

Virtual SHORT COURSE (free attendance) on

REPRESENTATION LEARNING and DISENTANGLEMENT in COMPUTER VISION and MEDICAL IMAGING

Wednesday October 6, 2021, 15:00 to 19:00 Italy time

Google Meet Link: meet.google.com/xhc-cmeo-buz

Lecturer:

Prof. Sotirios A. Tsafaris

Canon Medical/Royal Academy of Engineering Research Chair in Healthcare AI, Chair in Machine Learning and Computer Vision at the University of Edinburgh (UK)

Turing Fellow of the Alan Turing Institute

Web: <https://vios.science>

Organized by: University of Firenze, Dept. of Information Engineering (DINFO)

Contact: Prof. Carlo Colombo (carlo.colombo@unifi.it)

SCHEDULE:

15:00 to 17:00 [two breaks envisioned at 15.45 and 16.45]

PART 1: Learning representations

The deep learning (DL) paradigm has been widely adopted in almost all domains of image analysis as an alternative to traditional handcrafted techniques. However, the majority of deep neural networks rely on the existence of significant amounts of training data that are not always readily available.

- Why does modern machine learning require such large amounts of information/supervision?
- How do neural networks learn representations and what is representation learning?
- How representation learning relates to causality and the notion of generating factors?
- How disentangled representations related to generating factors and what are the standard methods to learn disentangled representations?

17:15 to 19:00 [one break envisioned at 18.00]

PART 2: Applications of disentangled representations in computer vision and medical imaging

We discuss possible applications in computer vision and the medical imaging field and existing open-ended challenges.

- What have been instrumental models solving image to image, segmentation and other tasks in computer vision?
- What have been ground breaking approaches in medical image analysis that can address challenges of data scarcity in medical imaging?
- What open challenges remain in the field of disentanglement?

Accompanying notes: <https://arxiv.org/abs/2108.12043>

BIO – Prof. Sotirios A. Tsafaris, or Sotos, (<http://tsaftaris.com>; <https://vios.science/>; @STsaftaris), is currently the Canon Medical/Royal Academy of Engineering Research Chair in Healthcare AI, and Chair (Full Professor) in Machine Learning and Computer Vision at the University of Edinburgh (UK). He is also a Turing Fellow with the Alan Turing Institute. Previously he held faculty positions with IMT Institute for Advanced Studies Lucca (Italy) and Northwestern University (USA). He has published extensively, particularly in interdisciplinary fields, with more than 180 journal and conference papers in his active record. His research interests are machine learning, computer vision, image analysis and processing.