Call for Contributions

Machine Learning for Sustainable Urban Futures: Infrastructure, Mobility, Economics, and Social Equity in Smart Cities 2.0

An edited collection to be published by Palgrave Macmillan

Co-edited by:
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The Jacques Ménard - BMO Centre for Capital Markets along with the Centre of Zero Energy Building Studies at Concordia University and the Engaged Sustainable Futures team at the American University in Cairo (AUC) kindly invite you to contribute to the forthcoming edited book ***Machine Learning for Sustainable Urban Futures: Infrastructure, Mobility, Economics, and Social Equity in Smart Cities 2.0*** to be tentatively published by **Palgrave-Macmillan**.

ABOUT THE BOOK

Cities are the engines of economic growth and innovation. However, urban agglomerations are also facing increasing risks from climate change. Extreme weather events, overpopulation, demographic transformations, resource scarcity, and political and economic uncertainties are now threatening the well-being of urban populations, the sustainability of urban environments, and the potential for economic growth. Machine learning (ML) presents a powerful new tool for managing, predicting, and mitigating future sustainability risks.

Traditionally, urban planners have relied on conventional techniques that depend on historical data and deterministic models. However, the dynamic and complex nature of the threats posed by climate change has highlighted the shortcomings of these conventional strategies. A new age in urban planning is being ushered in by machine learning. ML algorithms may ingest massive data to identify patterns and generate real-time predictions. The capacity of machine learning to perform predictive analytics highlights the technology's transformative potential. By examining past climate data, machine learning models can predict future patterns and assess how vulnerable urban regions are. This ability to forecast the future allows city planners to proactively put adaptive measures into place, such as building early warning systems, strengthening vital infrastructure, or creating robust urban designs. Beyond forecasting, machine learning can optimize urban resource management, tackling issues with waste management, energy use, and water scarcity. ML algorithms can also drive, optimize, and improve smart infrastructure.

Machine Learning for Sustainable Urban Futures: Infrastructure, Mobility, Economics, and Social Equity in Smart Cities 2.0 is an edited collection that examines how Machine Learning can be used to build resilient cities that are prepared for climate challenges and thrive economically. ML can predict and manage risks like flooding and heat waves by analyzing data from urban sensors. It can also optimize resource management for utilities, waste, and transportation.

Furthermore, advanced ML can improve infrastructure design and social equity in response to climate disruptions. Ultimately, the book explores how ML can create new economic opportunities for cities to ensure long-term financial health. The book will feature contributions from leading experts in architecture, urban planning, economics, public policy, computer science, and sustainability. Additionally, the edited book explores the anthropological and social repercussions of these ML developments on city dwellers on theoretical and practical levels. It showcases real-world case studies of successful ML applications in cities around the globe, providing valuable insights and practical examples for policymakers, urban planners, architects, and researchers.

CALL FOR CONTRIBUTIONS

Machine Learning for Sustainable Urban Futures: Infrastructure, Mobility, Economics, and Social Equity in Smart Cities 2.0 aims to explore and present new developments and advancements made in machine learning (ML) in the context of sustainable urban futures.

The editors are accepting contributions from experts in both the academic and practitioner communities, including those in data science, machine learning, urban planning, sustainability sciences, public administration, economics, and technology. The editors invite contributions that:

- Review and critically analyze new developments at the intersection of machine learning (ML) and sustainable urban practices, infrastructure, mobility, economics, and social equity,
- Focus on the sustainability benefits and possible downsides of applying ML technologies to urban planning, resource management, transportation, and economic resilience,
- Explain and demonstrate the predictive capabilities of ML in a sustainability context, using different model types such as supervised, unsupervised, and semi-supervised learning, and/or
- Explore broader human, economic, and ethical dimensions related to these technologies, such as policy, urban design, and the anthropological and social repercussions of ML developments.

Moreover, chapters that use case studies or comparative studies (between different applications in various industries or variations between regions) are strongly encouraged. The submissions

will be reviewed with an open mind and with a particular focus on the relevance of the chapter with respect to ML for sustainable urban futures.

POTENTIAL TOPICS FOR CHAPTERS

1. **Applications of ML in the design and management of infrastructure and buildings**
   - ML applications in the design of infrastructures and buildings
   - Smart and IoT technologies for monitoring and managing cities
   - ML applications in building and infrastructure management
   - Adaptable spaces and infrastructures through ML
   - Applications of intelligent and predictive systems for climate responsive urbanity

2. **ML applications in the management of resources and mobility in cities**
   - The application of ML in local and regional public transportation systems
   - Road and traffic management in the age of ML
   - Individualized urban mobility solutions: Autonomy, multi-mobility, and access
   - ML applications in utility services provision, management, and resilience
   - The application of ML in the transportation and movements of goods and services in cities

3. **ML applications for sustainable urban economics and businesses**
   - ML applications for sustainable urban practice: Circularity, symbiosis, and efficiency
   - ML for economic resilience and growth in cities
   - Business opportunities in cities driven by ML and AI
   - Applications of ML in managing essential resources in cities: Air, water, food, and healthcare management
   - Public finance and budgeting in ML-augmented urban environments
   - Economic policies and incentives for sustainable urban development through ML

4. **ML for socially sustainable and inclusive cities**
   - ML-powered community-driven planning and assessment of cities
   - ML and AI applications for affordable and equitable access to housing
   - Data-driven community services
   - Optimizing access to green and wellness spaces in cities
   - Funding, partnerships, and investment opportunities for ML augmented cities

5. **Resilience, governance, and policies for ML in cities**
   - Preserving biodiversity and revitalizing cities through ML applications
   - Regulatory and policy frameworks for ML in urbanity

- The ethical risks of ML applications and their management

IMPORTANT DATES

- Abstract and CV submission deadline – **September 30th, 2024**
- Selection of abstracts and notification to successful contributors – **October 15th, 2024**
- Full chapter submission – **January 15th, 2025**
- Revised chapter submission – **May 31st, 2025**

GUIDELINES FOR CONTRIBUTIONS

Submissions should be written in English using a non-technical writing style. The contributions may include diagrams/illustrations in order to present data, or photographs/figures (all in black & white) to better illustrate the topic of discussion. Submitted chapters should be original and exclusively prepared for the present book. No part of the article should be published elsewhere. Chapters must not exceed 9,000 words (including all references, appendices, biographies, etc.), must use 1.5-line spacing and 12 pt. Times New Roman font, and must use the APA 7th edition reference style.

Researchers and practitioners are invited to submit abstracts of no more than 500 words, a bibliography for their proposed chapter, and a CV. Abstract submissions are expected by September 30th, 2024. Submissions should be sent via email to ml_sust.urbanfutures@aucegypt.edu.

Authors will be notified about the status of their proposals and will be sent complete chapter guidelines.
Full chapters are expected to be submitted by **January 15th, 2025**.

Please note that there are no submission or acceptance fees for manuscripts.

ABOUT THE EDITORS

Thomas Walker[1]

Thomas Walker holds a BSc in Management Information Systems from the Technical University of Darmstadt, Germany, and an MBA and PhD degree in Finance from Washington State University. Prior to his academic career, he worked for several years in the German consulting and industrial sector at such firms as Mercedes Benz, Utility Consultants International, Lahmeyer International, Telenet, and KPMG Peat Marwick. His research interests are in emerging risk management, corporate finance, venture capital, sustainability & and climate change, FinTech, corporate governance, securities regulation and litigation, insider trading, and institutional ownership, and he has published over 70 articles, book chapters, and edited books in these areas. He is the lead editor of seven books on sustainable financial systems, sustainable real estate, sustainable aviation, environmental policy, emerging risk management, innovations in social finance, and water risk management. Dr. Walker is the principal investigator on research grants by the Social Sciences and Humanities Research Council (SSHRC), the Autorité des marchés financiers, and the Global Risk Institute. In 2018, he founded the Emerging Risks Information Center (ERIC, https://emerging-risks.com), which conducts targeted research on environmental, technological, and societal risks that affect our world today. In 2021, he became the inaugural director for the Jacques Menard/BMO Center for Capital Markets Research at Concordia University and the Concordia University Research Chair in Emerging Risk Management (Tier 1).

Sherif Goubran[2]

Sherif Goubran is an assistant professor of sustainable design in the Department of Architecture, School of Sciences and Engineering, at the American University in Cairo (AUC). He completed his PhD in the Individualised Program (INDI) at Concordia University in 2021. Before that, he completed a MASc in building engineering in 2016, focusing on energy efficiency in commercial buildings. He holds a BS in architecture from AUC. Goubran's research focus includes building sustainability and sustainability assessment, sustainability in architectural design, and human approaches in design. Specifically, his work investigates the theory and practice of sustainability in the built environment, combines qualitative and quantitative methodologies, and explores the shift from incremental to transformational design. He leads the Engaged Sustainable Futures (ESF), a platform for interdisciplinary ventures that aim to uncover the many possible sustainable futures of the built environment. Based in the Department of Architecture at the American University in Cairo, ESF MAM-BE achieves its vision through research, pedagogy, and creation.

Liangzhu (Leon) Wang[3]

Dr. Wang is Associate Director of the Centre for Zero Energy Building Studies (CZEBS) and have led multiple large-scale projects with Canada federal and provincial grants focusing on

urban climate and sustainability with the focus on studying the impacts of the climate change, such as Advancing Climate Change Science in Canada, and Canada Foundation of Innovation, contributing to international codes/standards and guidelines, such as IECC, ASHRAE, and REHVA. His research also contributed to the mitigation of urban heat island and COVID-19 impacts in Canada and were widely covered by the media. He has organized large international conferences and workshops and led multi-disciplinary projects, collaborating with many governments and research institutes, including National Research Council Canada (NRC), Health Canada, and Environment and Climate Change Canada. Dr. Wang is also leading the NRC collaboration in the recent Canada First Research Excellence Fund (CFREF) project "Electrifying Society – Towards Decarbonized Resilient Communities".

Ahmed Marey[4]

Ahmed Marey is a published author and researcher in sustainable architecture and computational design. He is a Ph.D. research student at Concordia University and the National Research Council Canada. He completed a MASc in building engineering in 2023. He also holds a BSc in architecture from the American University in Cairo, focusing on tectonics and computational design. Marey's research focuses on the interdisciplinary field of urban planning and machine learning. His work uses big data analytics to decipher complex urban interactions and provide valuable insights to policy and decision-makers. His research explicitly targets urban morphology prediction and its interaction with climate change.

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