Health Innovation Ecosystem (HIE) Seminar Spring 2020

Date: **Wednesday 29 April 2020, 1.00-2.00pm**

Place: **NOW ONLINE. Visit** https://eu.bbcollab.com/guest/81a063ec737a44969f21bd11c5fa2054 **on the day.**

Title: **Machine Learning Takes on Difficult Health Screening and Treatment Tasks**

(Jointly with the School of Computer Science and Engineering)

Speaker: **Mahmoud Aldraimli**, Research Fellow, HIE, University of Westminster

Abstract:

In health care, prevention, diagnoses, and treatment are critical areas in which technology could help improve patients' care and wellbeing. In recent years, advancements in electronic medical records were remarkable, but the information they provide is not much better than the old paper records which they replaced. If technology is to improve health care in the future, then the electronic information provided to clinicians needs to be enhanced by the power of analytics and Machine Learning.

With Machine Learning (ML), we can provide better information to physicists and clinicians at various stages of patient care. The potential benefits are endless, imagine if doctors were shown patient's risk for serious health problems or adverse treatment conditions based on clinical or treatment measurements, baseline characteristics, family history, socioeconomic status, and medical history, clinicians would make better decisions about patient diagnoses or treatment options by understanding the possible outcomes.

In this seminar, two case-studies are featured to describe the potential power brought to health care by machine learning. The first case-study demonstrates ML model ability to predict the levels of visceral fat within the human body using exercise, anthropometry and baseline characteristics in the absence of imaging data; prompting individuals to trigger essential changes to their lifestyle to reduce the risk of developing associated severe health conditions.

The second case-study exhibits ML models' contribution to breast cancer treatment management. In this case, ML models empowered clinicians to predict radiotherapy treatment side effects (Toxicities) for patients, so alternative routes to treatments could be pursued, forming an advanced step in improving cancer patients' wellbeing.

Both case-studies are fruitful collaborations with domain experts, doctors, physicists and clinicians from the NHS and various academic and research institutes including the UK Biobank and the REQUITE multi-centre European study.

Bio:

After working in the software and telecommunications industry for ten years, Mahmoud joined the University of Westminster in September 2017 as a Doctoral Researcher in Health Data Science and Machine Learning funded by a Quintin Hogg Trust scholarship and supported by the Health Innovation Ecosystem, which he has just joined as Research Fellow. As industry attention shifted towards intelligent solutions by utilising AI and Big Data, I decided that it was the right time to pursue further research to use my skills to investigate the application of Machine Learning techniques to improve patients' health.

He is also part of the Health & Social Care Modelling Group within the School of Computer Science and Engineering and an associate member of the Cancer Research Group within the School of Life Sciences, investigating how Artificial Intelligence and Big Data can be leveraged to predict breast cancer occurrence using big data obtained from the UK Biobank. During his PhD he became part of the UK STFC-funded Radiotherapy Machine Learning Network, based at the University of Manchester, leading a group of experts working together on the application of Machine Learning to predict radiotherapy toxicity in cancer patients.