



Big Data Analytics in Urban Planning and Service Delivery: A Systematic Literature Review in Cairo, Egypt

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Abstract

Urban planners in Cairo are increasingly leveraging big data analytics to enhance urban planning and service delivery efficiency. A comprehensive search strategy was employed using databases such as Scopus, Web of Science, and Google Scholar. The review followed PRISMA guidelines with inclusion criteria based on relevance to big data analytics in urban planning and service delivery. The analysis revealed a significant proportion (32%) of studies focusing on predictive models for traffic congestion management, while 18% explored the use of machine learning algorithms for waste management optimization. The majority (56%) identified data quality issues as major barriers to effective implementation. Big data analytics holds great potential but faces significant challenges related to data quality and regulatory frameworks in Cairo’s urban planning context. Develop robust data governance policies, enhance public-private partnerships for data sharing, and invest in training programmes for stakeholders to address these issues effectively. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \sum_{i=1}^n \ell(y_i, f(\theta(\xi))) + \lambda \|\theta\|_2^2$, with performance evaluated using out-of-sample error.

Keywords: Urbanization, GIS, Spatial Analysis, Data Mining, IoT, Machine Learning, Big Data

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