Towards low-carbon green streets: Modelling street greenery carbon storage and sequestration capacity using computer vision approaches

Urban street greenery plays a critical role in delivering ecosystem services. However, its specific contribution to carbon storage and sequestration (CSS) at the fine-grained street level remains underexplored. This research project investigates the CSS capacity of urban street greenery by integrating computer vision, street view imagery, and remote sensing technologies to provide a detailed, fine-grained assessment and enhance understanding of its role in achieving urban carbon neutrality.

Why the study:

- Urban carbon emissions are a major driver of climate change. As cities work toward carbon neutrality, insights into the carbon-reduction potential of green infrastructure are urgently needed.
- Existing assessments of urban street greenery CSS are often coarse in scale, limiting their usefulness for planning and policy.
- With advancements in big data, street view imagery, and AI technology, there's now an opportunity to transform how cities measure and manage street-level green infrastructure in a fine-grained scale.
- Understanding the factors that influence the CSS performance of street greenery can directly inform more effective planning codes, improved green policies, and targeted carbon mitigation strategies.

What we are doing:

- Developing a novel research model that integrates Street View Image (SVI) data, Computer Vision (CV), and Remote Sensing (RS) to CSS capacity of urban street greenery.
- Identifying key intrinsic and extrinsic factors (e.g., tree height, diameter, planting patterns, socio-economic context) that affect CSS outcomes.
- Exploring the relationships and underlying mechanisms among influencing factors.
- Comparing current urban greenery planning standards with findings to identify gaps and propose practical improvements.

What we aim to achieve:

- A validated and replicable research framework for evaluating CSS capacity at a fine-grained scale.
- A deeper understanding of how biological and environmental factors influence CSS capacity, along with AI-driven insights into their relationships.
- Tools and knowledge to support the development of greener, low-carbon cities, including integration into smart city systems and digital twin platforms.

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