

Chapter 9

Current Trends, Opportunities, and Futures Research Directions in Geospatial Technologies for Smart Cities

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ABSTRACT

Studying current trends and opportunities in geospatial technologies for Smart cities helps city planners and administrators understand technology advancements and aids in better implementation practice. Similarly, understanding future research directions enables researchers and policymakers to harness these technologies fully and anticipate upcoming developments. Overall, this approach supports the creation of more livable, sustainable, and equitable cities for all. This chapter explores the

DOI: 10.4018/979-8-3693-8054-3.ch009

current trends, emerging opportunities, and future research directions. Geospatial AI is supported by several cutting-edge technologies such as IoT, digital twins, and 3D/4D urban modeling. Future geospatial research should use advanced AI models, real-time analytics, and privacy-preserving technologies. Understanding the technologies' ethical and inclusive implementation is essential to support long-term urban sustainability and citizen well-being. Such Smart cities can ensure more sustainable, resilient, and equitable urban environments for future generations.

1. INTRODUCTION

Smart Cities (SC) are considered the future of urban living. Numerous computing and geospatial technologies are used in cohesion to help city administrators get a unified view and help them make effective decisions and formulate strategies for SCs (Mishra & Singh, 2023; Smékalová & Kučera, 2020). Urban environments generally involve lots of complexities, mostly of technologies and data. Further, the spatial data and related technologies are evolving, offering immense opportunities as Smart cities adopt geospatial technologies.

Further, the SC agenda has increased regional cooperation between cities, increased digitalization, and is meeting citizen service requirements much better than before (Masik et al., 2021). This chapter attempts to explain several challenges and opportunities that emerge with the increasing adoption of intelligent solutions for urban management. Both SCs and geospatial technologies are rapidly evolving topics. Exploring future research trends helps stakeholders stay on top of research and use it for the next phase of urban innovation. The subject is multidisciplinary and is a topic of interest for researchers in multiple fields. It spans urban planning, GIS (Geographic Information Systems), data science, computer science, and sustainability. The application and culmination of these studies are evolving into newer sub-studies. Spatial analysis primarily deals with “location information” and “attribute information”. Statistics deals with uncertainty quantification. Spatial Statistics is an evolving field in which spatial analysis meets statistics (Cressie & Moores, 2023). Along similar lines is Geoinformation and Communication Technology (GeoICT), another evolving discipline that culminates in ICT implementations involving geographic information science (GIS) and systems in SCs (Ang et al., 2022). Figure 1 shows the Geospatial Data Flow in Smart Cities.

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