Bridging the Micro-Macro Divide: Multi-Scale Modeling of Technology Adoption

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Abstract: The adoption of new technology depends on various factors, such as the type of technology, the context or culture in which the technology is introduced, and the individual decisions by people within that culture. This work presents an approach that uses an agent-based model to encompass the detailed behavior of individuals and their immediate network of relationships, as well as an influence-based system dynamics model to show how society-level influences function interactively and with respect to individual agents. The exploration of technology adoption grounds the model in a realistic environment and allows the incorporation of theoretical models from multiple relevant domains. The integrated model demonstrates how representing behavior at multiple scales is a natural approach that allows for a greater understanding of how influences across different scales interact and affect the adoption of a new technology.