UNCOVERING THE GLOBAL AND LOCAL STRUCTURES OF URBAN NETWORKS VIA POINCARE EMBEDDING

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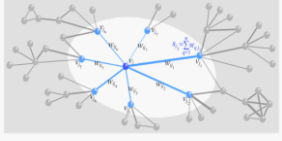
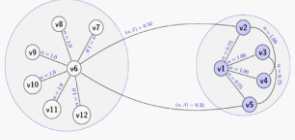
Motivation – Urban Network Analysis

Indicators at the city-level: Fail to capture the complex relationships bet-ween cities.

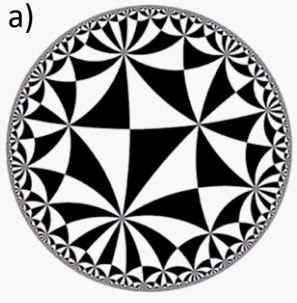
Proximity/Hierarchy (Complex network): Cannot capture both global and local struct-ures simultaneously.



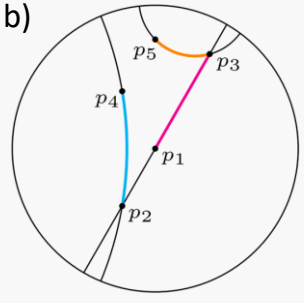


Motivation – Hyperbolic Space

a)

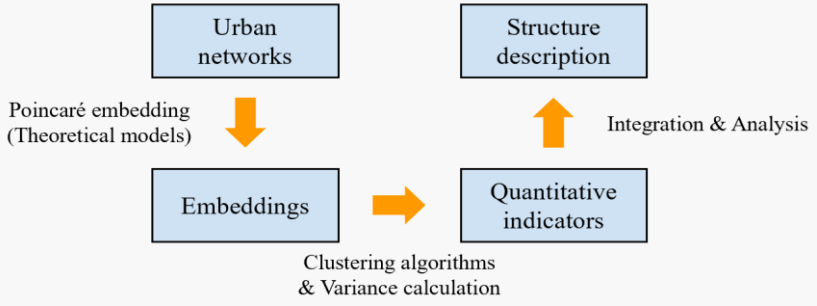


b)

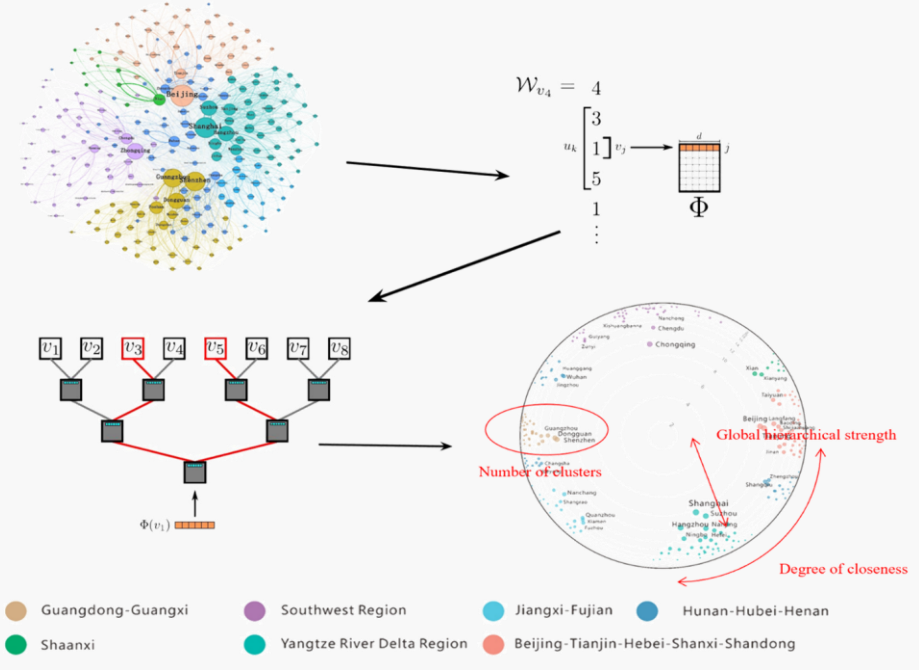


a) Visualization of the Poincaré disk;
b) Geodesics in the Poincaré disk.

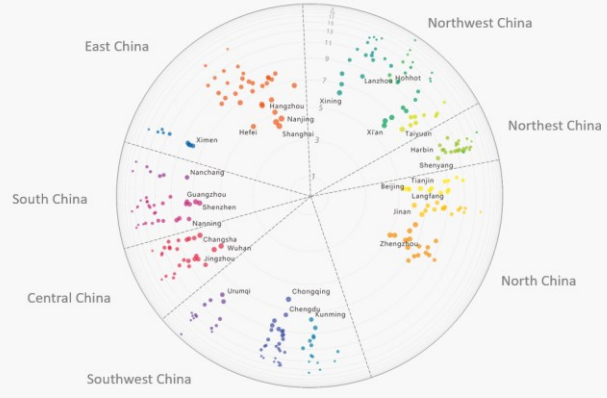
Pipeline

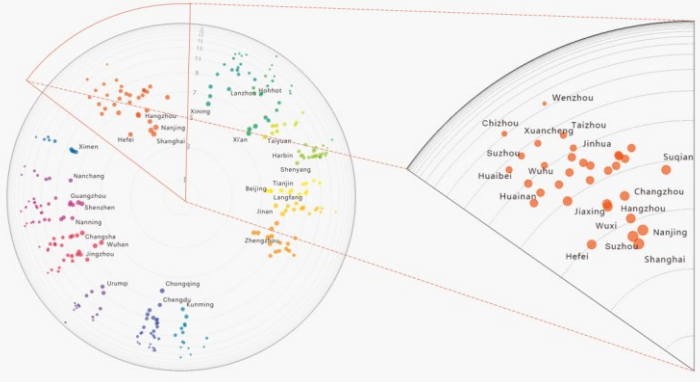


Methodology – Poincare Embedding



Results & Conclusions





By embedding the urban networks into the Poin-caré ball, the global and local structures of the ne-tworks are effectively maintained, and compre-hensive quantitative analysis and observation can be carried out.