



AI OPEN ACADEMY
PRE-CONGRESS
Workshop

02-11-2023

From 15:00-18:00

Registration Fees 150 USD

For whom: Fertility professionals interested in modern
Machine Learning methods.

AI ACADEMY

Time: 3 hours

When & Where: MEFS 2023, Istanbul

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Objective: Familiarize participants with the basic concepts of machine learning, e.g., measuring algorithm efficiency, as well as with more advanced concepts related to deep learning and trustworthy AI in the context of medical applications.

Lessons learned: Participants will learn how to measure algorithms accuracy and how to set up experiments in a medical context so that the results are meaningful. They will learn how to apply deep learning in medical image processing. They will get acquainted with ethical aspects of AI.

Brief Introduction to Machine Learning (1 hour)

In this part we will introduce basic machine learning concepts and the most fundamental algorithms that can be used in the context of medical applications: regression, decision trees and neural networks. We will concentrate on aspects of evaluating experiments and measuring algorithm efficiency, e.g., we will introduce how to measure precision, recall and discuss the precision-recall tradeoff. These experimental setups will be illustrated in the context of IVF applications, i.e., Embryo scoring. In order to clearly visualize the importance of the right approach we will highlight different paradoxes appearing in this statistical context, e.g., accuracy paradox, false positive paradox, or Simpson's paradox.

Using Deep Learning in Medical Applications (1 hour)

In this unit we will dive deeper (but not too deep) into concepts of deep learning in order to understand why current neural networks overcome Moravec's paradox. Moravec's paradox was for long the main reasons why AI was so rarely used in medicine. Moravec wrote in 1988, "it is comparatively easy to make computers exhibit adult level performance on intelligence tests or playing checkers, and difficult or impossible to give them the skills of a one-year-old when it comes to perception and mobility". Exactly efficient perception is the key prerequisite needed in medical application of AI where high quality images or time-lapses need to be understood and analyzed. We will show the framework of using deep learning in a medical context e.g., analyzing ultrasonography timelapses.

Trustworthy, Legal and Regulatory Aspects of AI (1 hour)

AI Paradox states that better technology needs more and not less human oversight and responsibility. We are witnessing rapid advances in artificial intelligence (AI), particularly in natural language processing, e.g., ChatGPT, which might cause confusion about the future. This duality of anticipation for the unprecedented opportunities AI requires from us simultaneous development of ethical governance. This is especially important in medical application. In this talk we will introduce the basic ethical aspects that are relevant when developing AI systems for medicine, e.g., data bias, algorithm bias, basic notions of fairness and trustworthiness. We will comment as well on regulatory and copyright aspects of modern AI tools.

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