

AI-Driven Data Governance for Smart Cities: Balancing Privacy, Efficiency, and Public Trust

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Abstract

The integration of Artificial Intelligence (AI) in smart cities has transformed urban governance, enhancing efficiency in public services, infrastructure management, and decision-making. However, the widespread use of AI for data collection and analysis raises significant challenges related to privacy, algorithmic bias, transparency, and public trust. Without proper governance, AI systems risk exacerbating inequalities, infringing on citizen rights, and reducing accountability in automated decision-making. This paper explores how AI-driven frameworks can enhance data governance while ensuring privacy protection, algorithmic fairness, and citizen empowerment. Key strategies include federated learning to enable decentralized data processing, differential privacy to protect individual identities, and explainable AI (XAI) to increase transparency in automated decisions. Additionally, bias detection mechanisms and algorithmic audits are essential to prevent discrimination in AI-driven urban systems. Public trust is crucial in smart city initiatives, requiring citizen engagement models, participatory AI councils, and transparent data-sharing policies. Case studies from Barcelona, Singapore, Buenos Aires and Toronto illustrate effective AI governance approaches that balance innovation with ethical considerations. The paper proposes a comprehensive governance framework integrating privacy-centric AI, fairness-aware algorithms, and public engagement strategies to ensure sustainable, transparent, and accountable AI-driven urban ecosystems. By aligning technological advancements with ethical and legal safeguards, smart cities can optimize AI's potential while maintaining public trust and regulatory compliance.

Keywords

AI Governance, Smart Cities, Data Privacy, Ethical AI, Public Trust.