CORS · SCRO

Canadian Operational Research Society
Société canadienne de recherche opérationnelle

CORS Micro-Event:

Machine Learning and Artificial Intelligence in Healthcare

To register: https://wlu.ca1.qualtrics.com/jfe/form/SV_bgsFWricXvYZv37

Event Schedule

Friday, October 30, 2020
1-3 PM EST

- 01:00 p.m. Opening Remarks
- 01:05 p.m. Talk 1
- 01:25 p.m. Talk 2
- 01:45 p.m. Talk 3
- 02:05 p.m. Plenary Talk
- 03:00 p.m. Closing Remarks and Adjournment

Talk 1

Iimproving Health Care Management Through a Combination of Deep Learning and the Blockchain Technology

Presenter: Egbuonu Chinedu, Ph.D. Student
Supervisor: Anjali Awasthi
Concordia Institute of Information and System Engineering, Concordia University

Abstract. This study aims to build a Smart Medical System, by developing a blending problem approach through the implementation of a cross-intersectional synergy between AI, the Blockchain technology and IOT. Firstly, it starts out by defining the different components of the technology units, i.e. blockchain and Machine learning, and then it continues with the description of how these components can be integrated into a whole digital ecosystem. Finally, it finishes off by delivering the results such digital integration is meant to cultivate. Synoptically, it presents a proposal and an implementable approach that defines how the combination of AI and blockchain hold the prospect of reducing medical wait times, achieving high health data throughput, simplifying hospital operations and more importantly how it can be used in the prediction of future health problems, including an unexpected pandemic.

Talk 2

A Bayesian Machine Learning Approach for Patient-Specific Treatment of Type 2 Diabetes

Presenter: Somayeh Ghazalbash, Ph.D. Candidate
Supervisor: Manaf Zargoush
Health Policy & Management, DeGroote School of Business, McMaster University

Abstract. This research aims to use Machine Learning to identify patient-specific treatment plans for diabetic patients considering their chronic conditions and demographic characteristics. To this end, we used Bayesian Network modeling, for both predictive and prescriptive purposes, with the electronic health records of 17,773 Type II diabetic patients. First, we predicted the 30-day mortality risk for 24 patient groups based on their combinations of chronic conditions and demographic characteristics for 128 different treatment plans. Then, we identified the best treatment plans by minimizing the risk of 30-day mortality. Our results indicate various optimal pathways of medication therapy for the diabetic patients who had different chronic conditions and demographic characteristics.

Talk 3

Predicting the Number of Beds Required to Clean at the Emergency Department (ED) Using Machine Learning Algorithms

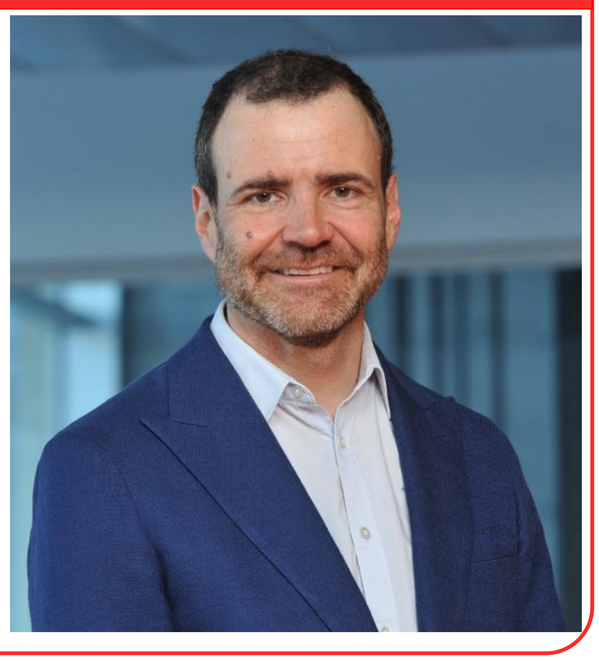
Presenter: Tahera Yesmin, Ph.D. Candidate
Supervisor : Michael Carter
Department of Mechanical and Industrial Engineering, University of Toronto

Abstract. Housekeeping is crucial in patient-flow from ED to inpatient bed. Delay in bed cleaning is one of the significant contributors to excess wait times in the ED. When a patient leaves a bed (for example, discharge or admitted to inpatient), housekeeping staff must clean and sanitize the bed. Knowing when the beds will be available especially during ED surge can facilitate the process of bed cleaning. This research aims to apply machine learning algorithms to predict the number of beds available in the next four hours. This will enable housekeeping staff to plan and reduce ED wait times.

Plenary Speaker

Louis-Martin Rousseau

Full Professor at Polytechnique Montréal, Canada Research Chair in Healthcare Analytics and Logistics



Improving the Efficiency of Cancer Treatment through Predictive and Prescriptive Analytics

The main cancer treatment modalities are surgery, radiation therapy and chemotherapy. The complexity of logistics processes surrounding the preparation of schedules for staff who work in cancer treatment centres is the fact that they involve extremely costly resources, sometimes synchronously. In addition, they are subject to several due dates (i.e., appointments already scheduled, maximum waiting time) and several hazards (i.e., variable preparation time for each patient) and should handle unexpected events like the arrival of patients requiring urgent palliative care. The flow of operations should be controlled to ensure that treatments are prepared in time for their delivery. We will discuss several problems which can lead to improve throughput of patients, such as scheduling appointments and medical personnel, and designing treatment that can be delivered efficiently, which were conducted with our hospital partners. We will cover the use of simulation, online stochastic optimization with Benders decomposition and column generation.

Organized by: The Health Care Operational Research Special Interest Group (HCOR SIG)