

Introduction to the HICSS-56 Minitrack on Geospatial Big Data Analytics

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1. Introduction

Geographic perspectives have historically contributed unique solutions to diverse problems, centred on the complex relationships between humans and their environments. With increases in sensors, social media, human mobility data, spatial imagery and remote sensing, geospatial big data presents an emerging frontier of research and innovation in the system sciences and across various sectors and industries. Advancements in geospatial big data have provided businesses and organizations with an ability to obtain more granular level information on human behavior.

With the increased automation of data collection and analysis, along with the development of algorithms that can extract and illustrate patterns in human behaviours, geospatial big data has raised key questions about research processes and the ways in which academics and industry practitioners should engage with these data sources. There is an ever growing need to address questions on how to make sense of these vast amounts of raw information and how to evaluate the role of traditional forms of scientific theories and models in assessing these types of data. With geospatial big data providing immense opportunity for expanding our understanding of human behaviours, there has been increased reliance on new data sources for understanding human interaction across many disciplines.

This minitrack includes papers that analyze and mine geospatial big data using cutting-edge scientific approaches to provide insights to complex problems and systems in business, government, and society. This minitrack includes both theoretical and empirical papers in a variety of analytics contexts including deep learning, big data analytics, tourism analytics and business decision support. The following provides a brief overview of the five papers included in this minitrack.

2. Deep Learning and Land Use Classification

The paper on “Using Isolation Forest and Alternative Data Products to Overcome Ground Truth Data Scarcity for Improved Deep Learning-based Agricultural Land Use Classification Models” by A. Garcia Pereira, L. Porwol, A. Ojo proposes a preprocessing method to help improve the quality of performing land-use classification. Specifically, this study investigates the use of an anomaly detection algorithm (Isolation Forest), to reduce noise in a large-scale, low-resolution ground truth dataset used to train land use deep learning models. Through the use of a data-centric methodology, the authors demonstrate the effectiveness of deep learning methods, coupled with Isolation Forest, to create mid-resolution land-use models and map products for agriculture. The authors go on to compare the differences between their deep learning approaches with traditional approaches used in remote sensing.

3. Tourism and Hospitality Analytics

The paper on “Spatial analytics with hospitality big data: Examining the impact of locational determinants on customer satisfaction in the U.S. hotel market” by M. Lee, J. Kim, and H. Shin investigates the locational determinants of hotel guest satisfaction through big data spatial analytics. Using a case study of 5,302 hotels in 151 U.S cities, the locational determinants, and the spatial heterogeneous effects of locational determinants, with regard to hotel guest satisfaction, are investigated. The study identifies that a hotel property’s proximity to city area, landmarks, parks, shopping center, and highways, were significant determinants of satisfaction.

The paper on “A User-POI-Guide Cost Optimization Method for Tourism Planning Considering Social Distance and User Preferences” by D. Li, P. Siriaraya, Y. Wang, and Y. Kawai proposes a new travel guide sharing service that considers the concept of social distance and user preferences. The proposed system can recommend

tour guides, scenic spots, and route planning to provide a real-time tour guide plan, which addresses user preferences.

4. Big Data guided Resources Businesses

The paper on “Big Data guided Resources Businesses – Leveraging Location Analytics and Managing Geospatial-temporal Knowledge” by S. Nimmagadda, A. Ochan, T. Reiners, and N. Mani, analyses changes in the business rules affecting big data modelling and subsequently how big data characteristics influence data modelling. This study identifies the significance of big data in the resources industry and how the heterogeneous and multidimensional data sources are articulated with spatial dimensions through mapping and modelling methodologies.

5. Corporate Location Planning

The paper on “The Evolution of Corporate Location Planning: A Survey Approach” by J. Aversa and T. Hernandez investigates the current state and progress in the type and scale of location decisions that retail firms undertake and the availability and use of geospatial and analytics within the decision-making process. Through an online survey of 89 retail location decision-makers, this study finds significant increases in the usage of geospatial big data and analytics within corporate location planning. Retail location decision-making approaches have expanded to include new data sources, such as social media and mobile location data.

6. Conclusion

Geospatial big data promises to offer comprehensive, interconnected, spatiotemporal data that can provide an increased level of sophistication and a more detailed understanding of human behavior. Furthermore, it presents the possibility of a new era of decision making centered on data-driven decisions that will challenge the boundaries and nature of location intelligence. The contributors to this inaugural research minitrack have showcased a number of research strands in which novel data sources and methodologies can play a key role for industry practitioners and academics.