



Séminaire organisé par le Comité étudiant CIRRELT-UL

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«From Prediction to Personalized Decision Support: AI-Based Approaches for Type 1 Diabetes Management»

Abstract: Despite significant advances in diabetes management technologies, many individuals living with type 1 diabetes still face considerable challenges in managing their condition on a daily basis. These challenges arise from multiple interacting factors that influence blood glucose levels, including insulin administration, carbohydrate intake, physical activity, and individual physiological characteristics.

In this presentation, I will provide an overview of our research on AI-based approaches for blood glucose prediction and personalized decision support. Our work uses real-world data collected from individuals living with type 1 diabetes, including children, adolescents, and adults, with varying levels of physical activity and different insulin delivery methods. I will first discuss how deep learning models use multivariate time-series data to predict blood glucose levels and anticipate hypoglycemic and hyperglycemic events, while addressing the challenges associated with physical activity and individual variability. I will then introduce our recent work on explainable AI and counterfactual optimization, which aims to go beyond blood glucose prediction by generating personalized and actionable recommendations to improve glycemic control, while respecting clinical constraints and accounting for individual preferences.

Biography: Monia Rekik is a Full Professor in the Department of Operations and Decision Systems at the Faculty of Business Administration, Université Laval. She holds an Engineering degree in Industrial Engineering from the National Engineering School of Tunis (ENIT), a Master of Applied Science (M.A.Sc.) in Applied Mathematics, and a Ph.D. in Mathematical Engineering from Polytechnique Montréal.

Her expertise encompasses mathematical modeling, combinatorial optimization, decision-making under uncertainty, and artificial intelligence. Her research addresses a wide range of problems, including personnel scheduling, production planning and scheduling, auction mechanism design, supply chain design and management, and type 1 diabetes management. Her work aims to develop decision-support approaches and tools to address complex problems, in collaboration with industrial partners and healthcare professionals.

She is a member of the Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT), the Research Network on Cardiometabolic Health, Diabetes and Obesity (CMDO), the CHU de Québec-Université Laval Research Center, and the Lab-Usine – Unité mixte de recherche sur les systèmes manufacturiers innovants. She is also an associate member of the Group for Research in Decision Analysis (GERAD). She coordinates the International Associated Laboratory (LIA) AlgoDIab1 in collaboration with the University of Lille and is a leader of the SDG Innovation Network.

VENDREDI

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Local 2327
Pavillon Palasis-Prince
Université Laval

This talk will be in English

Ouvert à tous

Café et viennoiseries

Organisateur:
Comité étudiant CIRRELT-UL

