

STUDENT RESEARCH

Street Eco-capacity: evaluation on the carbon storage capacity of urban street greenery

SYNOPSIS

Carbon neutrality has emerged as a pivotal topic in addressing the global environmental crisis. Urban green infrastructure is increasingly recognized as a critical biological tool for enhancing carbon absorption and fixation, thus mitigating carbon emissions and addressing carbon neutrality. This research is committed to addressing two key questions: Firstly, what is the carbon storage and sequestration (CSS) capacity of street-level greenery? Secondly, how can carbon metrics be developed to aid in the management and enhancement of street-level greenery, thereby augmenting the ecological benefits for urban areas? This study will investigate the estimation and visualization of the CSS capacity of street-level greenery by leveraging remote sensing techniques and AI technology, specifically computer vision. In so doing it will examine the relationship between the configuration of street-level greenery and its CSS capacity, contributing to the discourse on urban sustainability.



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OBJECTIVE

The objective of this research is to find a novel approach to quantitative analysis of the carbon storage capacity of urban street-level greenery.



METHODOLOGY

This quantitative study will undertake the collection and analysis of data utilizing remote sensing technologies, alongside AI methodologies including machine learning and computer vision.



ESTIMATED RESEARCH LENGTH

Present to October 2027 (3.5 years)

BACKGROUND

Currently, numerous studies have focused on estimating the carbon storage of various urban green spaces, including forest lands, urban parks, and urban forests (Brilli et al., 2019; Ariluoma et al., 2021). Urban street greenery, as an integral part of urban green infrastructure, requires further research to refine the rating and evaluation criteria for low-carbon city construction. While few scholars have investigated the carbon storage capacity of urban street greenery, the limitations of their experimental data can lead to crude and inaccurate results. Therefore, there is a need for a more detailed and comprehensive study of the carbon storage capacity of street-level greenery.

EXPECTED RESEARCH CONTRIBUTION

This study aims to elucidate the contribution of urban street greenery to urban ecology, thereby assisting urban planners and governmental bodies in the decision-making processes concerning the integration of street-level greenery to promote carbon neutrality. It will serve as a foundational model for estimating carbon stocks at the street scale, providing essential support for the broad application of carbon stock estimation methodologies and enhancing the evaluative criteria within the context of low-carbon urban development. The research will supplement existing sustainability indices by introducing a novel dimension for use by planners and designers.

NEW YORK CITY GVI IN STREET SCALE



SOURCE: Treepedia by MIT, 2016

REFERENCES

- Ariluoma, M., Ottelin, J., Hautamäki, R., Tuhkanen, E. -M., & Mänttari, M. (2021). Carbon sequestration and storage potential of urban green in residential yards: A case study from Helsinki.
- Brilli, L., Chiesi, M., Brogi, C., Magno, R., Arcidiaco, L., Bottai, L., Tagliaferri, G., Bindi, M., & Maselli, F. (2019). Combination of ground and remote sensing data to assess carbon stock changes in the main urban park of Florence.