Chapter 7
Approaches in Smart Urban Planning With Artificial Intelligence Through Data Science

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ABSTRACT

Sustainability is a key aspect of preserving for future generations without hindering the needs of the current generation. Sustainability is of interest because it is regarded as a social goal. Ever since the migration of population into urban settings has shown increase it is a key aspect for sustainability to plan, establish and run smart cities and implement sustainability goals while planning for further growth. Recent trends in artificial intelligence have led to a proliferation of studies that involve data and molding data for algorithms for better solutions. Data science and Artificial intelligence can create, control, and predict trends, solutions and issues involving urban planning, sustainability, and smart cities. This chapter discusses the use cases, problems and sustainable solutions and modes of using artificial intelligence and data science in urban planning and smart infrastructure.

INTRODUCTION

Artificial intelligence (AI) is the technology which has assisted in multitude of research by creating solutions and predictions to help humankind; Data Science (DS) is a key field which is working towards creation of relevant information and datasets

DOI: 10.4018/979-8-3373-3246-8.ch007

which help AI in understanding the problem statement and create solutions (Rathore et al., 2020). Together these technologies throw light on various scenarios that can be analysed for an issue, determining causes, effects, benefits of an approach. The idea is to inculcate sustainable development goals by researching ideas and implementations with AI and DS. Gradual evolution of technology and its involvement in building infrastructure can be observed currently with the introduction of smart homes, smart traffic systems, smart vehicles, or perhaps smart cities (Satpathy et al., 2025).

The main ideology of introducing these key terms in urban planning is to infuse technology advancements with functional infrastructure, making it more functional with less resources. With the onset of initial digital city creation for Amsterdam in 1994 (Boopathi, 2024), the growth gradually introduced key points of analysing urban data and management of cities. Traffic control systems were initial systems that were updated to manage increasing traffic and suggestions of shorter routes (Almuhanna & Salman, 2018). Implicitly this laid groundwork for other systems like parking systems. The development of smart infrastructure has complex relativity with multiple factors, such as cost, innovation, policies, and technology (Köster et al., 2018). To understand the importance of urban planning in this chapter explores the AI-driven approaches fine-tuned with data science to revolutionize the urban infrastructure and architecture (Hussain, 2024). Figure 1 discusses the brief technological advancements that shape the map of collecting data through sensors, analysing them with big data techniques and securing them with multiple strategies that can lead to usage of this data for deriving favourable results. The available data through satellite imagery, social media, sensors, IoT has proven to be a catalyst in figuring out solutions to make urban settlements better (Almolhis et al., 2020; Vangala et al., 2020). Planning cities that are more functional and resilient towards factors like transportation, housing, and availability of services. Algorithms in deep learning provide wider insights in data collected from multiple aspects, promotes result driven approach. Smart traffic systems are currently implemented in multiple countries which have shown reduction in traffic congestion, efficacy in alternative routes for fuel savings, smarter parking access and efficient lane and speed controls (Di Febbraro et al., 2020). Similarly, smart transportation systems are also braving better routes, decreasing latency in freight deliveries.