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Evaluating Walkability through Neighborhood Design Qualities using GIS: A Case Study of Suburban Areas in Tokyo

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Suburbanization leads to a new neighborhood structure compared with traditional ones which have plenty of spaces and destinations for residents to walk. This new structure consists of residential dwellings mostly with only few places for daily activities such as shopping or working. Such a neighborhood is considered as a low ? walkability neighborhood which causes physical inactivity. Walkability is a measure of effectiveness of neighborhood design in promoting walking and improvement of walkability has been found as a solution to achieve healthy life style. The purpose of this study is to figure out important factors for evaluating walkability in such areas and find a proper model with these factors to calculate walkability of suburban areas in Tokyo.

Six main factors (dwelling density, road accessibility, land use diversity, public transportation facilities, aesthetics and safety) are selected and GIS methods, combined with questionnaires, are used for collecting and analyzing data. Dwelling density, road accessibility and public transportation facilities are evaluated by census data while land use diversity, aesthetics and safety are evaluated by data from both questionnaires and census. Zonal analysis is used to include the effects from the surround cell values. Then in order to detect the importance of each factor, expert opinion in Analytic Hierarchy Process (AHP) analysis is used by giving weights to each factor. Subsequently, all the six factors are shown with their own weights through map layers and these map layers are overlaid to get the final walkability map in the study area. Based on the final walkability map and field data obtained, powerful factors and weak factors are summarized with the characteristics of each study area. Possible ways in promoting walkability is concluded according to the walkability map and questionnaire results.

キーワード: GIS, walkability, neighborhood design, suburban areas, physical activity
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