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Bridging Urban Planning and Environmental Conservation: A Regional Analysis of Northern and Central Kolkata

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Abstract : This study introduces an advanced approach to tree canopy detection in urban environments and a regional analysis of Northern and Central Kolkata that delves into the intricate relationship between urban development and environmental conservation. Leveraging high-resolution drone imagery from diverse urban green spaces in Kolkata, we fine-tuned the deep forest model to enhance its precision and accuracy. Our results, characterized by an impressive Intersection over Union (IoU) score of 0.90 and a mean average precision (mAP) of 0.87, underscore the model's robustness in detecting and classifying tree crowns amidst the complexities of aerial imagery. This research not only emphasizes the importance of model customization for specific datasets but also highlights the potential of drone-based remote sensing in urban forestry studies. The study investigates the spatial distribution, density, and environmental impact of trees in Northern and Central Kolkata. The findings underscore the significance of urban green spaces in met-ropolitan cities, emphasizing the need for sustainable urban planning that integrates green infrastructure for ecological balance and human well-being.

Keywords : urban greenery, advanced spatial distribution analysis, drone imagery, deep learning, tree detection
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