

A location analytics for geographical disparity analysis

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Simple and powerful location analytics to identify, test, and map the significance of geographical disparity in urban hazards is developed. Specifically, at a spatial granular unit, a minority's relative proportion to its general proportion across a region is defined as location amplitude index (LAI). A significant LAI indicates abnormal aggregation of a minority at a location, which potentially experiences significant hazards. Comparing a minority's LAI with the White's LAI, we then develop another measurement of location amplitude disparity index (LADI). LADI hence is used to statistically test the significance of a minority's disparity at a geographical granular unit. Using the 100-year floodplains in Birmingham, Alabama as the study areas, LAI and LADI identify and test geographical disparity of the Hispanic in the Valley Creek floodplain, insignificant ($p > 0.5$), and racial disparity of the African American is much significant with p values < 0.0001 . This new location analytics of LAI and LADI fill the knowledge gap of spatial analysis of ethnic disparity in hazard study. LAI and LADI provide precise geographical and demographic measurements for equitable solutions to climate hazards, which often disproportionately influence underserved communities.

Primary author: Dr MENG, Qingmin (Mississippi State University)

Presenter: Dr MENG, Qingmin (Mississippi State University)

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