



AVVISO DI SEMINARIO

Prof. Farida Cheriet

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software engineering
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Giovedì 22 luglio 2021
ore 12:00

Sala Consiglio, 7° piano

Artificial Intelligence for medical image Analysis: Applications and Challenges

This presentation will provide an overview of work done in recent years by our research group to develop artificial intelligence platforms for Computer Aided Diagnosis and numerical simulation of treatments in orthopedics, cardiology and ophthalmology. We first describe our surface acquisition system and introduce a set of clinical measurements (indices) based on the trunk's external shape, to quantify its degree of asymmetry. We will show how this technology allowed us to initiate new research programs such as: a) investigating the complex relationship between the external deformities of the trunk surface and the underlying bone structures obtained from X-rays; and b) modeling and simulating the effect of orthopedic treatment on the external appearance of the patient. These research activities opened a paradigm-shift in the treatment strategy as the surgeon presently takes into account the satisfaction of the patient instead of focusing only on the correction of the spine. Then, we will present our ongoing research in cardiac imaging, a field in which we initiated the development of innovative tools for the diagnosis and reliable clinical assessment of patients with Kawasaki disease. Finally, we will present our recent work on automatic diagnosis of ocular diseases using machine learning techniques.

Short bio. Farida Cheriet received the B.Sc. degree in computer science from the University USTHB, Algiers, in 1984, the D.E.A. degree in the field of languages, algorithms and programming from the University of Paris VI, France, in 1986, and the Ph.D. degree in computer science from the University of Montreal, QC, Canada, in 1996. She held a postdoctoral position at the Biomedical Engineering Institute, École Polytechnique de Montréal, from 1997 to 1999. Since 1999, she has been appointed in the Department of Computer and Software Engineering, École Polytechnique de Montréal, where she is currently a full Professor. She is an IEEE Senior member, a member of the research center of Sainte Justine hospital in Montreal and a member of Ordre des Ingénieurs du Québec. She is the director of two laboratories: LIV4D (Laboratory of Imaging and Vision in 4 Dimensions) at Polytechnique and LAVIANI (Laboratory of Non-Invasive Active Vision) at Sainte Justine research center. She has made contributions in medical imaging and has been collaborating with clinicians at Sainte-Justine Hospital since her appointment at Polytechnique in 1999. She also has recently established a partnership with Mila Institute and ophthalmologists from Maisonneuve Rosemont hospital to develop Artificial intelligence platforms for diagnosis of ocular diseases. Her research interests include, three-dimensional (3-D) reconstruction of bone structures from x-rays, calibration of x-ray imaging systems, non-invasive 3-D modeling of scoliosis deformities, 3-D Augmented Reality systems for minimally invasive surgery, retinal image analysis, 3-D reconstruction and visualization of vascular structures from multimodal images, and spatiotemporal registration of medical images. Her research activities have generated three patents, four licenses, and more than 100 journal papers and 200 full manuscripts and abstracts in conference proceedings.