

A framework for building value-based agent models of fishers

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Abstract

Human behavior is influenced by a number of factors such as personal values, social norms, and environmental and economic factors. Yet many of the models attempting to capture human behavior rarely go beyond the environmental and economic, and rarely dive into human decision making beyond homo economicus or heuristics. Likewise, fisheries models put their focus on stock models and struggling to include the human and social sides of fishing activities in their approaches, despite the fact that fisheries management is aimed at fishers rather than fish.

We approach modeling human social and decision making behavior using agent based models, Schwartz's theory of values and goal-plan-action theory. From this basis, we build a framework for developing agents able to reason about their internal values, goals and plans, in addition to considering environmental and economic factors into their decisions. In short, the values together with the environmental and economic factors act as filters, preference and priority measures for choosing which goals to pursue and which plans to achieve them, allowing the agents to behave in more complex and flexible ways. The agents are also able to learn and adapt their behavior based on experience, observations and interactions with other agents.

We illustrate the use of the framework by using it to build a model of a fishing community and its environment and use it to demonstrate the impact of values as well as the impact of environmental and economic factors on the fishers' behavior.

Keywords: Schwartz theory of value, value-based decision making, normative decision making, goal-plan-action theory, agent-based model.

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