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A Cluster-based Seismic Risk Assessment: Economic Loss Using GIS for Jaipur Sub-urban Area

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Abstract

Economic risk is an integral part of seismic risk assessment, which is eventually required in seismic risk mitigation, response planning, and better resource allocation for adaptation and mitigation. Geospatial techniques like remote sensing-based image clustering and Geographical Information systems (GIS) can be used for seismic risk assessment at city level.

In this paper, a GIS-based framework is proposed to assess the seismic risk of a part of the city in terms of economic loss using homogeneous clusters of different built-forms, which are proxies to different building typologies. A random sampling strategy is adopted for geo-tagged proportionate building surveys as a function of homogenous built form clusters and built-up density for Jaipur Sub-urban Area. An extensive survey was conducted using GNSS receiver to collect the geo-tagged information of different building typologies and the GIS database was created in real-time. Further, an analysis is carried out using HAZUS methodology for the estimation of seismic risk in terms of economic loss spatially, which can also help policymakers in planning and mitigation.

Keywords: Geographic information system, Economic loss, Seismic hazard, Earthquake, Damage