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# Towards Transparent Agent-based Models: Visualizing ABM Process Flows from Simulation Traces

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## Keywords

Model Transparency, Process Mining, Visualization

## Abstract

One of the challenges in promoting the Agent-based Modeling approach and communicating this kind of model is making it transparent to stakeholders. Through the years there has been an observed fast development of Agent-Based Models (ABM), especially in modeling social-ecological systems, which quickly raises and heightens the need for a transparent view of these models. Various protocols have been proposed for documenting these models, and calls have been made to ensure open access to the simulation code. However, the lack of consistency in model documentation plus the additional layer required to streamline comprehension and save time in understanding model code does not fully promote a sufficiently transparent view for general users. In response, we present a three-part methodology to make agent-based models transparent. Our objective is to provide a visualization of the ABM processes in a way that closely aligns with the source code without deriving the information from the model documentation. The approach is as follows: (1) automatically store execution logs, (2) apply process mining techniques to automatically discover agent processes, and (3) visualize the processes using graph modeling. Simulation logging was implemented within the GAMA platform to ensure compatibility with other models. For graph modeling, we present the final visualization using Business Process Modeling Notation (BPMN), a standard graphical representation for specifying business processes. The resulting visualization is designed to complement the model's source code and serve as an automatically generated model description. We demonstrate our methodology using various toy models available in GAMA.

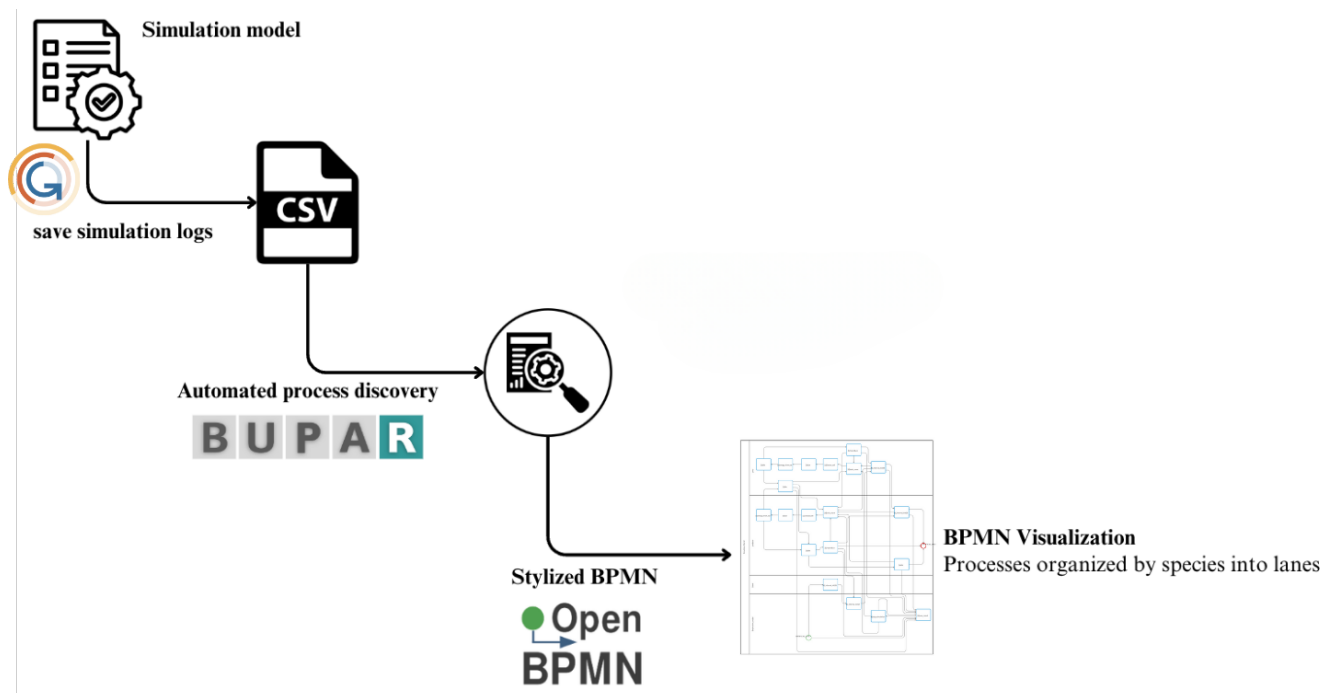


Figure 1: Methodology for extracting and visualizing process flow given an ABM