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Integrative Analysis of Urban Transportation Network and Land Use Using GIS: A Case Study of Siddipet City

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Abstract : Assessment of land use and transportation networks is essential for sustainable urban growth, urban planning, efficient public transportation systems, and reducing traffic congestion. The study focuses on land use, population density, and their correlation with the road network for future development. The scope of the study covers inventory and assessment of the road network dataset (line) at the city, zonal, or ward level, which is extracted from very high-resolution satellite data (spatial resolution < 0.5 m) at 1:4000 map scale and ground truth verification. Road network assessment is carried out by computing various indices that measure road coverage and connectivity. In this study, an assessment of the road network is carried out for the study region at the municipal and ward levels. In order to identify gaps, road coverage and connectivity were associated with urban land use, built-up area, and population density in the study area. Ward-wise road connectivity and coverage maps have been prepared. To assess the relationship between road network metrics, correlation analysis is applied. The study's conclusions are extremely beneficial for effective road network planning and detecting gaps in the road network at the ward level in association with urban land use, existing built-up, and population.

Keywords : road connectivity, road coverage, road network, urban land use, transportation analysis
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