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Effects of Urban Vegetation Morphology on the Distribution of Particle Air Pollution

Mengxue Yao, PhD in Architecture

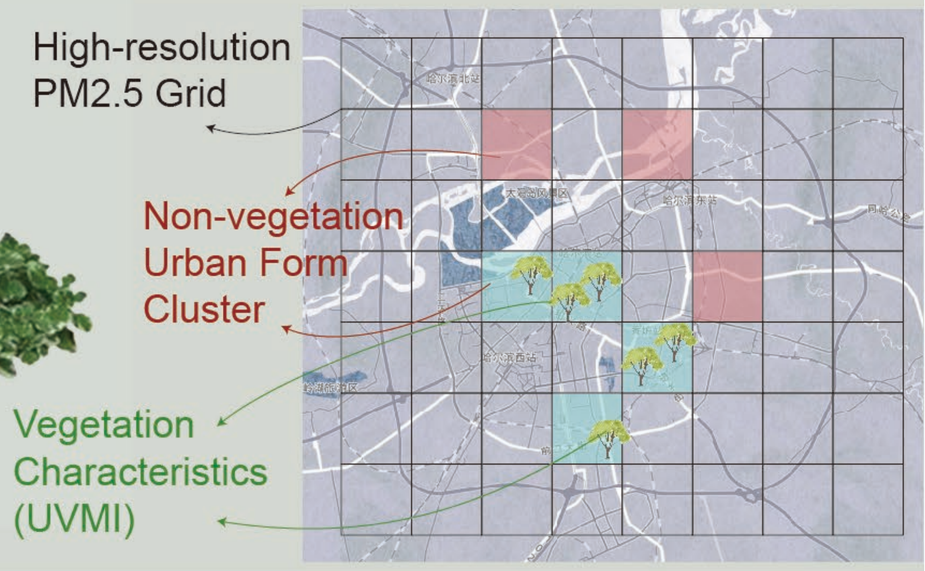
Background

Air pollution is one of the biggest threats to public health world-wide. In the context of complex urban substrates, the distribution of air pollutants is influenced by different aspects of urban form such as building density, road network. Vegetation, which have specific morphological structures under different urban planning and design configurations such as roadside trees or open green areas, plays an important role in air quality.

Research Aims

This doctoral research aims to investigate the relationship be-tween urban vegetation and air pollution – PM2.5 as the main air quality (AQ) target, within the context of complex urban form. The AQ research will focus on the morphological characteristics of urban vegetation, and answer following question:

Taking Harbin as an example of major cities facing serious AQ problems, how urban planning and design for better AQ may be guided by quantitative modelling of the effects of urban vegetation morphology on particle air pollution?



Anticipated Outcomes

(1) A **novel air pollution distribution prediction model** will be con-ducted, which based on morphological analysis of urban form and vege-tation, combining satellite data, ground-based AQ monitoring data, and urban form and vegetation morphology data.

(2) A **new urban vegetation morphology index (UVMI)** will be devel-oped in this research, which will be based on a novel fusion of the exist-ing NDVI and a new Street View Vegetation Index (SVVI).

UVMI=f(NDVI,SVVI)

Research Design

(1) Firstly, **city-level high-resolution PM2.5 concentration data** will be predicted, which will combine multiple data sources, like satellite datasets, and ground-station observations datasets.

(2) Secondly, based on the non-vegetation urban form characteristics, **urban areas' classification and clustering** will be conducted.

(3) Thirdly, among the urban area clusters, **the relationship between vegetation characteristics and PM2.5 distribution** will be built and quantified, which will help to put forward useful suggestions for urban planning and design from the aspect of PM2.5 mitigation.

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