Taking Active and Healthy Ageing out of the box: from ecological invalidity to 'wild' ageing trials

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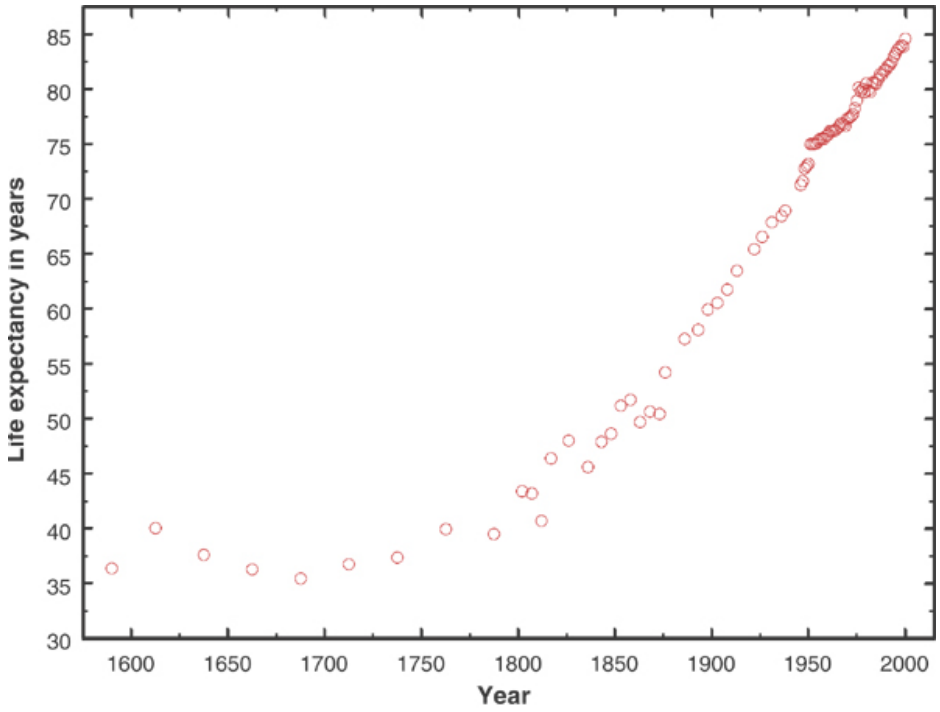
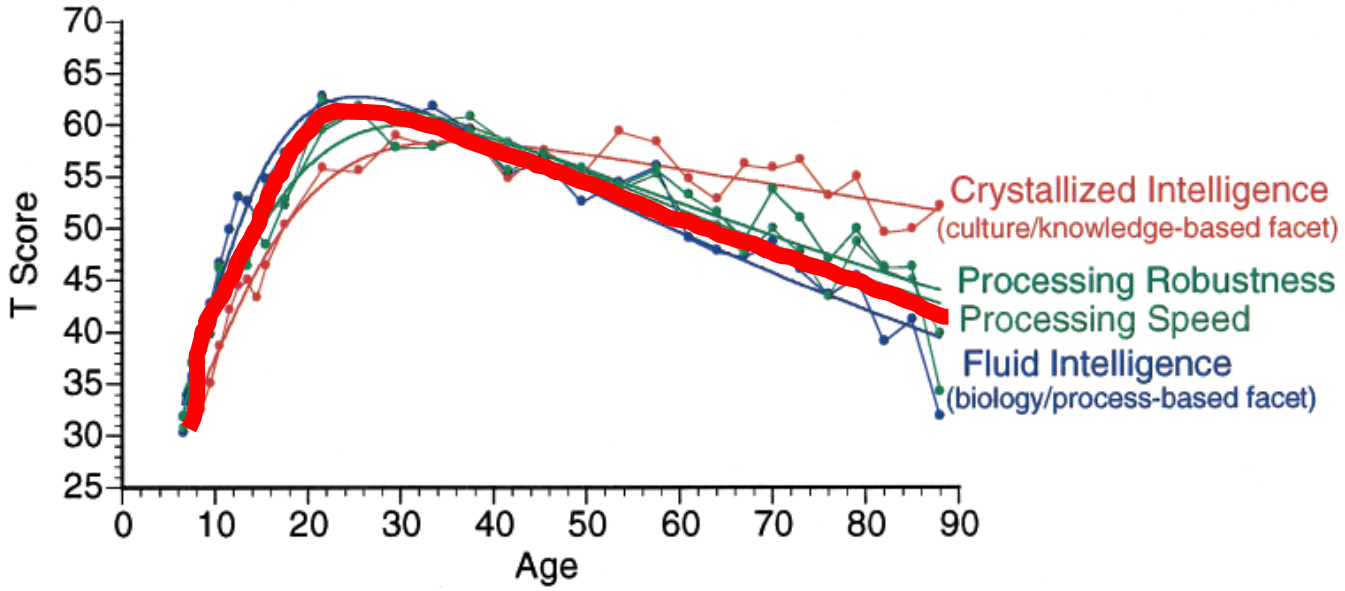
Ageing

We live longer



Ageing consequences…

Our abilities decline…



Li et al. (2004), Psychol Sci; Li et al. (2009), Psychol Res

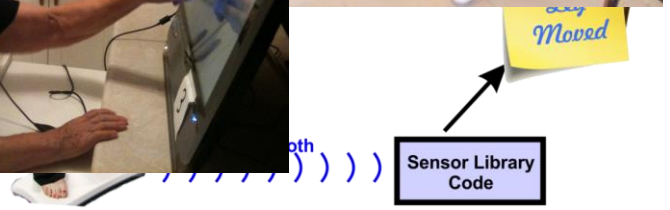
Bamidis, MEDICON 2016

Key points

- Learn, Live, Love, Inspire

LLM Care
Long Lasting Memories
Mind and body fitness for life

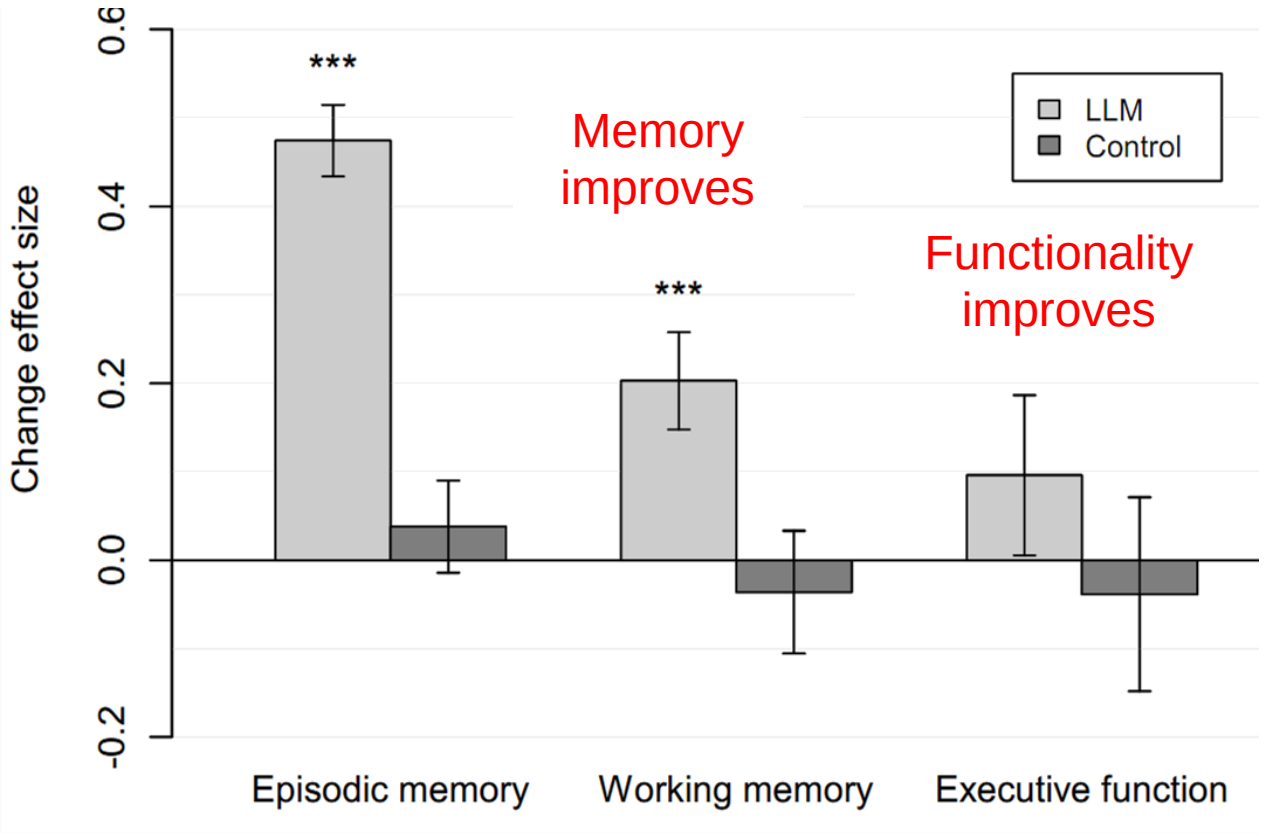
LLMcare product/service



http://www.youtube.com/watch?feature=player_embedded&v=ilABZtm8eGM

LLM Care
Long Lasting Memories
Mind and body fitness for life

scientific results → competitive advantage



Bamidis PD. et al. Gains in cognition through combined cognitive and physical training: the role of training dosage and severity of neurocognitive disorder Frontiers in Aging Neuroscience, 2015, DOI=10.3389/fnagi.2015.00152

LLM Care
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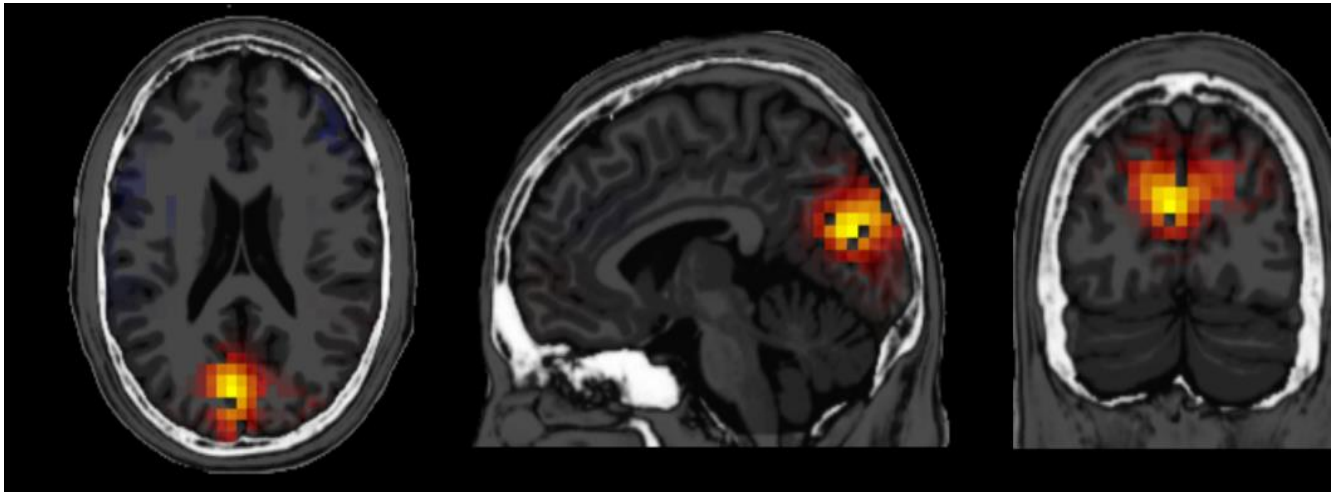
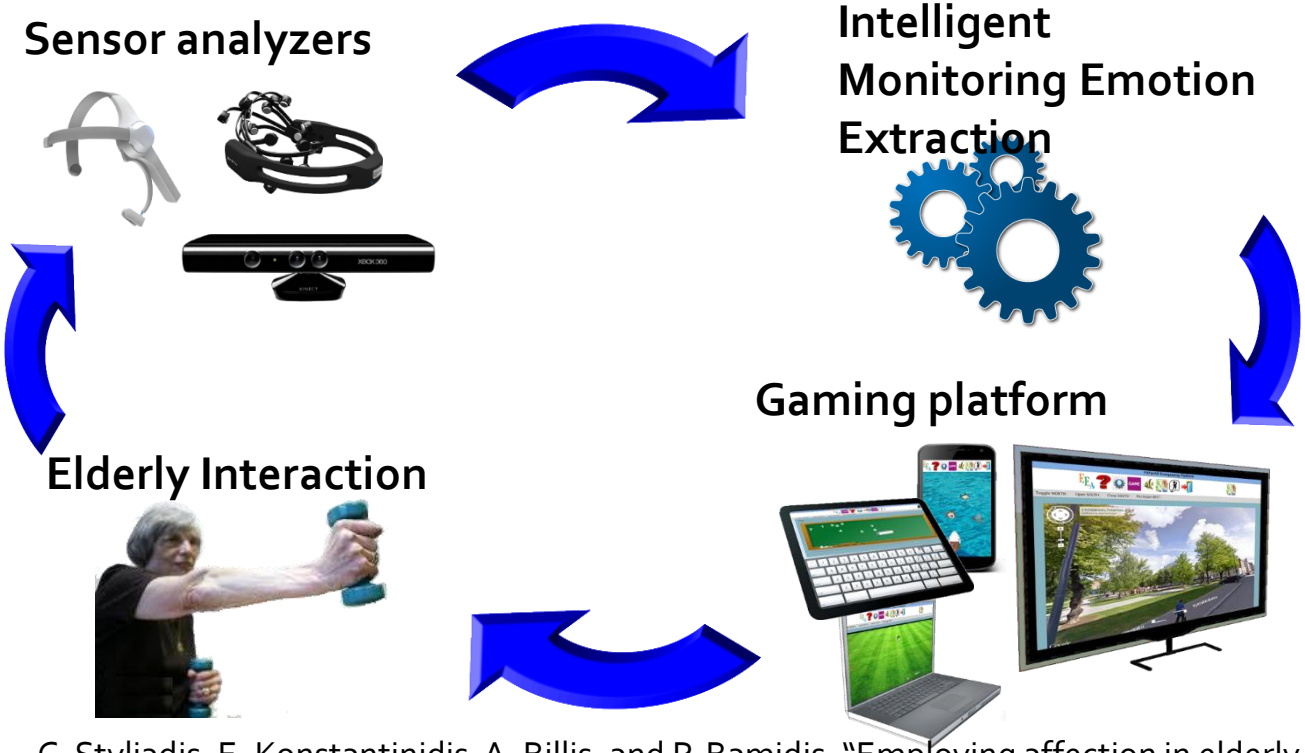


After training, brain noise is reduced in some areas

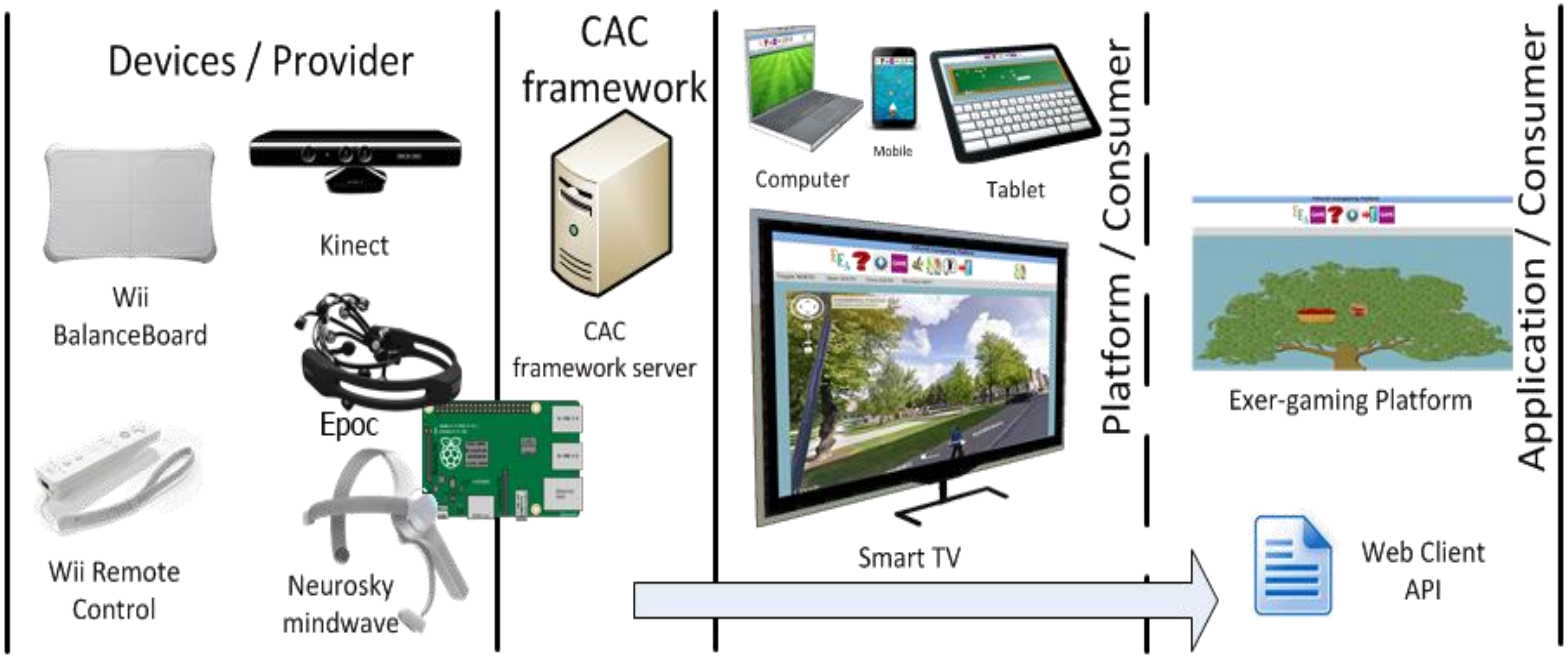
Styliadis. et al. Brain regions responsible for results of combined cognitive and physical Training Neural Plasticity, 2015

Back in 2013, our vision…



C. Styliadis, E. Konstantinidis, A. Billis, and P. Bamidis, "Employing affection in elderly healthcare serious games interventions," in *Proceedings of the 7th International Conference on PErvasive Technologies Related to Assistive Environments*, 2014, p. 32.

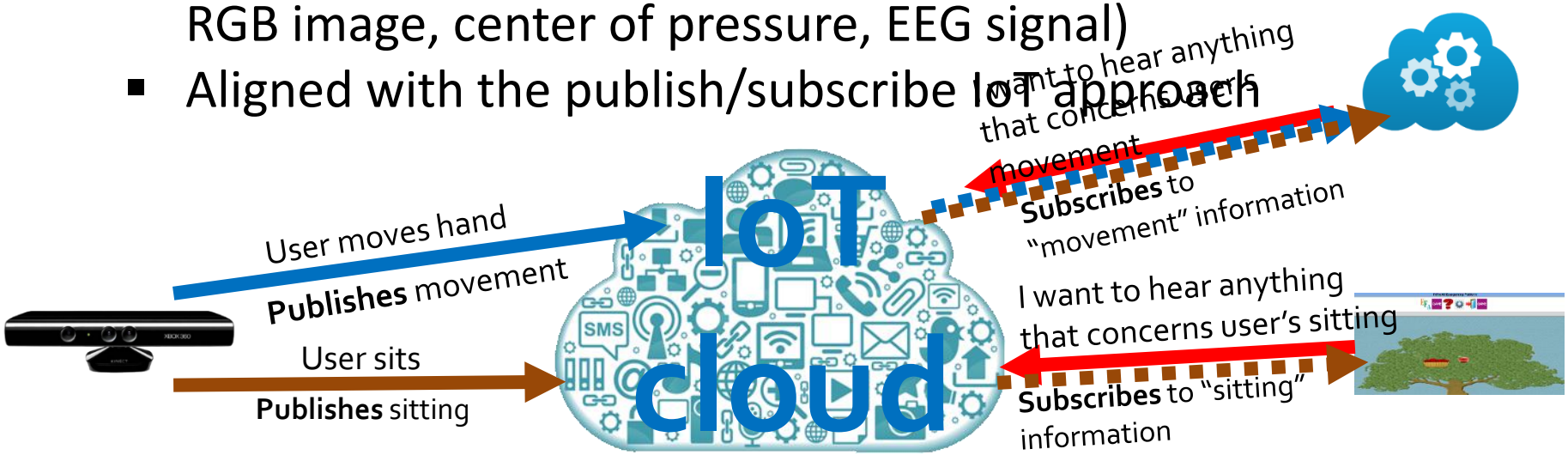
CAC Architecture



www.cac-framework.com

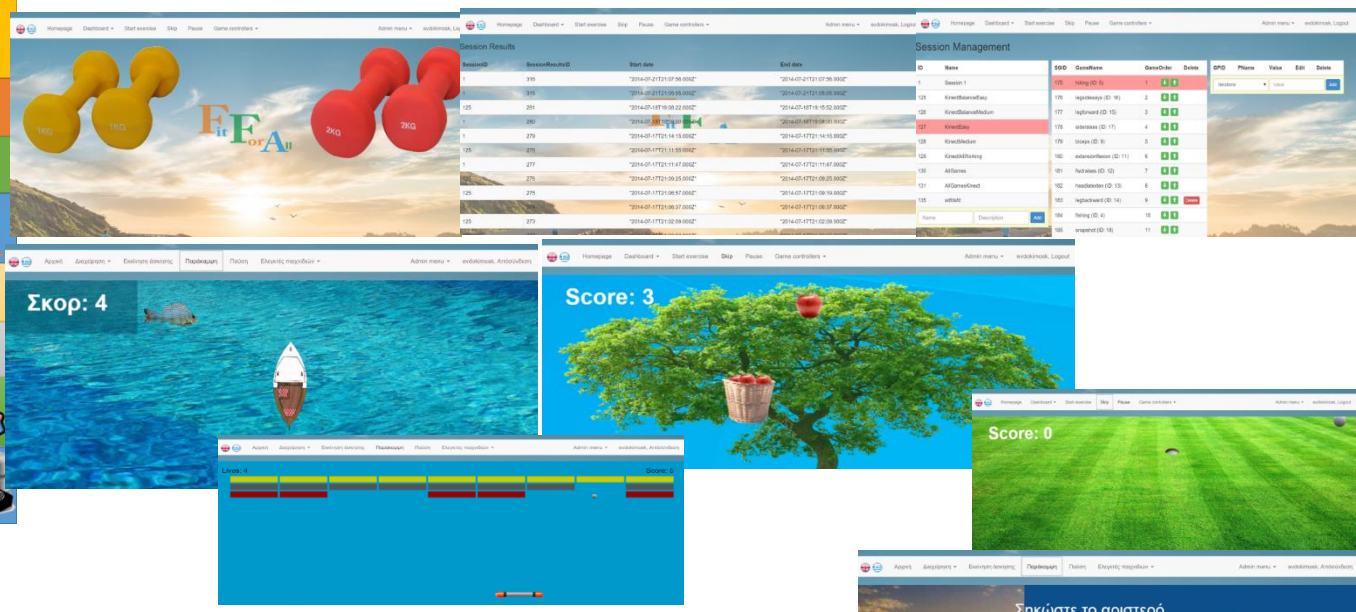
CAC-framework

- Has the role of an intermediary, in order to allow the connection of a series of controllers and applications.
- Adapted to controller information streaming (e.g. skeleton, RGB image, center of pressure, EEG signal)
- Aligned with the publish/subscribe IoT approach



E. I. Konstantinidis, P. E. Antoniou, G. Bamparopoulos, and P. D. Bamidis, "A lightweight framework for transparent cross platform communication of controller data in ambient assisted living environments," *Inform Sciences*, vol. 300, pp. 124–139, 2014.

Exergames and new technologies

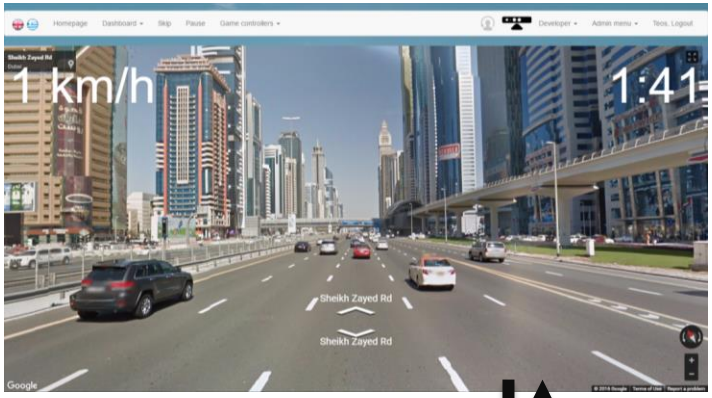


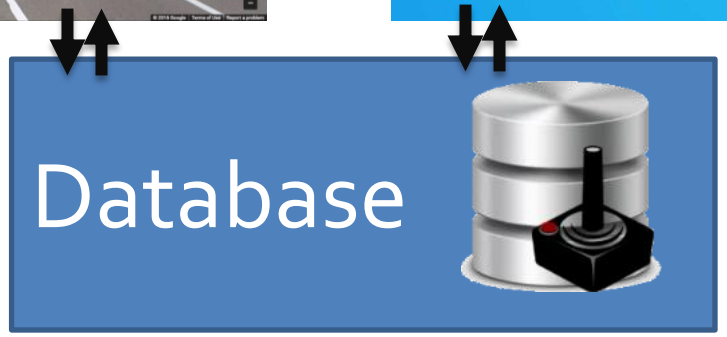
- **Subscribes** to the IoT cac-framework.com to get access to the controllers data streams
- **Publishes** gaming events to standard IoT communication protocols

E. Konstantinidis, G. Bamparopoulos, & P. Bamidis, "Moving Real Exergaming Engines on the Web: The webFitForAll case study in an active and healthy ageing living lab environment," *IEEE J. Biomed. Health Inform, 2016*

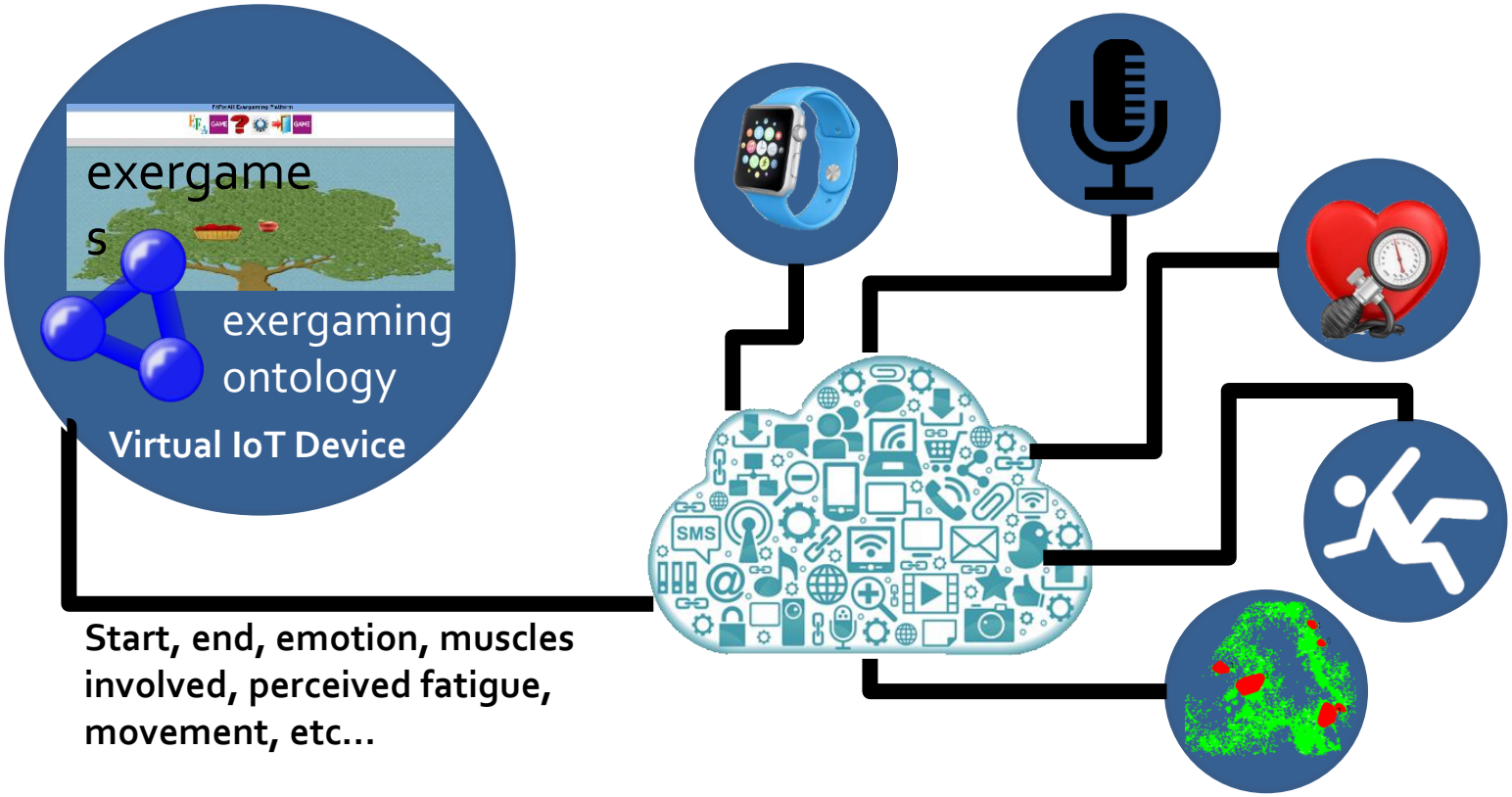
Vision realisation

- Emotional self-appraisal by users (subjectively)





Serious games as virtual, IoT enabled, devices



Our contribution to IoT semantics and open trials

G. Bamparopoulos, E. Konstantinidis, C. Bratsas, and P. D. Bamidis, "Towards exergaming commons: composing the exergame ontology for publishing open game data," *J. Biomed. Semantics*, vol. 7, no. 1, p. Article nr 4, Dec. 2016.

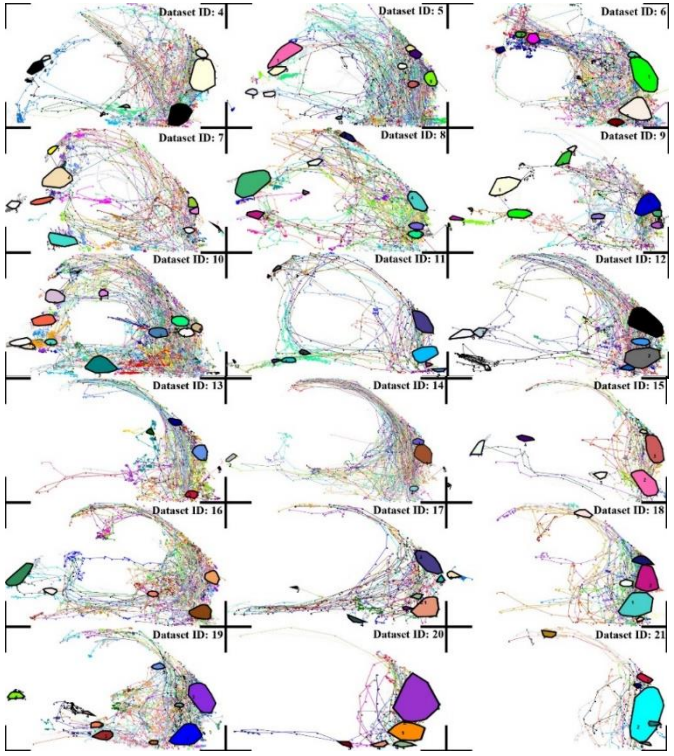
Active and Healthy Ageing Living Lab

- Located in the Aristotle University of Thessaloniki, Lab of Medical Physics
- Vision for a permanent living lab where elderly people could test and evaluate new applications, devices and approaches coming either from our group or external groups - researchers or companies (e.g. SMEs)
- The Active and Healthy Ageing Living Lab

http://www.aha-livinglabs.com

E. I. Konstantinidis, A. S. Billis, C. Bratsas, A. Siountas, and P. D. Bamidis, "Thessaloniki Active and Healthy Ageing Living Lab: the roadmap from a specific project to a living lab towards openness," in *9th International Conference PErvasive Technologies Related to Assistive Environments (PETRA)*, 2016.

Results from Experimental Datasets



E. I. Konstantinidis and P. D. Bamidis, "Density based clustering on indoor kinect location tracking: A new way to exploit active and healthy aging living lab datasets," in Proc. *IEEE 15th International Conference on Bioinformatics and Bioengineering (BIBE)*, 2015, pp. 1–6.

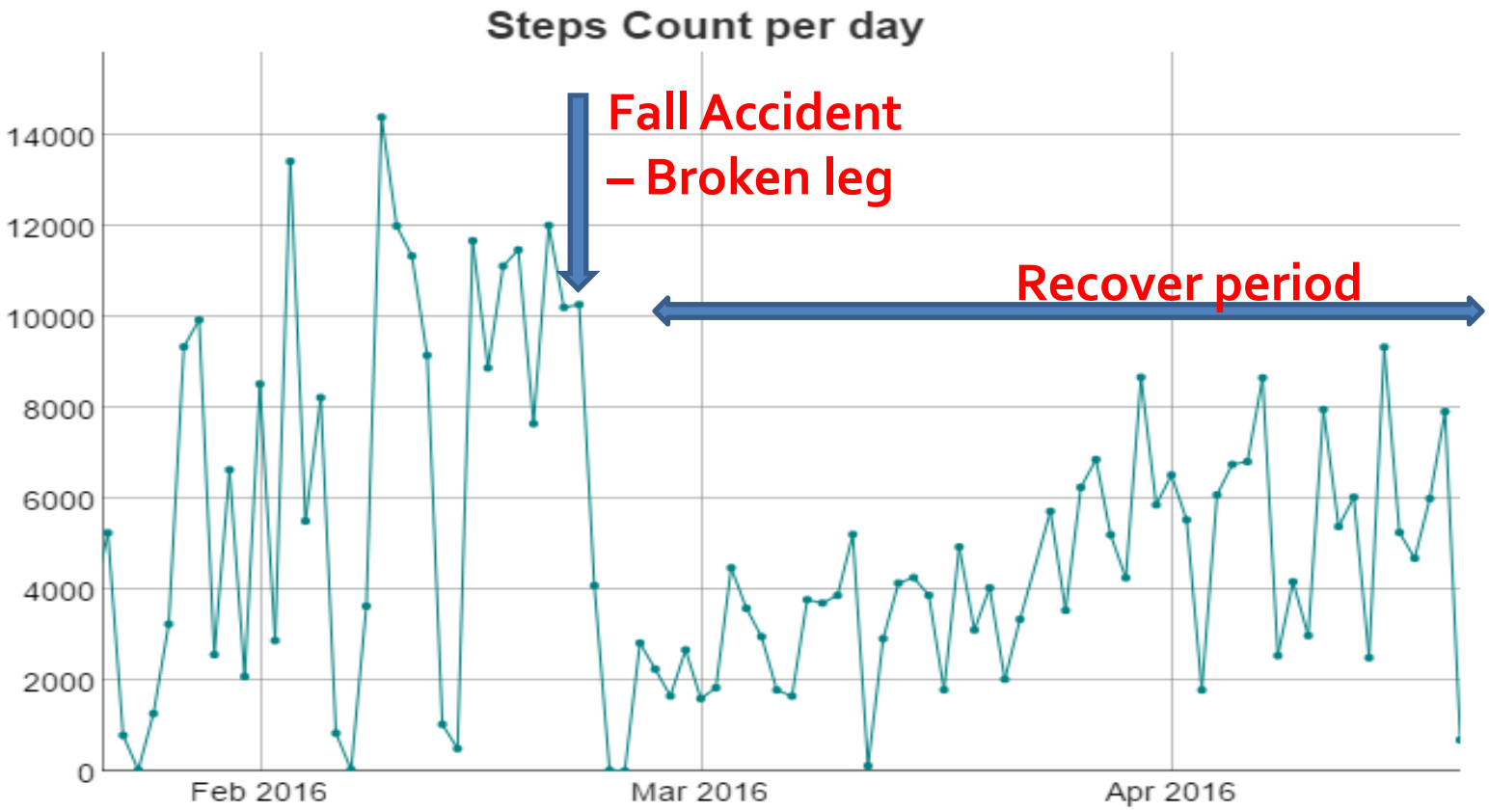
The UNCAP project on Active & Healthy Aging

- UNCAP: Ubiquitous iNteroperable Care for Ageing People
- UNCAP delivers an interoperable platform based on open industrial standards
- …leveraging on existing technologies for biosensing, indoor/outdoor localisation and home-automation.
- Result: an open source, scalable and privacy-savvy ecosystem compatible with existing Personal Health Record systems, that can deliver novel service help aging people (incl. those with cognitive impairments)
  live independently and with dignity.

PHC-20-2014: Advancing active and healthy ageing with ICT: ICT solutions for independent living with cognitive impairment

… in the wild…

Case Study - Fall accident



key recommendations / ideas pertaining to advancing OGC Standards

- Living Lab standards?
- Home analytics?
- Open pilots?
- New silver diagnostics?

thoughts on advancing interoperability standards, interoperability projects, or best practices

- Interoperable game services?
- What is needed?
- When, how fast, what for?

Co-design, Co-pilot Living Lab Commons

- for
-
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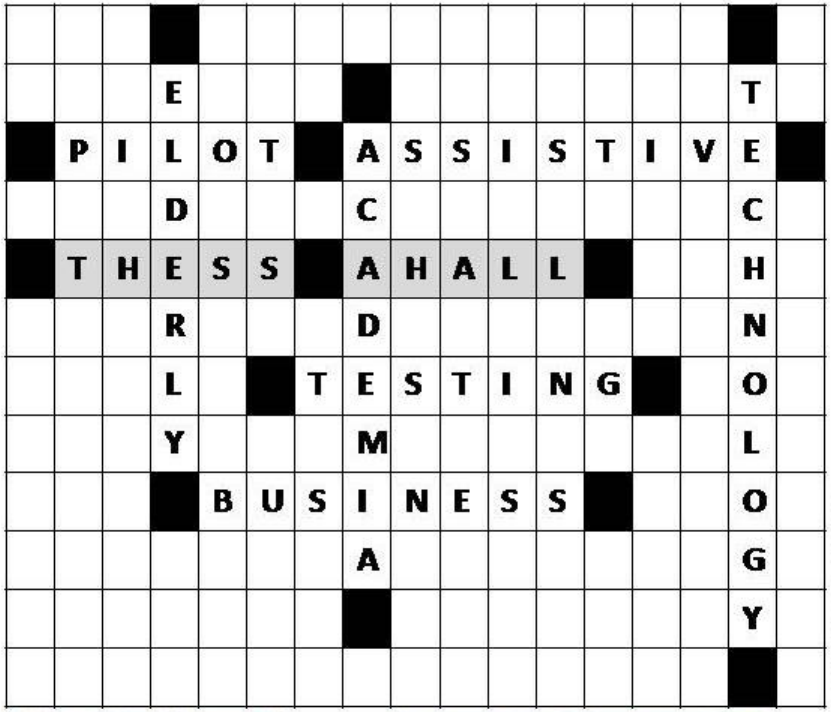

HALL

Thank you for your attention…

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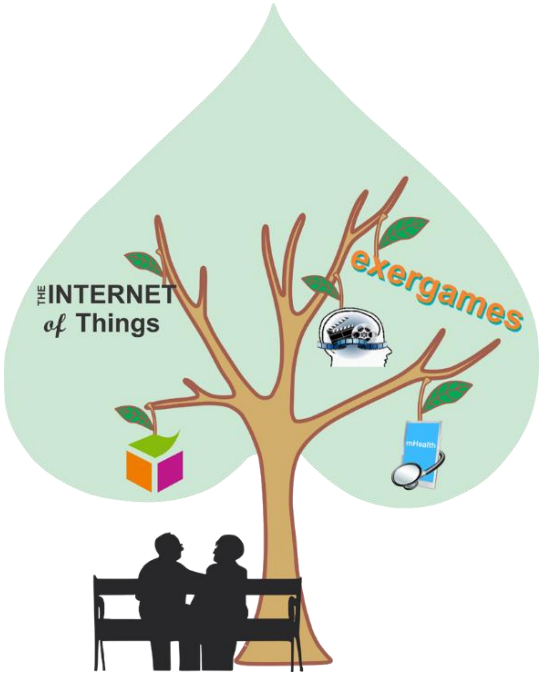

http://medphys.med.auth.gr/group/asoss