

Project profile

PANORAMA

Ultra wide context aware imaging



Over recent years, the use of images and videos in real-life applications has increased exponentially. There has also been a shift from basic recording and playback towards highly-sophisticated image processing. This shift has happened in the complete image-processing chain, ranging from acquisition to quality-enhancing processing and reproduction. The ENIAC JU project PANORAMA will develop and implement applications in medical imaging, broadcasting systems, and security and surveillance, all of which face challenges in the real-time handling and processing of large quantities of image data.

Sub Programme

- Nanoelectronics for health and the ageing society
- Nanoelectronics for communications and digital lifestyles
- Nanoelectronics for safety and security

As a direct result of advances in computer vision, products involving highly-sophisticated image-analysis technology now have an established role in our daily lives. In many application domains there is a move from 'single-view' to 'multi-view' imaging. Examples include the introduction of three- and four-dimensional imaging in healthcare, high definition TV and beyond in broadcasting, and multiple connected surveillance cameras for monitoring a scene.

These applications all involve substantial growth in the generation of images and the real-time handling of both images and data. This raises the question of how to deal with this increase in complexity.

Demanding needs

Breakthrough technologies are needed to enable imaging applications to handle more and more demanding requirements in terms of image quality, reliability and speed of image analysis.

Image acquisition needs to become

much more intelligent about what data to acquire – for example automatic region-of-interest detection – and how to optimise the image on the basis of the content. In view of the high data rates involved, this content-aware imaging has to be built into the acquisition devices.

Moreover, multi-view video processing requires sophisticated inter-camera calibration tools and sophisticated algorithms to merge many views into a more useful, non-redundant higher-level representation – such as a panorama or a 3D illustration.

Furthermore, acquisition devices need to become more context aware – any single device should be aware of the existence of other cameras and contribute to the combined optimisation of the imaging system in which they are used by means of external feedback.

These technological challenges lead to three main developments in imaging application areas:

1. *Ultra-wide imaging* – more and

more images become available in every format and support one can imagine;

2. *Content-aware imaging* – highly intelligent image acquisition with information about the data acquired; and
3. *Context-aware imaging* – providing camera awareness for higher-level user needs.

All three of these application domains face a huge increase in the number of images or video streams that need to be captured. On top of that, there is the growing complexity of processing. The applications typically involve a full loop of imaging, processing, visualisation, interpretation and human intervention.

Through research, development and demonstration of generic breakthrough technologies and hardware architectures, ENIAC JU project PANORAMA will provide autonomous image acquisition, tightly coupled to the image sensor. New CMOS-based image sensors will be developed to support such autonomous image acquisition. In all of these application domains, the solutions will allow the user to work more efficiently and concentrate on the primary task of the application.

Optimised parameters

Object segmentation is a basic building block of many intermediate and low level image analysis methods. It will be used in an X-ray system to locate anatomical regions of interest and to direct X-ray radiation to that

site. In broadcast applications, it can find people's faces and optimise image quality. In a multi-camera setup, the imaging parameters will be optimised to provide a consistent display of faces or other regions of interest.

The hardware and software of current systems was developed at a time when the amount of data processed was much less than today. If these systems do not evolve, they will not be able to handle contemporary and future demands. The trend from single-view to multi-view imaging therefore has serious implications for the imaging technologies which are currently in use.

Range of applications

PANORAMA will deliver solutions for applications in medical imaging, broadcasting systems and security and surveillance, all of which face similar challenging issues in the real-time treatment and processing of large volumes of image data. These solutions will help to establish a world-leading position for the European companies involved in the project and improve employment opportunities in this market segment.

The university partners in the ENIAC JU project will further strengthen their roles as leading educational and research centres for these technologies, which in turn will maintain Europe's lead in this field as the new generation of young scientists and engineers embark on their careers.

Health and ageing society

Partners:

- Armines
- Bosch Security Systems
- Capna DSP
- CMOSIS
- CycloMedia Technology
- Eindhoven University of Technology
- Grass Valley Nederland
- IBBT-FMI
- INRIA
- Medisys
- Philips Healthcare
- Q-Free
- STMicroelectronics Italy
- Technolution
- Thales Angenieux
- University of Catania
- University of Leeds

Project co-ordinator:

- Robert Hofsink, Philips Healthcare

Key project dates:

- Start: April 2012
- Finish: March 2015

Countries involved:

- Belgium
- France
- Italy
- The Netherlands
- United Kingdom

Total budget:

- €22.8 million



The ENIAC Joint Undertaking, set up in February 2008, co-ordinates European nanoelectronics research activities through competitive calls for proposals. It takes public-private partnerships to the next level, bringing together the ENIAC member states, the European Commission and AENEAS, the association of R&D actors in this field, to foster growth and reinforce sustainable European competitiveness.

Details correct at time of print but subject to possible change. Updates will be included in the project summary at the end of the project.

ENIAC Joint Undertaking • Brussels • Belgium
Tel : +32 2 221 81 02 • email: eniac@eniac.europa.eu • website: www.eniac.eu