

Challenges and Perspectives in Urban Flood Management Automation

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Abstract

Automation or digital transformation has become essential in various disciplines and organizations, including urban flood management. Urban floods are recurring natural disasters that can be mitigated through engineering solutions, but their management involves stakeholders from model developers to decision-makers. Therefore, automating urban hydrological models presents challenges related to data integration, interdisciplinary requirements, and the usability of tools for non-technical decision-makers. This research focuses on understanding the perspectives of computing professionals in urban flood management automation. A survey-based analysis was conducted using a questionnaire to understand the current practices and knowledge areas relevant to multi-model automation. The questionnaire was developed following a systematic methodology and validated through expert panels. The data collected from 44 computing professionals were analysed using the trapezoidal membership function of fuzzy logic to determine their perspectives on various aspects of automation. The study identified eight independent variables such as stakeholders' and developers' responsibilities, business rules, multi-model automation, calibration and verification of models, usability, security, multiple models in a single tool scenario, and automation frameworks. The findings provide insights into the gaps of unavailability of the HydroGIS tool development framework and satisfactory practices in urban flood management automation. The results urge to development of a suitable framework for HydroGIS tool automation and suitable guidelines and procedures for computing professionals in urban flood management projects.

Keywords: *Automation, Digital transformation, Software frameworks, HydroGIS tools*