TEACHING MODULE Announcement

PhD in Information and Communication Technology for Health
Università degli Studi di Napoli Federico II

Module Title: Deep Learning and Telecommunications in Digital Pathology: Foundations, Techniques, and Applications

Lecturer: Cristian Tommasino

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CV: Dr. Cristian Tommasino is a researcher at the University of Napoli Federico II, with a focus on deep learning and biomedical image analysis. He holds a PhD in Information and Communication Technology for Health, where he aimed to develop AI techniques to improve image analysis in digital pathology. His interests include applying AI techniques to enhance image analysis in digital pathology, with particular focus on image segmentation and classification, and graph neural networks for histopathological image analysis.

Dates

Date	Hours	Lecturer
27th November 2024	**13:30-15:30**	**Cristian Tommasino**
3rd December 2024	**13:00-15:00**	**Cristian Tommasino**
6th December 2024	**10:30-12:30**	**Cristian Tommasino**
11th December 2024	**14:30-16:30**	**Cristian Tommasino**
13th December 2024	**10:30-12:30**	**Cristian Tommasino**
16th December 2024	**14:30-16:30**	**Cristian Tommasino**

Room: Ex Softel, Building 3, I Floor, Via Claudio, 21

Content

I Lesson - Introduction to Digital Pathology and AI: Introduction of digital pathology, outlining its significance in modern healthcare and the transition from traditional pathology to AI-driven analysis. Introduction of key concepts of artificial intelligence and machine, with a focus on how they are applied to automate tasks in pathology and improve diagnostic processes.

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II Lesson - Fundamentals of Deep Learning for Image Analysis: Introduction of the foundational principles of deep learning, emphasizing the structure and function of Convolutional Neural Networks (CNNs) for image analysis.

III lesson - Applying Deep Learning to Pathology Images: Presentation of specific challenges of applying deep learning techniques to pathology images, including issues related to image scale, variability, and data preparation.

IV Lesson - Basic Techniques for Image Segmentation: Concepts of image segmentation, a critical task in pathology image analysis that involves delineating structures within an image. Introduction of common segmentation models, such as U-Net, and how these models are employed to identify and separate regions of interest within pathology images.

V Lesson - Interpreting and Explaining AI Models in Pathology: Introduction of the importance of interpretability and transparency in AI models, particularly in medical applications.

VI Lesson - Telecommunications for Digital Pathology: Exploring the role of advanced telecommunications in supporting digital pathology through high-capacity networks, such as 5G/6G, and distributed cloud infrastructure. Discussion of how these technologies enable real-time data sharing, remote access to pathology images, and AI-assisted diagnostics by facilitating the transfer and analysis of large-scale medical data and images across secure, high-speed networks.

ECTS Credits: 4

Notes

By November 20th, 2024, participants are requested to join the following MS Teams group:

Deep Learning and Telecommunications in Digital Pathology: Foundations, Techniques, and Applications (MS Team Code: **yvkca9y**)

Once accepted in the Teams group, students must fill the “students_info.xlsx” file with their information.

The course is in presence. However, students pursuing their PhD period abroad (**for research purposes**) have the option to request remote attendance for classes via MS Teams.

A final exam is scheduled at the end of the course.

For Information: **Dr. CRISTIAN TOMMASINO** – cristian.tommasino@unina.it