Evaluating Women Safety in Urban Areas Using Machine Learning

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Abstract: *Urban safety remains a critical concern, especially for women navigating unfamiliar or high-risk environments. This project proposes a data-driven solution titled "ML-Driven Safety Enhancement System for Women in Urban Areas", which leverages machine learning, geospatial analysis, and real-time public sentiment to recommend safer travel routes. The system integrates diverse data sources—including crime reports, CCTV density, public transport availability, and sentiment analysis from Twitter—to assign safety scores to city grid regions. These scores are dynamically visualized through an interactive map interface, helping users make informed decisions. A Dijkstra-based pathfinding algorithm is adapted to prioritize not only shortest routes but also the safest paths based on multi-factor risk assessment. Preprocessing steps include data normalization, geospatial grid division, and feature weighting. The model is trained and tested on city-specific datasets, with performance evaluated on both accuracy of classification and usability. This prototype, while not deployed, demonstrates the feasibility of intelligent public safety tools that merge civic data, AI, and urban planning to enhance mobility confidence for women.*

Keywords: Women's safety, Urban risk analysis, Machine learning, Geospatial data, Safe route recommendation, Sentiment analysis, Public transport access