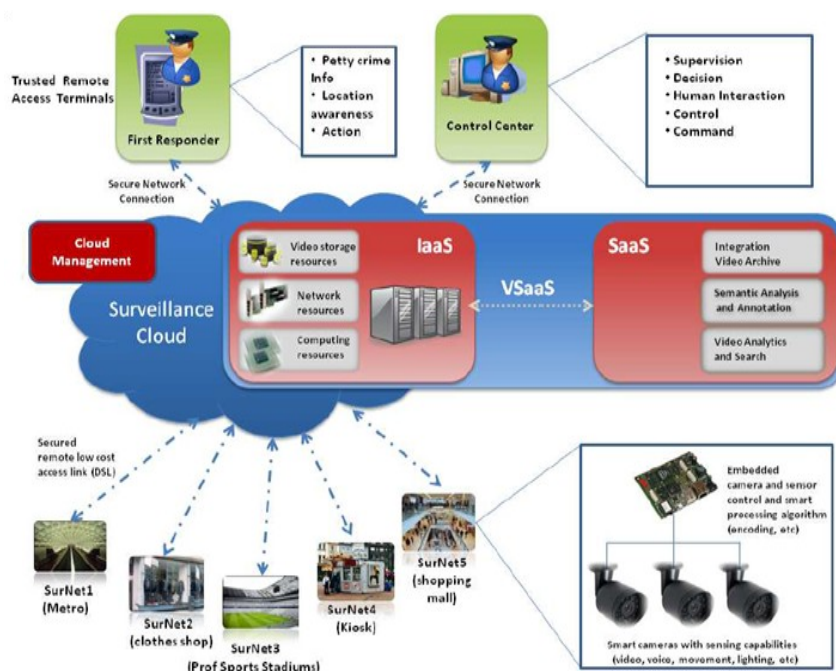
P-REACT Scope

Petty Crimes (also known as volume crimes) take place on a daily basis affecting citizens, local communities, business owners and infrastructure owners. Petty Crime incidents such as theft, criminal damage and anti-social behaviour are on the rise in Europe due to the economic crisis, in turn these incidents adversely impact the local socioeconomic environment. The P-REACT solution will focus on connecting citizens, business owners, infrastructure owners and security, and law enforcement personnel so that Petty Crime incidents can be effectively dealt with

and prevented in the future.

The P-REACT project will design and develop a low cost surveillance platform that will detect Petty Crime incidents. The solution will encompass intelligent video and audio sensors to detect Petty Crime incidents, a cloud based monitoring, alert detection and storage platform.

Concept Design



Following the successful work undertaken in the first period of the project life, **the second semester saw the partners working fruitfully**, significant progress was made especially with regard to the development of software and hardware components of the system.

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Project details

Start date: 2014-04-01
End date: 2016-03-31
Duration: 24 Months
Reference: GA n° 607881
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Call: FP7-SEC-2013

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The End-Users Advisory Board

The P-REACT project is focused on impacts of Petty Crime on citizens, business owners, infrastructure owners and security and law enforcement personnel. The research will seek to develop a solution based around the needs and concerns of these key identified users in an urban environment.

To enrich the functionality of the system, P-REACT has built End-

***“P-REACT
is an end-user
driven solution”***

Users Advisory Board (EUAB), composed by potential end-users and Law Enforcement Agencies with the aim to provide feedback on the project key topics. The EUAB collaborates, as an advisor,

to any relevant activities during the project, evaluating relevance of decisions and results, guaranteeing the sustainability of the solution.

So far, the following organizations expressed their interest to serve as EUAB members:

End-Users



Hellenic Police
(Greece)



Cypriot Police
(Cyprus)



Udaltzaingoa/ Guardia Municipal
(Spain)



Cyta (Cyprus)



TRAINOSE S.A
(Greece)



RAILWAY PROCUREMENT AGENCY (Ireland)



ICTS HELLAS
(Greece)



TPER SPA
(Italy)



ISS SECURITY S.A.
(Greece)



Municipality of Bologna
(Italy)

P-REACT



PYRSOS SECURITY
S.A. (Greece)

Great progress on P-REACT Solution development

Work package 2, focussed on System requirements, has been successfully completed. As a result of extensive interaction with Stakeholders during workshops and other events, the overall system requirements, specifications, and architecture design have been clearly defined.

Furthermore, work on the proposed system components is well underway. Both the cloud infrastructure and the embedded platform have been designed with a first version developed and tested. The Video Content Management System (VCMS) has been released, and the development of audio and video analytics (including depth sensor analytic) is underway.

Testing to check reliability of data flow and components, and suitability of basic audio and video analytics has been undertaken. As a result, a large proportion of component versions are now available.

Results achieved include an initial demonstrator of an integrated end-to-end system covering event detection in the embedded video analytics components, packaging of video and detection data into a structured data format, transmission to the cloud side VCMS and indexing and storage of the received clip.



Compliance with data privacy and ethical aspects



The objective of P-REACT is to develop, demonstrate and validate a low cost technology solution capable of dealing with criminal activity, essentially based on a innovative video-surveillance system handling images and audio elements. Furthermore, trial demonstration will be deployed for demonstrating and validating its functionalities, that will involve people as volunteer participants.

Aspects related to privacy and ethics play therefore a primary role, and compliance must be satisfied with the related rules and regulations both at European and Member States levels. In any case, prior to the possible commercial exploitation of the platform, key privacy and ethical concerns identified along to its use by the potential end users must be addressed and clearly defined by each proprietor/owner.

Since the first step of the project, the P-REACT partners put a lot of effort to handle with this aspect, and a meticulous Privacy by Design approach has been undertaken.

A Ethical Advisory Board has been established including, apart from partners' representatives, three external experts in order to advise the project on issues of data privacy, potential for infringement

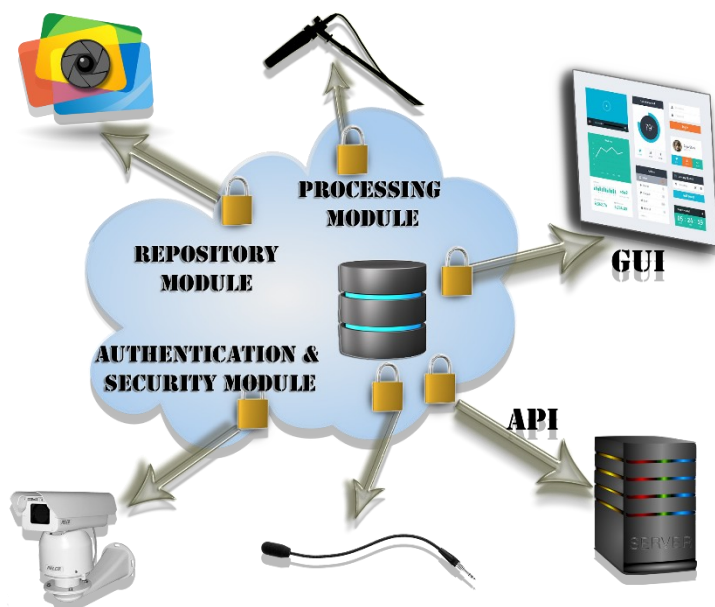
of human rights and misuse of technologies developed.

Then, prior to the commencement of P-REACT research activities, all respective Data Protection Agencies of the countries of the partners belonging to the P-REACT project have been notified (Greece, Italy, Cyprus, Spain, Ireland, UK). In addition to these notifications, before pilot testing phases of the P-REACT, the respective National Data Protection Authorities of the participant's countries that the pilots will take place will be notified of the projects pilot phases and more specifically on the personal data of the voluntary participants that will be utilized.

Furthermore, Ethical Approval letters have been acquired by each member of the consortium declaring that they approve the commencement of the research activities and certifying that they will fully comply with FP7 Data Protection and Privacy Ethical Guidelines and more specifically with ethical principles and relevant national, union and international legislation, including the Charter of Fundamental Rights of the European Union and the European Convention on Human Rights and its Supplementary Protocols.

The P-REACT partners are confident that the consistency of their project activity with the undertaken Privacy by Design approach, the findings of the assessment and the EAB recommendations will guarantee the necessary privacy and ethics safeguarding.

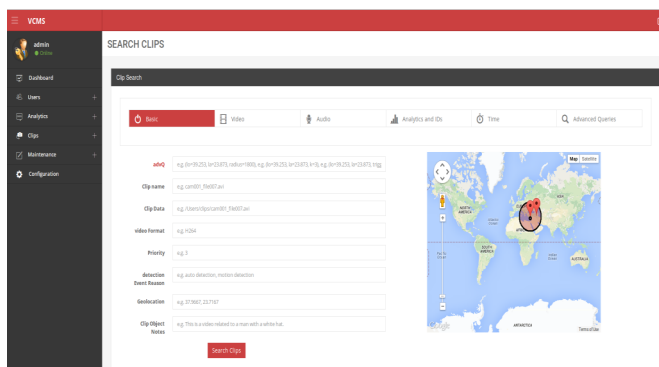
VCMS: The Video Content Management System



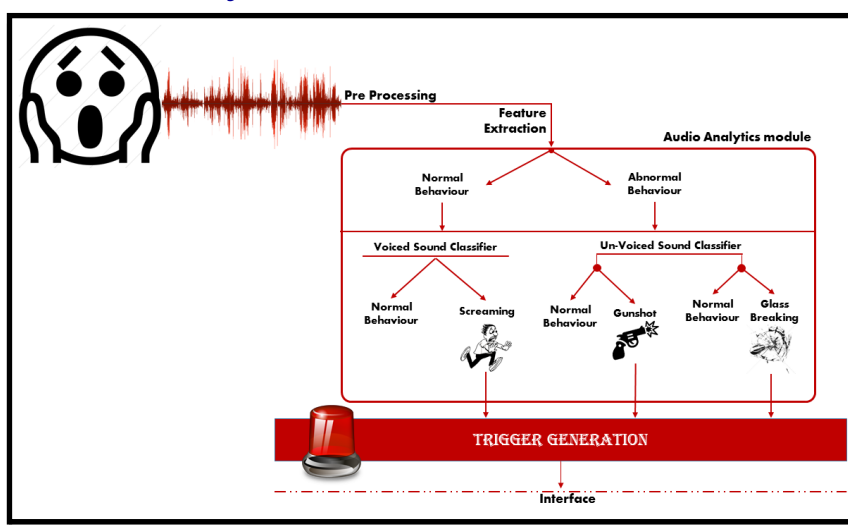
The need for the efficient handling and management of multimedia content (audio and video) makes inevitable the deployment of a CMS (Content Management System) module. The VCMS is a CMS solution, especially tailored to the needs of the P-REACT project. Indeed, the system supports accelerated searches for large amounts of data with the use of metadata, and its modular design allows with ease the integration of procedures/modules for targeted operations.

The VCMS is capable of efficiently handling heterogeneous data whilst ensuring data integrity with the use of digital signatures. Additionally, the system allows the specification of levels of user privileges flexible enough for controlling access to

specific features and mechanisms that ensure data integrity and reliability. For the needs of the project, the VCMS has been programmed to respond to application specific queries/searches by making use of repository contained information as well as external knowledge (i.e. retrieve the occurred alerts within a specified radius, retrieve (specific or not) alerts occurred within the past days/hours/minutes etc). The VCMS is easily integrated with other systems through its API or through its especially designed user friendly graphical interface.



Audio Analytics



Audio covers a 360-degree area, enabling a video surveillance system to extend its coverage beyond a camera's field of view and adds as much to our understanding of events as the captured images.

Audio analytics is performed through the means of classification which aims at identifying to which of a set of categories, a new uncategorised artefact belongs; on the basis of a training set of artefacts whose class/type is known. Within the implemented system, classification is executed on a low-

cost embedded system with limited processing and storage power. The implemented audio analytics module is capable of identifying key alarming events like screaming, glass breaking and gunshots. The detection of events is accomplished with the C5.0 classification algorithm the selection of this method was the result of a concrete experiment where several classification methods were called to categorise recorded audio as true or false alarms.

See more related projects

During the first year of the P-REACT project, a close collaboration with the [SmartPrevent Project](#) Coordinator has been established. Quarterly telcos have taken place in which both Project Coordinators updated on the status of their projects, and explored areas of collaboration. As a result of those conversations, a couple of tangible outcomes have been achieved.



Both SmartPrevent and P-REACT projects have collaborated in preparing a research projects parallel session that will take place during the [12th IEEE International Conference on Advanced Video and Signal based Surveillance \(AVSS\)](#), in Karlsruhe - Germany, on August 25th-28th, 2015.



Also, the P-REACT project has been in contact with the Project and Technical Coordinators of the [LASIE project](#). As a result of these contacts, the P-REACT project has been invited to participate in a research projects parallel session that will take place during the [6th International Conference on Imaging for Crime Detection and Prevention \(ICDP-15\)](#), in London, on July 16th, 2015.

Participation in the 8th International Conference on Ubiquitous Computing & Ambient Intelligence (UCAmI 2014)

The Video Soft Sensing (VSS) Workshop, organized within the 8th International Conference on Ubiquitous Computing & Ambient Intelligence (UCAmI 2014) held in Belfast (UK) last 2th-5th of December 2014, was focussed on real-time video analytics within tasks like: object or person detection and recognition, scenario recognition, event and activity recognition, anomaly detection and identity recognition and verification.

Vicomtech-IK4 took part in the workshop, presenting their latest developments on accelerated person detection and tracking in surveillance video footages. The technologies presented in the workshop will be adapted and applied in the P-REACT project for the detection of humans and suspicious human activities related to volume crime in city environment.

Participation in the International Conference on Innovation in Transport for Sustainable Cities and Regions “2014 Annual Polis Conference”

The aim of the P-REACT dissemination in the 2014 Annual POLIS Conference was the presentation and introduction of the project, its objectives, components, and expected results, in the POLIS network, focussed on sustainable mobility and innovation in transport for Cities and Regions. At the same time, the objective was the invitation at potentially interested subjects to join the End-Users Advisory Board of the project.

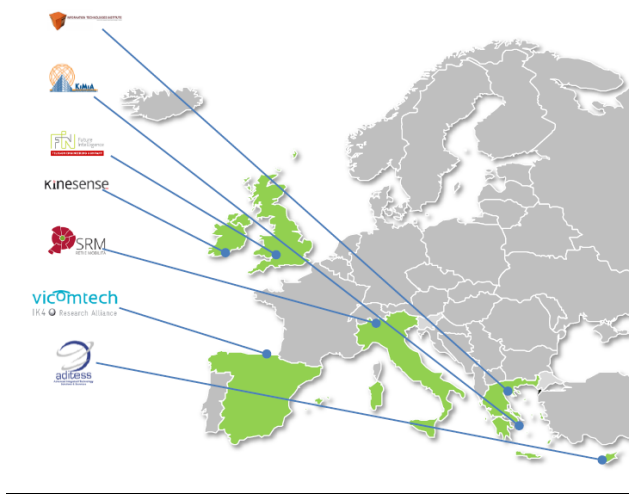
During its presentation, SRM described the P-REACT project, illustrating the project objectives and numbers (e.g., partners, life span, funds, deliverables, etc...), what criminal events might be considered as the petty crimes, the lack of current surveillance solutions, the concept design and the system architecture of the P-REACT system, and its main components.

The P-REACT project was disseminated also at the booth assigned to SRM to present the EU funded projects in which the agency is partner. General public and interested attendees were introduced to P-REACT, and invited to join the EUAB. And P-REACT dissemination materials were distributed, i.e., the project brochure and leaflet.



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Contacts

Do you want to know more about the P-REACT project?
Please visit the project website, or address to the following contacts.

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