Politechnika Śląska
Wydział Architektury
Katedra Urbanistyki i Planowania Przestrzennego

Mesh city - cyfrowa strategia analizy przestrzennej miasta w społeczeństwie sieciowym

Autor: mgr inż. arch. Piotr Kamiński

Promotor: dr hab. inż. arch. Michał Stangel

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Wydział Architektury
Politechniki Śląskiej

Politechnika
Śląska

Abstract

The subject of the work is the analysis of urban service infrastructure through a proprietary algorithm that utilises Big Data taking into account user ratings. The algorithm enables the extraction of useful information in the context of planning resilient and 15-minute cities, such as the qualitative identification of services, gaps in the urban fabric, dysfunctions, and spatial sequences, presented in the form of pixel maps on a city scale.

Considering the current state of research and the synthesis of conditions in contemporary mid-sized European cities, including the intensification of the climate, identity and digital crisis, along with the UN-backed global need for the development of resilient and 15-minute cities, the author concludes that the integration and symbiosis of the physical fabric of cities with their digital layer is crucial for future urban development in the wake of platform urbanism and smart cities.

By analyzing cities using Castells' network language, and assuming the network society as the basic social structure, with platform capitalism and sharing economy as the leading economic models, the author proposes an analytical framework, based on synthesising K. Lynch's urban model into two elements: "nodes" and "threads," attemptempting to introduce a flexible method for studying contemporary cities. The proposed analytical structure based on nodes and threads is a response to the growing importance platform urbanism, as well as an attempt of integrating the physical and digital infrastructures of cities, inspired by N.Talebs' barbell strategy.

According to these assumptions, the author analyses the service infrastructure of Poznań and Warsaw using a bespoke algorithm written in Python, utilising big data from the Google Maps platform via its Google Places API programming interface. While defining the parameters of the algorithm, the author focused on the variation within nodes, the quality based on current ratings (scoring) and the average price levels within nodes (gatekeeping), analogous to Rahmans' digital power and transmission criteria. The analysis of services was subdivided into three groups: food, commerce and entertainment, and finished by a composite, neighbourhood scale study for Winogrady, Poznań.

The tool allows for the acquisition, sorting and visualisation of data on the current state of services infrastructure, and analysis by overlaying the result on a city map. The algorithm is scalable and transferrable, enabling studying any given city, based on any keywords, both quantitatively and qualitatively (derived from current price levels and user ratings). This constitutes a distinguishing feature of the research.

The resulting colour visualisations in the form of pixel maps at city scale, where pixels (nodes), correspond to areas of 400x400m or 1200x1200m (approximately a 5- and 15-minute walking distance), overlayed on maps, allow for new insights into city services. This includes assessing the health of each node, identification of spatial threads, revealing qualitative dysfunctions and functional gaps in the existing urban tissue, thus providing useful information in the context of planning 15-minute and resilient cities.