



**CERTH**  
CENTRE FOR  
RESEARCH & TECHNOLOGY  
HELLAS

April 2016



## INDUSTRY 4.0

RESEARCH - TECHNOLOGY - INNOVATION  
FOR SUSTAINABLE GROWTH

### INDUSTRY 4.0

Emerging opportunities  
and challenges

### PRODUCTION OF CLEAN FUELS

New technologies for cleaner  
and more energy efficient  
fuels

### GENOMICS IN PUBLIC HEALTH

Genomics in public  
health and the contribu-  
tion of Greece

# Newsletter CERTH in English

## Opinions—Dimitris Tzovaras

In this column, researchers of CERTH express their opinion regarding the research environment in Greece, make suggestions, express ideas and raise concerns about crucial research issues in the country. In this issue, the Director of the Information Technologies Institute (ITI/CERTH), Dr. Dimitrios Tzovaras is the one that provides valuable food for thought.

Below, some of the most important points of his utterances:

- Greece needs a 10 year strategy planning as inspired by the successful examples of other countries
- Extroversion is the key for Greece to be more competitive in the European and global research community
- Greece's weakness is the low level of exploitation of its research results. Greece's strength is the spark of beautiful minds in the country
- Spin- offs and competence centers will help Greece to bridge the gap with the industrialized world
- Research in one field is good, interdisciplinary research is better

## Augmented Reality (AR) for Industry: The Satisfactory Solution

Why introduce AR technologies in industrial production lines?



Augmented Reality may soon be implemented in the industry sector as part of the on-going digital industrial revolution, called Industry 4.0. Augmented reality interfaces, such as AR glasses, can deliver key information for training and maintenance to workers in a fast, reliable and interactive way. AR applications, especially when shaped through gamification approach, can be both attractive and efficient to workers.

*“AR glasses allow the user to see information over the reality”* explains Francesco Giartosio, founder and CEO of [GlassUp](#), a company specialized in AR see-through lightweight eyeglasses. *“Within the Satisfactory project, GlassUp will provide a professional version focused on the needs of industry. The system will enable workers to receive real-time information, for example on a maintenance problem, and will be guided toward practical solutions”*.

“AR is one of these technologies that help people work better in a manufacturing context”, Antonio Serra said. He is business development manager at Regola, a company developing middleware solutions and products oriented to 3D real time rendering in virtual and augmented reality representation. Both SMEs, Regola and GlassUp, are part of the SatisFactory project.

### What is the SatisFactory project?

In January 2015, a European consortium of researchers and industrialists launched the SatisFactory project, which aims to demonstrate and promote the potential of industry 4.0 to improve the work environment in factories. SatisFactory is a three-year research project funded by the European Commission under Horizon 2020 programme. Project’s target is to create a collaborative and augmented reality ecosystem for increasing satisfaction and knowledge sharing in smart factory environments.

### How AR can be integrated with other digital technologies? The SatisFactory architecture

The SatisFactory project proposes to incorporate a set of cutting-edge technologies in industrial assembly lines thus providing labourers with real-time informational support for incident management, maintenance and training.

### When will the final products be ready?

SatisFactory is currently demonstrating the innovative functions and associated services of AR in factories in three pilot plants. Expected benefits range from workers wellbeing to safety and productivity gains.

In 2015, the project focused on the preliminary identification of end-user needs and the specification of use cases. On this basis, system requirements and functionalities – including a data exchange model (CIDEM) – were developed. Next steps will include further development of the technologies and a test phase in three pilot plants in Italy and Greece, belonging to the automotive and energy sectors. The SatisFactory solutions will be widely deployed in factories worldwide in the near future.

## Digital service in the Greek Industry still remain weak - Interview with Dr. Dimos Ioannidis



The Digital transformation of Industry (Industry 4.0) could create -through the adaption of key technologies- huge opportunities for Europe both for new and already existing businesses. One could say that it is the engine of Europe’s economy.

Dr. Dimos Ioannidis, Research Assistant of the Information Technologies Institute (ITI/ CERTH), and part of the team that coordinates the Satisfactory project, talks about the emerging opportunities and challenges

the digitalization of Industry is going to create. In addition, he refers to the arising ethical dilemmas concerning the changes in jobs as well as to the readiness level of Greece in taking advantage of this digital revolution. “Whether this transformation will have a positive impact on Europe or not, depends upon the way the emerging opportunities as well as the hidden dangers are going to be managed”, he points out.

## Sensorizon wins in Venture Cup regional Final

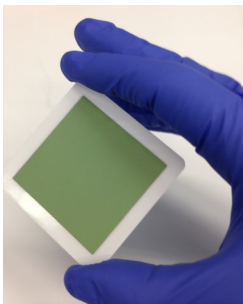


Sensorizon, a Dem@Care business case – a system for assisting people with dementia and personnel in Nursing Homes – has won the regional final in the Venture Cup business plan competition in Sweden, in the Category “Life Science and Technology”. 50 business cases competed in 4 categories.

Sensorizon is an ambient intelligent system to be used in Nursing Homes to measure patterns of behavioral and psychological symptoms of dementia. The staff members in nursing homes (clinicians and caregivers) frequently do not fully understand the behavioral changes of people with dementia, a fact that makes it very hard to do clinical assessments and to plan better clinical interventions. The system relies on ambient and wearable sensors for observing people with dementia and performs automated analysis to access their current cognitive and emotional state.

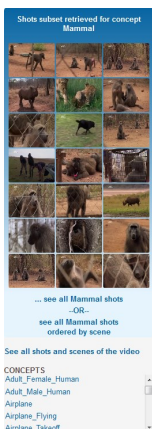
The information from Sensorizon helps the staff members in maintaining a comprehensive view of the changes in behavior and mood and the current health status of the person with dementia by improving care planning and the quality of care in nursing homes.

## Cleaner and more Energy efficient fuels



The fossil fuels-based global electricity production inevitably accounts for the significant and continuous rise in atmospheric carbon dioxide concentrations and depletion of carbon-based energy resources. Partial replacement of fossil fuels as well as CO<sub>2</sub> valorification, have both become important global issues as well as prime research targets. In response to this tendency, hydrogen seems to be the key energy carrier for a sustainable energy system, while water electrolysis powered by RES has been identified as a key neutral-carbon-footprint route in this direction. The 4-years duration research project **SElySOs**, awarded with a fund from the Fuel Cells and Hydrogen Joint Undertaking (part of the EU’s Horizon 2020 research and innovation programme), targets the advancing of **Solid Oxide Electrolysis** technology for cost effective hydrogen production via water electrolysis, as well as syngas production via CO<sub>2</sub> and water co-electrolysis. CPERI/CERTH contributes to this effort as member of the 7-partner consortium, with the aim to bring step change improvements over the technology and create added value to the energy market.

## On-line video analysis service



The ITI-MKLab team has developed and published on the Web an on-line video analysis service. Through the service’s publicly accessible Web page, user can submit videos for analysis, and has a quick access to the automated analysis results. The service allows the uploading of videos in various formats, and performs visufeat analysis using shot segmentation, scene segmentation and visual concept detection algorithms. A few hundred visual concept detectors are evaluated for each video shot. The complete service runs at high speed (i.e., it is several times faster than real-time video processing). As soon as the analysis is completed, results are displayed with the help of an interactive user interface, which allows viewing the video structure (shots, scenes), viewing the concept detection results for each shot, and searching by concept within the set of detected shots. This service and the video analysis techniques that it uses were developed as part of the EU-funded FP7 research projects ForgetIT (<http://www.forgetit-project.eu/>), LinkedTV (<http://www.linkedtv.eu/>) and MediaMixer (<http://mediamixer.eu/>).

To try this service, go to: <http://multimedia2.iti.gr/onlinevideoanalysis/service/start.html>

## Award for Energy management best practices



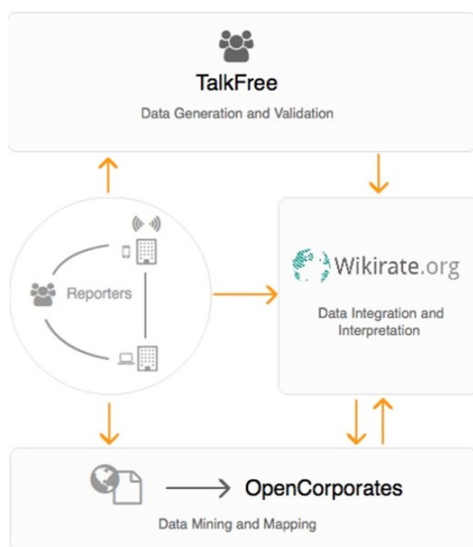
The Hellenic Institute of Transport of the Centre for Research and Technology Hellas (HIT/CERTH) is awarded the Bronze Award in the category "Emissions Reduction/Minimization", thus proving that it has the knowledge base and can strongly contribute to projects aimed at reducing emissions and, consequently, have an impact on the achievement of national and European objectives with regard to energy management.

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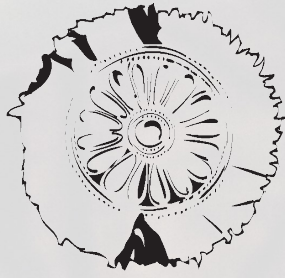
## “Genomics technologies are expected to transform all health areas” Interview with Prof. Christos Ouzounis

Genomics, a rapidly evolving sector of great importance in medical research, is expected to transform all sectors of public health. As health is now included in all EU policies, the European Union pays significant attention to the integration of genome-based knowledge and technologies in certain areas. Dr. Christos Ouzounis, Senior Researcher and Director of the Biological Computational and Research Process Laboratory of CERTH, speaks about the latest achievements in Genomics research, their importance in public health as well as the contribution of Greece in this research field.



## Online platforms for the awakening of people about sociopolitical, economic and environmental issues

European Union is funding research for the development of information and communication systems that target both at the awakening of the citizen about sociopolitical, economic and environmental issues and finding solutions through a collective effort. This way, sustainability and new types of social innovation, also known as CAPS (Collective Awareness Platforms for Sustainability and Social Innovation) are being promoted. The Multimedia Knowledge and Socialmedia Analytics Lab of ITI/CERTH participates in three new European projects: 1. PROFIT aiming at the economic awakening and literacy of people, 2. HACKAIR aiming at the awakening of people regarding air pollution and 3. ChainReact aiming at the sustainability of corporate networks.



# ΕΚΕΤΑ

ΕΘΝΙΚΟ ΚΕΝΤΡΟ  
ΕΡΕΥΝΑΣ & ΤΕΧΝΟΛΟΓΙΚΗΣ  
ΑΝΑΠΤΥΞΗΣ

The **Centre for Research and Technology-Hellas (CERTH)** founded in 2000 is one of the leading research centres in Greece and listed among the TOP-20 E.U. institutions with the highest participation in competitive research grants.

Today CERTH includes the following five institutes with indicated major fields of research:

- **Chemical Process & Energy Resources Institute (CPERI)** Sustainable & Clean Energy, Environmental Technologies, Chemical & Biochemical Processes, Advanced Functional Materials
- **Information Technologies Institute (ITI)** Informatics, Telematics and Telecommunication Technologies
- **Hellenic Institute of Transport (HIT)** Land, Sea and Air Transportation as well as Sustainable Mobility services
- **Institute of Applied Biosciences (INAB)** Agri-biotechnology, Health Translational Research, Informatics for big bio-data
- **Institute for Research & Technology of Thessaly (IRETETH)** Agrotechnology, Mechatronics, Biomedicine and Kinesiology

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