



Big Data Analytics in Urban Planning and Service Delivery: An Egyptian Perspective in Cairo

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Abstract

Urban planning in Cairo faces significant challenges such as population growth, infrastructure strain, and service inefficiencies. A mixed-methods approach combining quantitative surveys with qualitative interviews to analyse public perception and usage patterns of digital services. Survey results indicated that 75% of respondents used at least one digital service for urban governance, revealing themes of improved transparency (e.g., city budget allocation) and convenience (e.g., online payment systems). The survey data supports the potential of big data analytics in optimising Cairo's urban services. Implement continuous feedback mechanisms to refine digital service offerings based on public engagement patterns. Big Data Analytics, Urban Planning, Service Delivery, Cairo, Egypt Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sum}_{i=1}^n (y_i - f(\theta(\xi)))^2 + \lambda \|\theta\|_2^2$, with performance evaluated using out-of-sample error.

Keywords: *Geographic Analytics, Urban Informatics, Spatial Data Science, Geographic Information Systems (GIS), Data Mining, Network Analysis, Smart Cities*

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