UROP RESEARCH PROJECTS

SUTD
SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

Walkable Southeast Asia: A Repository Of Urban Liveability Features

PURPOSE

Studying urban walkability in Southeast Asian cities is important to:
- Boost economic development
- Reduce automobile dominance
- Promote sustainable transportation

Studying urban walkability can contribute to making cities more resilient, equitable, healthy, and sustainable.

Our study aims to identify walkable, bikeable, and drivable neighborhoods with access to green spaces in five Southeast Asian cities, comparing Singapore, Manila, Phnom Penh, Jakarta, and Ho Chi Minh City using open-source databases.

Our study provides valuable insights into street network configurations to inform urban planning for greater accessibility and sustainability.

TOOLS & METHODOLOGY

Geospatial Analysis

Used spatial data and geographic information systems (GIS) to analyze and visualize patterns and trends in geographic data. This involved tasks such as identifying, mapping, and comparing urban network characteristics.

Python scripts were used to automate the loading of geospatial maps, merging them with boundaries of areas of interest, calculating the walkability index, and utilizing isochrones for data analysis.

Face-to-face surveys with approximately 1,000 respondents per city were stored in an SQL database for further clustering analysis.

DATA & SCRIPTS

This Python code automates the conversion of raster data into vector format, associating data values with polygons and saving it as a GeoDataframe

Creating isochrones

Point of interest (POI) coordinates =[-6.210526,106.726289]
Code to extract all the nodes that are reachable from that point of interest within 800m distance

Computed the envelope of a set of all points in a plane, which generates a convex hull

FINDINGS

Total area of Jakarta (sq km): 665.08
Total network density (km of network per sq. km): 42.28

Population Density   Building Density   Elevation Density

Convex Hull
- **Population density (per sq. km): 15,457.85**
- **Building density (per sq. km): 2,560.45**
- **Elevation density (per sq. km): 43.25**

PROCEDURE
- Extracted the pedestrian network using boundary files.
- Calculated the total length of network edges, network density and intersection density.
- Extracted Population Counts.
- Computed the three walkability indicators within an isochrone.

RESULT
- By comparing walkability indicators among different isochrones, we can quantify the walkability of neighborhoods.
- Analysis of walkability in the districts of Bendungan Hilir (Central Jakarta), Tanah Merah (North Jakarta), and Cengkareng (West Jakarta).

CONCLUSION

Going Forward:
- Computing the walking distance from the center of the isochrone (e.g., POI) to the nearest park.
- Computing isochrones for the entire city of Jakarta.
- Computing walkability metrics for all the other 4 cities.

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EXPANDING HORIZONS, NURTURING MINDS