Demonstrating Taxon: a Language for Formal Reasoning with Digital Fabrication Machines

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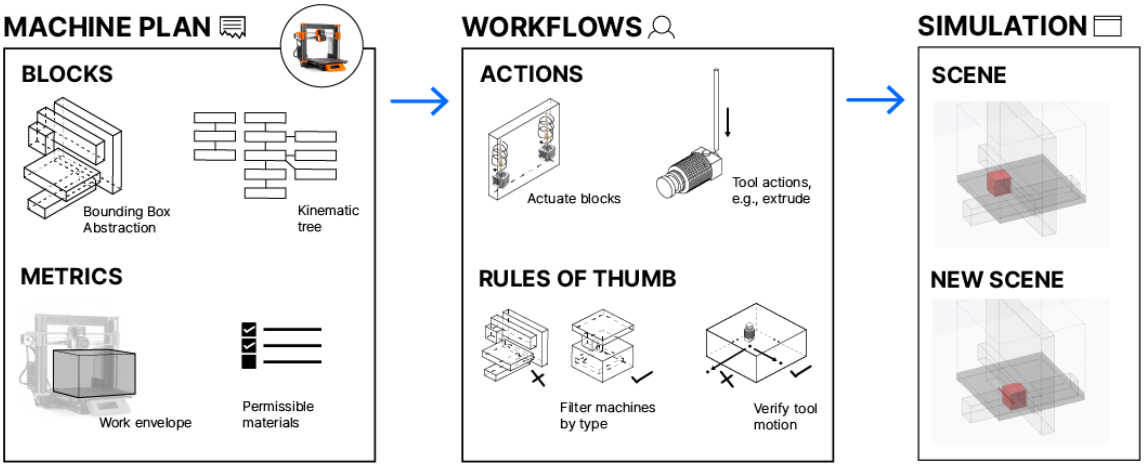

Digital fabrication machines for makers have expanded access to manufacturing processes such as 3D printing, laser cutting, and milling. While digital models encode the data necessary for a machine to manufacture an object, understanding the trade-offs and limitations of the machines themselves is crucial for successful production. Yet, this knowledge is not codified and must be gained through experience, which limits both adoption of and creative exploration with digital fabrication tools. To formally represent machines, we present Taxon, a language that encodes a machine's high-level characteristics, physical composition, and performable actions. With this programmatic foundation, makers can develop *rules of thumb* that filter for appropriate machines for a given job and verify that actions are feasible and safe. We integrate the language with a browser-based system for simulating and experimenting with machine workflows. The system lets makers engage with rules of thumb and enrich their understanding of machines. We evaluate Taxon by representing several machines from both common practice and digital fabrication research. We find that while Taxon does not exhaustively describe all machines, it provides a starting point for makers and HCI researchers to develop tools for reasoning about and making decisions with machines.

We have released an early demo of Taxon on the web, as well as its source code. If accepted to SCF, we would plan on walking through Taxon's functionality as participants access the website.

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