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Efficient Subsurface Mapping: Automatic Integration of Ground Penetrating Radar with Geographic Information Systems

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Abstract : Integrating Ground Penetrating Radar (GPR) with Geographic Information Systems (GIS) can provide valuable insights for various applications, such as archaeology, transportation, and utility locating. Although there has been progress toward automating the integration of GPR data with GIS, fully automatic integration has not been achieved yet. Additionally, manually integrating GPR data with GIS can be a time-consuming and error-prone process. In this study, actual, real-world GPR applications are presented, and a software named GPR-GIS 10 is created to interactively extract subsurface targets from GPR radargrams and automatically integrate them into GIS. With this software, it is possible to quickly and reliably integrate the two techniques to create informative subsurface maps. The results indicated that automatic integration of GPR with GIS can be an efficient tool to map and view any subsurface targets in their appropriate location in a 3D space with the needed precision. The findings of this study could help GPR-GIS integrators save time and reduce errors in many GPR-GIS applications.

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