Agents to the Rescue: Creating Artificial Labs for Evaluating Human-Centric and Coupled Human-Natural Systems

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Anecdotal evidence suggests that the Social Simulation community suffers from a lack of structured and standardised ways for model development and documentation. For large, multi-disciplinary projects with multiple collaborators, this issue becomes even more evident. Past efforts to introduce Software Engineering techniques in Agent Based Social Simulation failed to succeed, as advanced applications of such methods still remain poorly employed and underexplored. Furthermore, these methods are difficult to understand and to apply for those who do not have a Software Engineering background.

To overcome this gap, we have created a model development methodology, namely the Engineering Agent Based Social Simulation framework (or EABSS framework for short). Full details can be found in Siebers and Klügl (2017). The framework is grounded on the concept of co-creation (Mitleton-Kelly 2003) and ideas from Software Engineering (Sommerville 2015). It uses focus group discussions, predefined table templates, and UML (a graphical notation used in software engineering to conduct system analysis and design) as main forms of stimulating and documenting contributions during problem analysis and model development. It is this combination of tools and methods that make it approachable for everyone, who wants to give it a go. It can be applied to exploratory as well as explanatory simulation studies of human-centric or coupled human-natural systems.

The EABSS framework has been used for two purposes, for collaborative model development and to stimulate and formally support discussions about philosophical questions of societal models. We have tested the framework in several domains, including Architecture, Geography, Organisational Behavior, and Mental Health. It is designed with the aim to look at a system in more detail with every further step. There is always information from previous steps that can be used to get started with the next step. This principle serves validation, as getting stuck in the current step is a good indicator that something in previous steps is not quite right and needs to be amended.

While we understand the model development process very well, we often struggle when it comes to working out how to embed relevant qualitative and quantitative evidence into our models. It is easy said on a high level what is relevant (e.g. by referring to a well-established theory), but how to do it practically, is often very difficult to work out. We would like to use the workshop to come up with an EABSS framework extension that can guide the users with embedding qualitative and quantitative evidence into the models they develop.

References

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