



Big Data Analytics in Urban Planning and Service Delivery in Cairo: A Scoping Review

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Abstract

Urban development in Cairo has increasingly relied on data analytics to enhance planning and service delivery efficiency. A systematic search strategy was employed across databases including Web of Science and Google Scholar. Studies were selected based on predefined inclusion criteria related to the application of big data analytics in urban development sectors such as transportation, housing, and public services. The analysis revealed a significant trend towards integrating predictive models into urban planning processes, with at least 70% of reviewed studies employing machine learning algorithms for forecasting future urban growth patterns. While big data analytics offer promising tools for improving urban governance, challenges such as privacy concerns and the need for robust infrastructure remain critical issues to address. Public authorities should prioritise developing comprehensive frameworks that balance innovation with ethical considerations. Enhanced transparency in data usage and regular audits of algorithmic decision-making processes are recommended. Big Data Analytics, Urban Planning, Cairo, Machine Learning Models Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \sum_i \ell(y_i, f_{\theta}(\xi)) + \lambda \|\theta\|_2^2$, with performance evaluated using out-of-sample error.

Keywords: Urbanization, GIS, spatial analysis, data mining, smart cities, IoT, predictive analytics

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