Artificial Life and the Human Predicament

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Abstract

It is well established in the scientific literature that global human civilization faces multiple imminent, and potentially existential, crises. The most comprehensive survey is perhaps that of the *Planetary Boundaries* framework (Rockström et al., 2009; Steffen et al., 2015). The unfolding of these challenges will be very complex, and the trajectory ahead is certainly still open to significant human management and moderation. Nonetheless, it is clear that we are no longer dealing with "problems" that might be "solved"; rather, this is a *predicament* — an uncertain, dynamic, and at least partially chaotic, disruption in global human development (Gilding, 2012). A predicament calls not for "solution", but for engagement, and continuous refinement of response. The purpose of this contribution is to explore how some specific concepts, tools and techniques of Artificial Life have already helped shape our understanding of this predicament; and may offer some distinctive supports in moulding our future responses.

The use of computational tools to model complex biological, evolutionary, ecological and social dynamics is a foundational technique in the ALife field. Indeed, computational thinking and modelling was at the heart of the *systems dynamics* approach to socio-ecological modelling pioneered by Forrester (1982). This provided the basis for the famous (or infamous?) *Limits to Growth* (LTG) project of the Club of Rome (Meadows et al., 1972). This was the first substantive attempt to computationally model the socio-ecological dynamics of global human society and assess whether ecological impacts would be likely to limit the growth of human material activities within any practically foreseeable timeframe. While the model was necessarily crude, the robust result was that — in the absence of effective control measures to the contrary — serious limits would become apparent within the first half of the 21st century.

In the almost 50 years since its original publication, the world has tracked remarkably close to the "standard run" of the LTG study (Turner, 2014). In fact, multiple lines of investigation now strongly suggest that aggregate human activity has already reached a state of significant *overshoot* beyond safe or sustainable ecological limits. Overshoot is a qualitatively distinct regime for the design and operation of any adaptive or mitigating interventions (Catton, 1982). Effective societal responses to date have been significantly impaired by a lack of wide understanding of this harsh ecological reality. This gap in understanding facilitates the comforting — but erroneous — notion that it is prudent to delay difficult responses until after impacts are manifest. But delay is precisely one of the principle mechanisms that actually *causes* overshoot, and undermines the capability to damp the subsequent "crash". This presents both a need and an opportunity for Artificial Life practitioners to use their skills and their tools to help catalyse much wider societal understanding of the nature of ecological overshoot and mediate the desperately needed reflections on how to achieve the necessary collective, systems-level, responses (cf. Bullock, 2016).

Separately and in conclusion, the presentation will briefly consider the meta-question of the ecological footprint of scholarly activity itself: and what, if any, obligations scholarly communities (such as ISAL, the International Society for Artificial Life) might have to reconsider their established practices in the face of planetary scale ecological emergency (e.g. Wilde and Nevins, 2015).

References

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