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How to Represent Landmark Trees in Digital 3D Maps? An Automated Workflow and User Study

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Digital 3D maps created from digital elevation models (DEMs) cannot properly capture trees due to the 2.5D nature of the DEMs. Leveraging publicly available DEMs and orthophotos as the only input data sources, we present a fully automatic pipeline that models landmark trees. We conducted two crowdsourced user studies to evaluate visual appeal and scene recognizability using two different levels of detail of tree representations generated using our pipeline. Users found highly detailed trees much more appealing, and also easier and more trustworthy to recognize, with open-ended responses revealing key factors like realism, coherence, and tree shape influencing their preferences. However, the ability to recognize a location seems to depend more on the surrounding environment than the representation of the landmark tree in focus. We discuss the implications of these results for digital 3D outdoor maps.

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