

International Summit on Industrial Engineering

December 08-10, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Multicriteria classification methods: Methodology and applications

Nabil Belacel

Moncton University, Canada

Knowledge Discovery processes (KD), including data mining and machine learning, are well-known approaches that lead to a successful decision-making process. However, KD usually requires discovering useful knowledge from data, while data mining and machine learning techniques focus on the application of algorithms for extracting patterns from data. They do so by analyzing the information that resides in data or legacy systems using advanced algorithms and modeling techniques. Machine learning is a popular approach for gaining and extracting new and valuable knowledge from data. It provides techniques that often focus on the application of algorithms to extract patterns from data and to infer rules. The extracted rules are used later to discover new knowledge. The inductive approach in machine learning has been employed to build the models of human decision making with rules. The extracted rules and knowledge can enable a decision maker (DM) to identify market trends, assist in disease diagnoses, or support and facilitate the making of well-informed decisions. However, the study of decision making has also been addressed by another field called multiple criteria decision analysis (MCDA). MCDA techniques have originally been developed mainly in the fields of operation research, social psychology, and business management. In recent years, the field of MCDA is attracting many researchers and decision-makers from many areas including health, business, defense and construction. The employment of MCDA techniques helps to organize a professional decision-making process. The major distinguishing aspect of MCDA is the orientation toward decision support (decision aid) rather than simple decision model development. Generally, MCDA approaches are focused on the model development features that are related to the modeling and representations of the decision makers' preferences, values and judgment policy. The general idea of this presentation is to integrate two major Fields: machine learning and MCDA for classification problems. The author will present a new developed technologies based on MCDA and machine learning for KD with some applications to different areas including bioinformatics, intrusion detection and telecommunication.

Biography

Nabil Belacel, (PhD Free University of Brussels, Belgium; Postdoctoral at GERAD "Group for Research in Decision Analysis" of University of Montreal) is a Senior Research Officer at the National Research Council- Data Analytics for Engineering Group. He is a Registered Professional Engineer in Canada. He is internationally recognized for his research on multiple criteria classification methods and their application to ICT. He is the recipient of numerous scholarships and awards, including a gold award of excellence from Canadian Information Productivity Awards in 2007. He also received in May 2009 the CATA Alliance Innovation and Leadership Award in the Public Sector Leadership in Advanced Technology category at the 24th Annual Canadian Innovation and Leadership Awards Gala. His research interests include operations research, multiple criteria decision analysis, data analytics.

Nabil.Belacel@nrc-cnrc.gc.ca