Robot Spatial Reasoning via 3D Models

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Abstract : With this paper we present several experiences deploying novel, low-cost resources for computing with 3D spatial models. Certainly, computing with 3D models undergirds some of our field's most important contributions to the human experience. Most often, those are contrived artifacts. This work extends that tradition by focusing on novel resources that deliver uncontrived models of a system's current surroundings. Atop this new capability, we present several projects investigating the student-accessibility of the computational tools for reasoning about the 3D space around us. We conclude that, with current scaffolding, real-world 3D models are now an accessible and viable foundation for creative computational work.

Keywords : 3D vision, matterport model, real-world 3D models, mathematical and computational methods