Social Change Symposium

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Title: Using machine learning in regulatory compliance checks for the construction industry

Abstract: Construction is a mature and highly regulated industry subject to various planning and building regulations. Failure to comply may result in disputes, defects, and potential legal actions, leading to project delays and hefty penalties. To minimise these risks, a compliance check is usually conducted at each stage of a construction project by an experienced surveyor. The experiences of surveyors, the volume of work and frequent regulations updates pose significant challenges to the process's efficiency, consistency, and accuracy. Building information modelling (BIM) allows building information to be represented digitally and provides opportunities to automate compliance checks. Extensive studies were conducted in automated compliance checks (ACC), and commercial systems were developed. Machine learning algorithms were introduced to support building code extraction and semantic enrichment of the BIM data capture. However, utilising ML to perform ACC holistically is still a green field. This research will explore the current areas of study in the ACC domain and propose an end-to-end framework to perform ACC using ML. In addition, the research will also analyse challenges facing architects and surveyors today and ensure the framework is extensible and can be seamlessly embedded in the existing compliance check process. As a case study, BIM extracts from the design phase will be validated against the performance requirements for Class 1a residential buildings under the Australian National Construction Code (NCC).

Keywords: Building Code, Automated Compliance Check, Planning Approval, Process Automation, Natural Language Process, BIM, Machine Learning, ML, Natural Language Processing, NLP, Building Information Modelling, IFC, NCC, Building Class 1a.