



II EDITION - SPECIAL SESSION ON

**EXPLAINABLE ARTIFICIAL INTELLIGENCE FOR UNVEILING THE BRAIN:
FROM THE BLACK-BOX TO THE GLASS-BOX (XAIB)**

15TH JULY 2022, 14:00-16:00 (GMT+2)

Google Meet joining info

Video call link: <https://meet.google.com/ogt-xpte-qek>

Live Stream: <https://stream.meet.google.com/stream/79d3a5ff-ce7a-4311-8f86-c222ab2668f8>

PROGRAM

14:00

Dr. Alessia Sarica

sarica@unicz.it

*Neuroscience Research Center, Department of Medical and Surgical Sciences,
Magna Graecia University of Catanzaro, Italy*



Presentation of the Special Session

Nowadays, Artificial Intelligence (AI) and Machine Learning (ML) are widely used for the exploration of the Brain and their application ranges from the processing and analysis of neuroimages to the automatic diagnosis of the neurodegenerative diseases. However, without an explanation of the ML findings, the automatic medical and clinical decisions are still hard to be trusted. Indeed, the black-box nature of most algorithms, although providing high accuracy, makes the interpretation of the predictions not immediate. Thus, in recent years the need of interpretable and explainable AI, especially in Healthcare, got stronger, as well as the need of glass-box models able to show a trade-off between intelligibility and optimal performance.

14:10-14:40

Prof. Monica Hernandez

mhg@unizar.es

Computer Sciences Department, University of Zaragoza, Aragon Institute on Engineering Research



**Universidad
Zaragoza**

**Explainable AI towards understanding the performance of the top-three TADPOLE challenge
methods in the forecast of Alzheimer's disease diagnosis**

Monica Hernandez is associate professor at the University of Zaragoza (UZ). She received her B.Sc. and M.Sc. degree in mathematics in 2000 from the UZ. In 2008, she received her Ph.D. degree in Computer Science. Since then, she has been a passionate researcher on diffeomorphic registration and computational anatomy for understanding neurodegenerative diseases. Her current research interests include traditional and deep-learning based diffeomorphic registration, machine learning for the diagnosis and prognosis of neurodegenerative diseases, and interpretability and explainability towards computer aided decision making systems. Monica received a best paper award in ICCV for the inclusion of the stationary parameterization into LDDMM. The same year, she obtained a runner up position in MICCAI conference. In 2021, she was awarded with the best-reviewer award recognition in MICCAI conference.

Question time
(5 min)

14:45-15:15

Dr. Bojan Bogdanovic

bojan.bogdanovic@students.finki.ukim.mk

Ss. Cyril and Methodius University in Skopje (FCSE - Faculty of Computer Science and Engineering)



In-depth Insights into Alzheimer's disease by using Explainable Machine Learning approach

Bojan Bogdanovic is a Bachelor of Engineering in information sciences and computer engineering and He has graduated at the Faculty of Computer Science and Engineering by Ss. Cyril & Methodius University in Skopje, Macedonia. Currently, Bojan is working as a software engineer on ERP Microsoft systems. Since his college days, Bojan has developed an enthusiasm and interest into the field of data science. Amazed by the power of machine learning and incredible conclusions that can be obtained by its implementation and usability, He started to grow his knowledge in this field in a self-initiative manner (considering it as a hobby). The scientific paper mentioned above started as his graduation thesis covering the traditional machine learning approach - creating several models, comparing their metrics and deciding which one predicts most efficiently. While working on it, the thesis got a different dimension where the spotlight was set on the explainable machine learning. The goal was not to find the model with best metrics anymore, but rather to explain and show how a model with pretty stable metrics predicts subjects with particular diagnosis. Diving deep into features importance and influence on a particular subject, several hypotheses that are counted as relevant for the Alzheimer's disease were mildly rejected. Together with contributions from two incredible minds - Dr. Monika Simjanoska at Ss. Cyril and Methodius University in Skopje and Dr. Tome Eftimov at Jozef Stefan Institute in Ljubljana, they managed to obtain relevant research results and conclusions from the in-depth analysis of the Alzheimer's disease. The main trigger and motivation for Bojan to work on research in this field of study was the loss of his father, who was diagnosed with Alzheimer's disease in his middle adulthood.

Question time
(5 min)

15:20-15:50

Dr. Antonio Parziale

anparziale@unisa.it

Department of Information and Electrical Engineering and Applied Mathematics, University of Salerno



Universita' degli
Studi di Salerno

Handwriting analysis and Machine Learning against Neurodegenerative disorders

Antonio Parziale is a Postdoctoral research fellow at the Department of Information and Electrical Engineering and Applied Mathematics of the University of Salerno, Italy. He received a Master's degree in Electronic Engineering and a Ph.D. in Information Engineering from the University of Salerno, Italy, in 2009 and 2016, respectively. He works at the intersection of artificial intelligence and cognitive computational neuroscience with a focus on how the brain learns and controls movements. His research interests include handwriting analysis for early diagnosis of neurodegenerative diseases, signature and writer verification, systems neuroscience, and motor control. In 2012, he co-founded a spin-off company devoted to providing AI technologies for automatic document processing. He holds an international patent on handwriting recognition. He has served conferences and international journals as a reviewer, program committee member, chairman and guest editor since 2010.