UIIN OFFICIAL MAGAZINE

JULY 2019

UNIVERSITY INDUSTRY

INNOVATION MAGAZINE

Universities & Emerging Technologies

Join our vibrant network of Higher Education professionals and discover how to bring about innovative change in your own university through our upcoming workshops:

ENTREPRENEURIAL LEADERSHIP

11-12 NOVEMBER, 2019

Amsterdam, The Netherlands

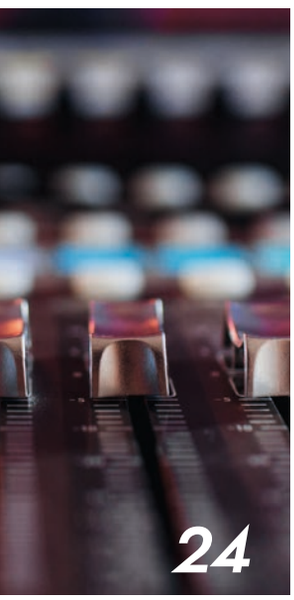
UNIVERSITY BUSINESS COLLABORATION

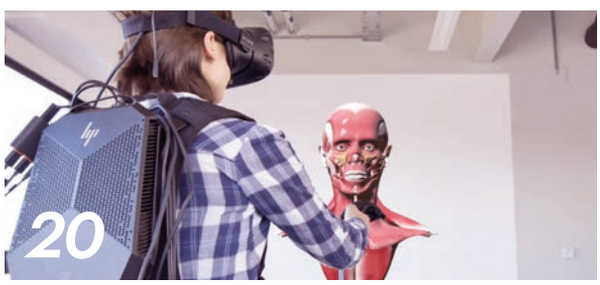
13-14 NOVEMBER, 2019

Amsterdam, The Netherlands

Visit www.edu.uiin.org
or contact us at office@uiin.org

Contents





EMERGING TECH FOR UNIVERSITIES

UNIVERSITIES FOR EMERGING TECH

The new wave of digital disruption is more visible than ever in our lives, and arguably at a rate of change that has never been experienced before. Advancement in algorithms and increased internet connectivity have enabled new technologies to emerge and bring in a storm of opportunities to the adopting industries.

Within the area of IT, we are introduced to a whole new set of vocabulary, from 'smart contracts' to 'wearables', 'm-health' and 'deep learning' that represent technologies with a digitalised touch to the original concepts. As much as the developments are well embraced by a number of sectors, e.g. management, energy, healthcare, and education, the practices are still in transformation and debates are not over regarding implications.

Where do the HEIs stand in the face of these changes? From the educational perspective, the universities are facing a double-challenge: developing & selecting effective pedagogies, and preparing the students to a labour market that is impacted by the disruption of emerging technologies. Looking into their research mission, there is growing interest by the universities to collaborate with industries and other societal actors to build expertise and further understanding on the phenomena.

Taking this as a starting point, in our new issue we aim to inspire the discussions with two interrelated questions: What are the implications of the emerging technologies for universities in the educational experiences they offer, and their administrative operations? And how do the universities contribute back to the development of those technologies? Reactions are diverse, we can conclude, glancing through the selection of our articles that reflect on the institutional initiatives in the Netherlands, Malta, US, Australia, UK, and the collaborative projects from the European landscape.

Accordingly, our content is delivered to you in two chapters: Part One explores the Blockchain and Extended Reality (XR) technologies being adopted in the HEI sector, and Part Two focuses on the university-industry collaborations for the development of the technologies underlining Blockchain, Artificial Intelligence (AI), and Internet of Things (IoT) for their exploitation in the education, business, and smart city initiatives.

While we are highlighting only a fraction of initiatives, we would love to know what you think on the subject. Let us know about your perspectives via our UIIN Twitter account, or send us your opinion piece that we can share with our community.

We wish you all a pleasant reading and many useful takeaways.

Hacer Tercanli
Managing Editor

Editor: Hacer Tercanli **Associate editor & Designer**: Alexandra Zinovyeva

We thank our contributors:

Alexandra Zinovyeva
Alex Grech
Alina Meloyan
Andrew Johnston
Chris Ebeling
Chris Jagers
Craig Golding
Daniel Livingstone
D. Christopher Brooks
David Neville
Jessica Osgoodby
Karl Andersson
Ken Weber
Matthieu Poyade
Matt Ramirez
Ovidiu Vermesan
Paul M. Rea
Roberto Gavazzi
Ruth Clark
Stefano Fava
Tori Campbell

OVIDIU VERMESAN & KARL ANDERSSON

A Vibrant IoT Research & Innovation Ecosystem across Europe

Internet of Things (IoT) has entered the next stage of development bringing new values through IoT- enabled pilots with broader vision of IoT as a combination of connected devices, connectivity, software, platforms, stakeholders, information and applications as part of integrated ecosystems and new IoT driven business models. IoT technologies and applications have been moving towards a network of intelligent objects with social capabilities that need to address the interactions between autonomous systems and humans. IoT technology coupled with artificial intelligence (AI) can form the foundation of improved and eventually entirely new products and services. The powerful combination of AI, IoT, Distributed Ledger Technology (DLT) and Blockchain brings new challenges in addressing distributed IoT architectures and decentralised security mechanisms.

The IoT European Large-Scale Pilots Programme was launched in 2017 by the European Commission with the aim to foster the deployment and evolution of IoT solutions through the integration of advanced IoT technologies, from development to testing and integration, and as close as possible to operational conditions. The programme involves more than 250 organisations from 19 European countries, addresses over 80 use cases which creates opportunities for entrepreneurs, expanding local businesses to European scale, and supports the development of secure and sustainable European IoT ecosystems. The universities and the research institutes involved in the programme are important sources of new ideas in applied IoT technologies that contribute to innovation in IoT deployments sites and applications, by producing new knowledge and exposing the IoT ecosystem stakeholders to that knowledge preparing the ground for transferring the implementation results into businesses.

The programme projects are applying IoT approaches to specific real-life challenges across different use cases, based on European relevance, technology readiness and socio-economic interest in Europe. By deploying IoT technology in different sectors of the society, more sustainable solutions could be achieved, and resources saved. If not investing in Europe now, there is a big risk that Asia and the USA will take the lead developing the area way further and leaving Europe behind.

With a total funding budget of €100M, these large-scale pilot projects address five different and specific domain areas, from smart living environments for ageing well, smart farming and food security, wearables for smart ecosystems, reference zones in EU cities and to autonomous vehicles in a connected environment. More particularly, these projects include:

- ACTIVAGE [1] - ACTIVATING INNOVATIVE IoT SMART LIVING ENVIRONMENTS FOR AGEING WELL – The project builds the first European interoperable and open IoT ecosystem enabling the deployment, at large scale, of a wide range of Active and Healthy Ageing IoT based solutions and services.

- AUTOPILOT [2] - AUTOMATED DRIVING PROGRESSED BY INTERNET OF THINGS – The project develops an IoT connected vehicle platform and IoT architecture based on the existing and forthcoming stand- ▶

THE IOT EUROPEAN LARGE-SCALE PILOTS PROGRAMME ADVANCES THE STRATEGIC DIRECTIONS NEEDED TO SUPPORT FUTURE RESEARCH, DEVELOPMENT AND INNOVATION OF THE NEXT GENERATION INTERNET OF THINGS TECHNOLOGIES AND APPLICATIONS

ards, as well as open source and vendor solutions.

- IoF2020 [3] - INTERNET OF FOOD AND FARM 2020 - is dedicated to accelerating the uptake of IoT technologies in the European farming and food chains and ultimately strengthening their competitiveness and sustainability.

- MONICA [4] - MANAGEMENT OF NETWORKED IoT WEARABLES – VERY LARGE-SCALE DEMONSTRATION OF CULTURAL AND SOCIETAL APPLICATIONS - is a large-scale demonstration of how cities can use existing and new IoT solutions to meet sound, noise and security challenges at big open-air cultural and sports events, which attract and affect many people.

- SynchroniCity [5]- DELIVERING AN IoT-ENABLED DIGITAL SINGLE MARKET FOR EUROPE AND BEYOND - represents the first attempt to deliver a digital single market for IoT-enabled urban services in Europe and beyond.

To foster the take-up of IoT in Europe and enable the emergence of economically sustainable IoT solutions, the programme involves stakeholders across the whole value chain and address the validation, sustainability and replicability of architectures, interoperability properties, standards, and best practices for various IoT applications and deployments, as well as introducing innovative business processes and business models. The validation of user acceptability by addressing, issues of trust, security and privacy through pre-defined privacy and security impact assessments, liability and coverage of user needs in the specific real-life scenarios of the IoT pilots are the key elements for the adoption of IoT technologies and the verification of the related business models to guarantee the sustainability of the approach beyond the projects life time.

The projects in the programme that aim to foster user adoption addressing the topics of common interest include CREATE-IoT [6] - CROSS FERTILISATION THROUGH ALIGNMENT, SYNCHRONISATION AND EXCHANGES FOR IoT, that stimulates collaboration between IoT initiatives, foster the take up of IoT in Europe and support the development and growth of IoT ecosystems based on open technologies and platforms. Align with this, U4IoT [7] - USER ENGAGEMENT FOR LARGE SCALE PILOTS IN THE INTERNET OF THINGS, whic combines complementary Responsible Research and Innovation – Social Sciences and Humanities (RRI-SSH) expertise encompassing social and economic sciences, communication, crowdsourcing, living labs, co-creative workshops, meetups, and personal data protection to actively engage end-users and citizens in the large-scale pilots.

The IoT Large-Scale Pilots make use of the rich portfolio of technologies and tools developed and demonstrated in controlled environments and extend them to real-life use case scenarios with the goal of validating the advanced IoT solutions across complete value chains with actual users and proving its socio-economic potential. The operation of the IoT applications at large scale aims to respond to real needs of end-users (public authorities, citizens and business), based on underlying open IoT technologies and architectures that can be reused across multiple use cases and enable interoperability across those.

Through the advanced solutions developed, the IoT European Large-Scale Pilots Programme supports the creation of a wide-ranging and diverse European IoT community, involving SMEs, midcaps, large enterprises from all regions in Europe including component suppliers, system integrators, and system implementers, academia and consumer groups and creates the basis for a rapid implementation of IoT technologies across various industrial sectors.

There are good chances that Europe, in the long run, clearly can be the world leader, both in terms of IoT research, innovation and IoT deployment by focusing on IoT solutions respecting the human-centric concerns in terms of privacy, security, openness, sustainability and control of personal data. In this context, the IoT European Large-Scale Pilots Programme advances the strategic directions needed to support future research, development and innovation of the next generation Internet of Things technologies and applications and provides major inputs to the elaboration of future research and innovation work programme Horizon Europe. ■

"The CREATE-IoT project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 732929".

Notes:

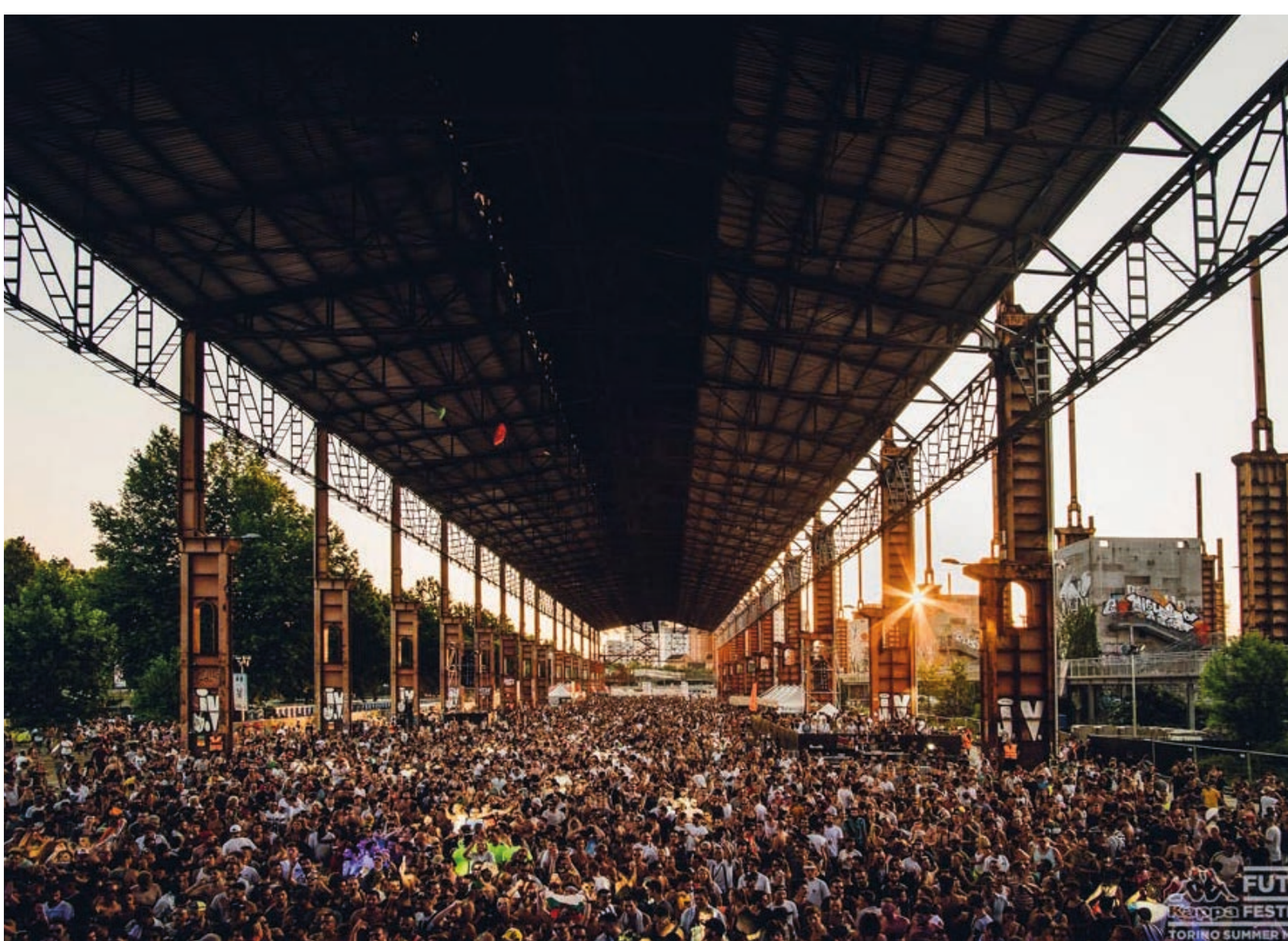
1. ACTIVAGE project http://www.activageproject.eu/
2. AUTOPILOT project: https://autopilot-project.eu/
3. IoF2020 project: https://www.iof2020.eu/
4. MONICA project: http://www.monica-project.eu/
5. SynchroniCity project: http://www.synchronicity-iot.eu/
6. CREATE project – IoT: http://www.create-iot.eu/
7. U4IoT project: http://www.u4iot.eu/

OVIDIU VERMESAN is a Co-ordinator of CREATE-IoT. He is the Chief Scientist at SINTEF Digital, Oslo, Norway focusing on research in the area of embedded electronics, cognitive/intelligent communication systems, integrated electronics, IoT/IIoT, and autonomous systems.

KARL ANDERSSON is a Co-ordinator of U4IoT. He is an Associate Professor and Executive Director for Centre for Distance-spanning Technology at Luleå University of Technology, Sweden focussing on research in the area of pervasive and mobile computing.

AUTOPILOT project: https://autopilot-project.eu/

MONICA project: http://www.monica-project.eu/



ROBERTO GAVAZZI & STEFANO FAVA

IoT Meets Wearables in the Entertainment and Security Market:

MONICA at a Glance

Outdoor events, whether they are concerts, festivals or sporting events have become commonplace in many European cities.

The events, attracting millions of participants, bring a number of benefits to European cities including tourism and revenues. However, they also bring together a number of challenges related to crowd management, such as noise, pollution and security. In such an environment MONICA project fosters the promotion of a disruptive platform, a merging result of different technologies and solutions in the IoT domain, to provide a valuable way to address the increasing challenges that open–air event management is facing.

The MONICA Project is a Large-Scale-Pilots (LSP) demonstrating of how cities can use IoT and smart city technologies to meet sound, noise and security challenges at big, open-air cultural and sport events, which attract and affect many people. Several applications are deployed at large events in six European cities from 2017 to 2020. MONICA leverages on a wide consortium of 29 partners, six cities, including Municipalities, SMEs, R&D&I institutions from across the EU.

Much of the MONICA backbone comes out of Universities and Research Institute skills. The Fraunhofer Institute for Applied Information Technology (FIT) is coordinating the project and the LINKS Foundation (formerly ISMB), an Italian Research and Innovation company, is leading the technical coordination, in charge of the overall architecture and IoT Platform, Wearables & Sensors work packages. The overall MONICA technical concept, deployed and customized in accordance to the different requirements of each pilot is depicted in the Figure 1.

Within MONICA defined Smart Events Ecosystems in the areas of "crowd safety and security", "sound monitoring and control" and "citizen engagement and innovation" meet proper stakeholder community, so that the demand and the supply sides are both covered and thus generating effective and valuable solutions to be implemented, tested leaving the seeds for further exploitation activities.

The demand side is well represented in MONICA by cultural event organizers, public and business administration and citizens that can leverage on the project outcomes by improving organizational, safety and experience issues during public events. Shareholders are benefiting from valuable components and assets developed by MONICA, including datasets collected during piloting activities. Some of the datasets MONICA collects are available and released by public authorities as open datasets for scientific purposes (i.e. MOVIDA Pilot in Torino), with close attention to the European General Data Protection Regulation 2016/679.

Concerning the supply side, MONICA can leverage ▶

THE MONICA PROJECT IS A LARGE SCALE-PILOTS DEMONSTRATING OF HOW CITIES CAN USE IOT AND SMART CITY TECHNOLOGIES TO MEET SOUND, NOISE AND SECURITY CHALLENGES AT BIG, OPEN-AIR CULTURAL AND SPORT EVENTS, WHICH ATTRACT AND AFFECT MANY PEOPLE

on the experience and competences of a large number of valuable stakeholders, including technologies experts, Telecom companies, IT providers, infrastructure and system integration services providers, security and privacy experts, cognitive scientists, regulatory specialists, entrepreneurs and finally start-ups to whom dedicated hackathons have been addressed. (see Figure 1).

In this architectural framework, 4G/5G mobile Network and Cloud technologies will be very important assets for realizing the Smart City platforms, such as MONICA Platform, all across the world. In particular, MONICA Project TIM (Telecom Italia Mobile) proposes the traditional Telco standard and open approach. This approach can be represented with an ICT framework based of four layers (See Figure 2).

The bottom layer (yellow one) represents the smart things (sensors for example), the second layer (the red one) represents the TelCo Networks (supporting all types of IoT communications), the third layer (blue one) the Cloud and the IoT Platform, and the forth layer (the green one) the Application Platforms (like for example security platform and noise management platforms). TIM proposes 3GPP standard and open Networks (4G and 5G) taking the mobile network approach also to the IoT and smart city context.

In particular, the analogy is based on the fact that in the mobile and Internet world an open ecosystem has been established in which new smartphones manufacturer can enter. For example when Apple developed its own phone it just did it following the 3GPP standard and this provided natively interoperability with every 3GPP TelCo Network in the world and with every other smartphone available (for example those from Samsung, Nokia, etc.).

The approach of the mobile Network and Services is replicated by TIM into the IoT and smart city world opening the market to a multibrand ecosystem devices and applications developers, providing native interoperability between different manufacturers, network providers and application providers, independently from the country. For enabling this approach, Network Platforms in the Cloud are also very important. Within MONICA, TIM is using its internal developed IoT (Internet of Things) Cloud Platform named ICON that has been integrated in the SCRAL (Smart City Resource Adaptation Layer) middleware. ICON is based on the international standard OneM2M.

Among the achievements of MONICA, we can mention the enhancement of sound perception and noise reduction for the KappaFutur Festival in Torino and the Friday Rock concerts at TIVOLI Gardens in Copenhagen where sound zones were established to enhance the sound experience for concertgoers and performers while at the same time mitigating the noise for neighbors.

Another valuable asset achieved is the augmented user experience where communication to customers, crowds and citizens was improved by the use of mobile apps and IoT wristbands with value adding features. The apps enable people to interact with and locate each other, the best way out or the bars with the shortest queue, and guiding participants to the nearest exit in case of an emergency. Such features were performed for example in Hamburger DOM funfair and Nuits Sonores festival in Lyon.

Security issues were tackled in some use cases defined to strengthen crowd safety. Applications involving the use of cameras, tethered airships and wearables to enable security personnel to capture real-time data about crowd size and density for the purpose of analyzing, predicting and handling emerging incidents, while being compliant with personal privacy provisions and rights were performed for example in Torino Movida test site and Pützchens Markt festival in Bonn.

MONICA is now willing to get challenged even more, tackling massive scale operation, demonstrated by 10,000 simultaneous end users based on open standards and architecture with only the application layer specific to deployment; using cost-efficient wearables and legacy smartphones; promoting data security and trust management framework and ensuring full data protection and privacy.

Please, take a chance and visit MONICA at: https://www.monica-project.eu/ ■

IMAGE CREDIT: The MONICA Project

ROBERTO GAVAZZI is the Senior Program Manager Innovation - TIM- Telecom Italia Mobile.

STEFANO FAVA is the Senior Research Engineer – LINKS Foundation.

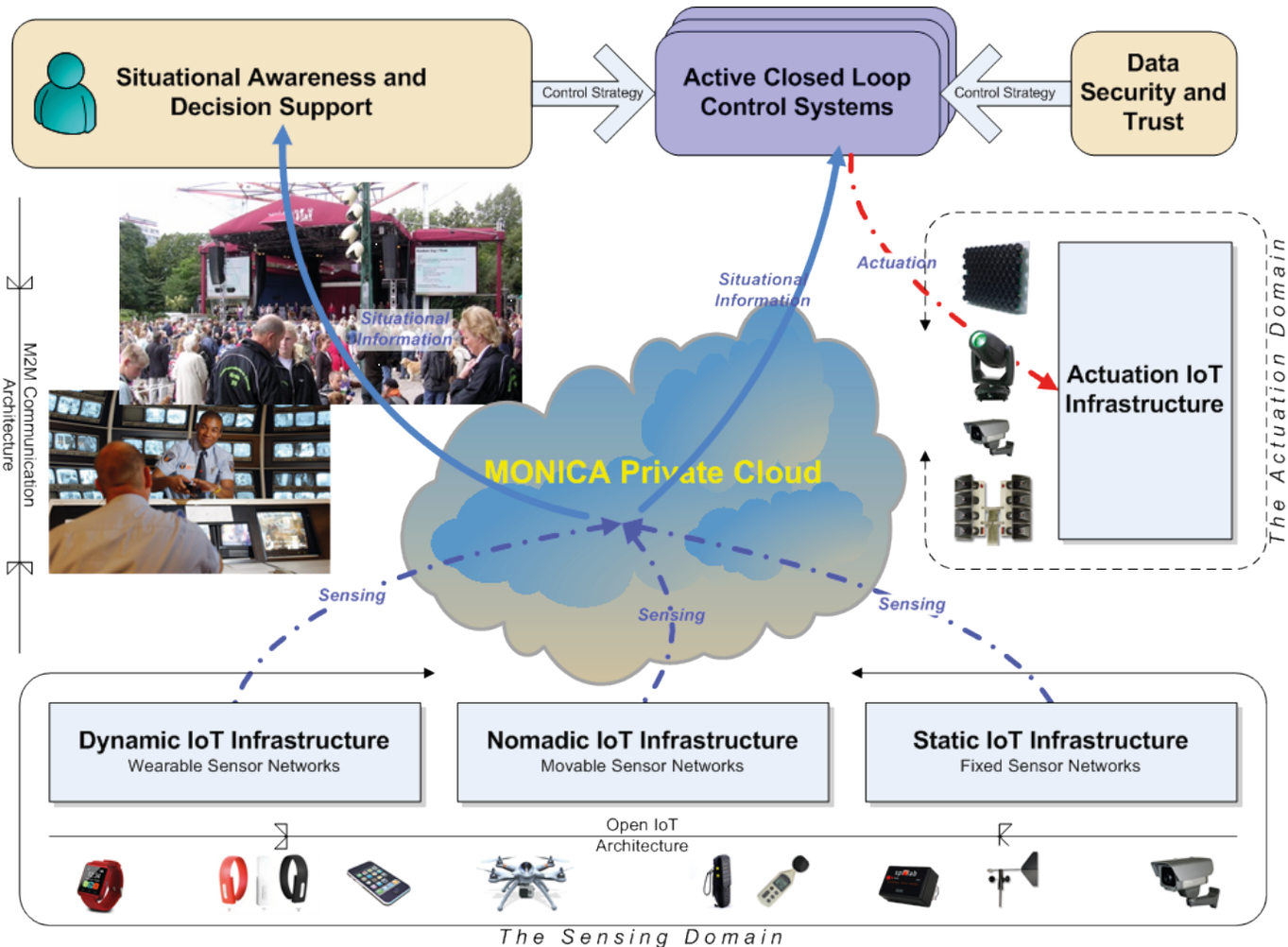


FIGURE 1 MONICA technical concept.

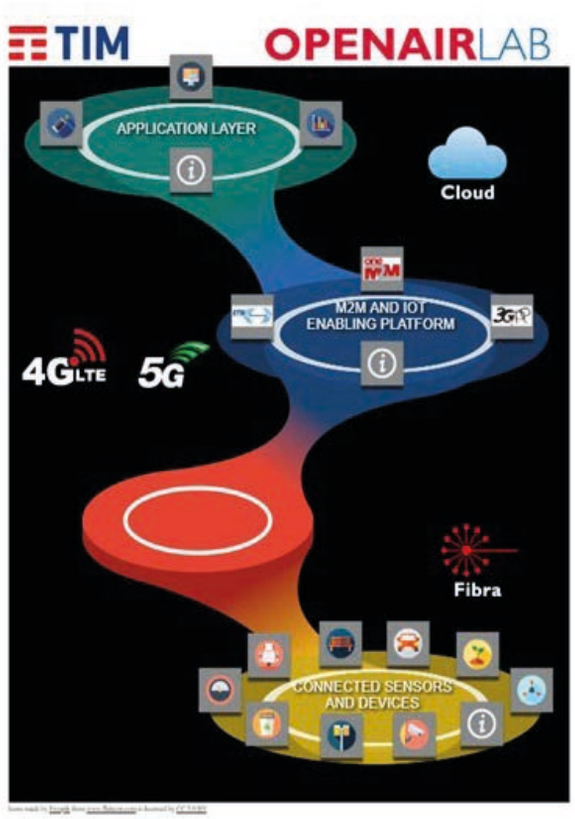


FIGURE 2 ICT framework.

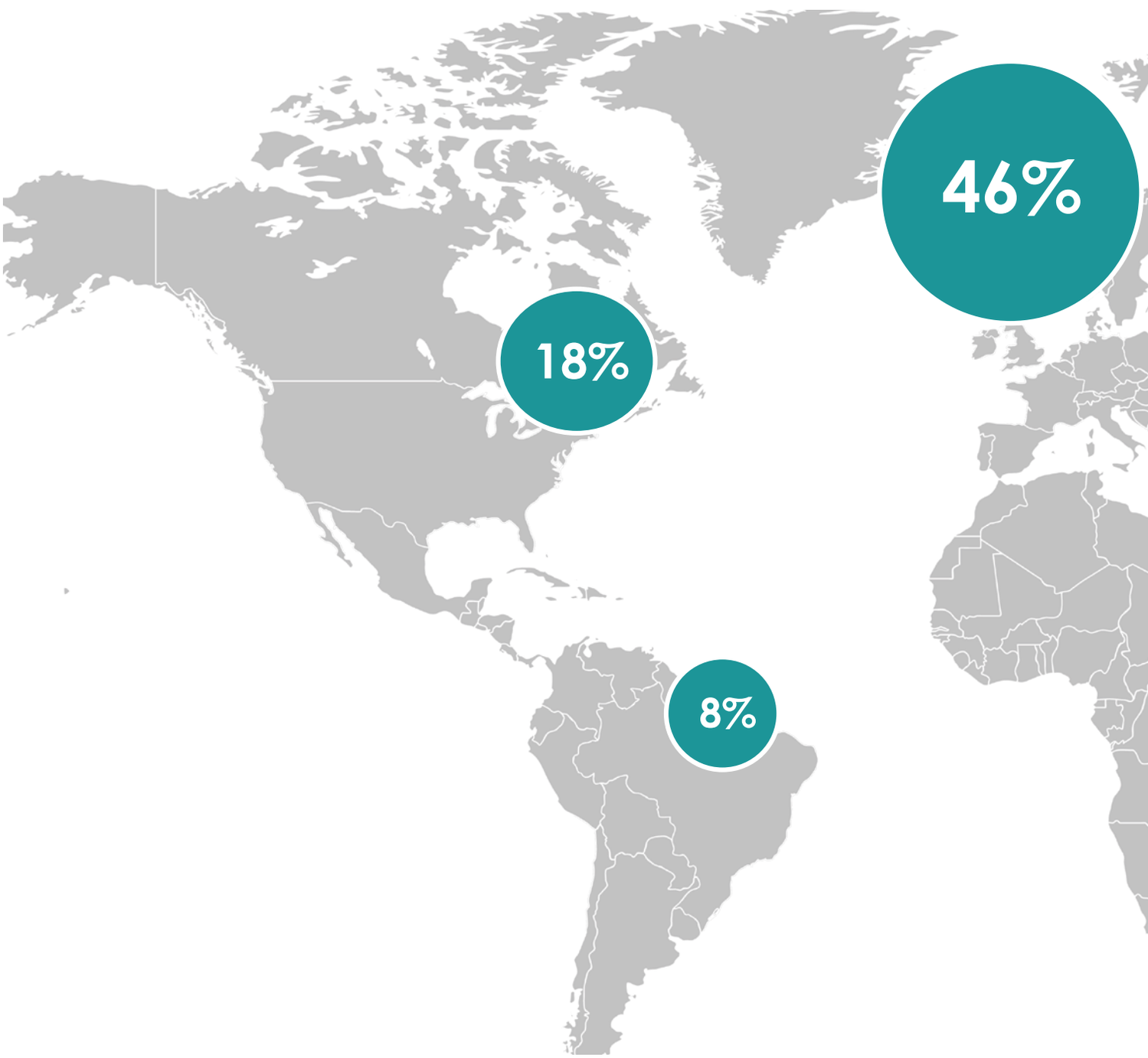
AMONG THE ACHIEVEMENTS OF MONICA, WE CAN MENTION THE ENHANCEMENT OF SOUND PERCEPTION AND NOISE REDUCTION FOR THE KAPPAFUTUR FESTIVAL IN TORINO AND THE FRIDAY ROCK CONCERTS AT TIVOLI GARDENS IN COPENHAGEN

Do you want to be featured in our magazine?
Or you have suggestions on the theme of our next magazine issue?
Please feel free to contact us!

office@uiin.org


UIIN
University Industry
Innovation Network
office@uiin.org
UIIN OFFICIAL MAGAZINE
SPECIAL ISSUE JANUARY 2019
UNIVERSITY
INDUSTRY
INNOVATION MAGAZINE
Australia's
Innovation
Pathways

WE ARE A NETWORK DRIVEN BY ITS **MEMBERS**



350+

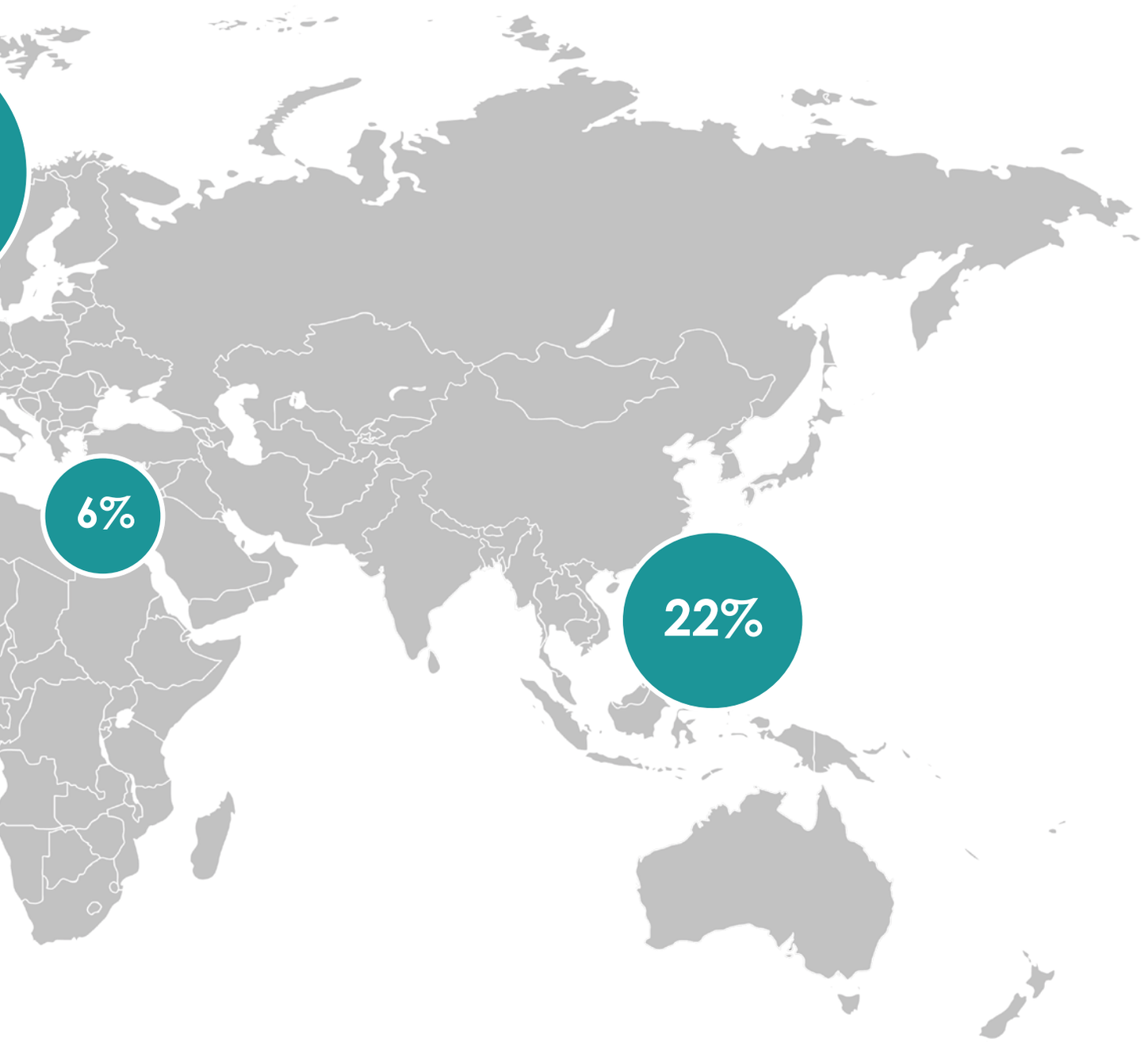
Registered UIIN members

40+

Countries represented in the UIIN member database

500+

Participants at our last UIIN annual conference




A?


ACADEMICLABS


S2S
Science2
Society


18
57
BGE


Università
Ca'Foscari
Venezia


Australian Government
Department of Industry,
Innovation and Science


Edge Hill University


EFMD


TU/e
EINDHOVEN
UNIVERSITY OF
TECHNOLOGY


eit
Digital


KANSAS STATE
UNIVERSITY


KMUTT
King Mongkut's
University of
Technology
Thonburi


LEHIGH
UNIVERSITY


LINKÖPING
UNIVERSITY


LSE
THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE


patsnap


RUDN
university


HÁSKÓLINN Í REYKJAVÍK
REYKJAVÍK UNIVERSITY


1862
RIGA TECHNICAL
UNIVERSITY


RMIT
UNIVERSITY


THE UNIVERSITY OF
AUCKLAND
NEW ZEALAND


THE UNIVERSITY OF
WESTERN
AUSTRALIA


TURKISH
AEROSPACE


ean
universidad


UNIVERSITI MALAYSIA
SABAH


UNIVERSITY OF
COPENHAGEN


THE UNIVERSITY OF
MELBOURNE


UNSW
THE UNIVERSITY OF NEW SOUTH WALES


UNIVERSITAS OSLOENSIS
MDCCCXI


University of
South Australia


UNIVERSITY OF
WISCONSIN SYSTEM
UW


Veltech
Dr.RR & Dr.SR
University


VYTAUTAS MAGNUS
UNIVERSITY


WESTERN SYDNEY
UNIVERSITY

WE THANK OUR ORGANISATIONAL MEMBERS FOR YOUR CONTINUOUS SUPPORT!

Interested in becoming our member?
Learn more at www.uiin.org

UNIVERSITY INDUSTRY

INNOVATION MAGAZINE

www.uiin.org