TWO TOWERS IN GEOSPATIAL SEMANTICS: TOP-DOWN AND BOTTOM-UP APPROACHES

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Abstract

The semantics of our geospatial world is predominately characterized in two manners: the top-down (theory-driven) approaches and the bottom-up (data-driven) ones. Top-down approaches often utilize human knowledge and ingenuity to formalize and explicitly represent various types of geospatial knowledge with the instruments such as ontologies and semantic web technologies (knowledge graphs). On the other hand, today bottom-up approaches have gained greater momentum, which leverages massive geospatial data and machine learning techniques for knowledge discovery. In this talk, Weiming will talk about his previous and ongoing endeavors in both perspectives. Specifically, he first presents several geospatial knowledge representation studies for geospatial data integration and visualization, with the instruments of semantic web technologies. Then he will demonstrate several data-driven studies in unsupervised spatial representation learning using different types of data, e.g., points-of-interest, human mobility data, and remote sensing data. Such learned representations are used for multiple tasks in spatial data mining, e.g., urban function inference, population estimation, and housing price prediction. At last, Weiming will try to deliver a prospect on the convergence of the two towers in geospatial semantics.

Speaker bio

Weiming Huang is currently a Wallenberg-NTU Postdoctoral Fellow at the School of Computer Science and Engineering, Nanyang Technological University. He obtained his doctorate in Geographical Information Science at Lund University, Sweden in 2020. He was also a visiting researcher at the Center for Spatial Studies, University of California, Santa Barbara. He has served as a topic editor of the Big Earth Data journal, and a reviewer or a program committee member for several top-tier computer science and GIScience journals or conferences. He is the recipient of several prestigious awards, such as the EuroSDR award for the best PhD thesis related to geoinformation science in 2021, and the Waldo Tobler Young Researcher Award by the Austrian Academy of Sciences in 2022. Weiming's research interests mainly include geospatial semantic web (knowledge graph), and spatial data mining.