Designing from Zeroth Principles

Jordan W. Suchow (suchow@berkeley.edu)
Michael D. Pacer (mpacer@berkeley.edu)
Thomas L. Griffiths (tom_griffiths@berkeley.edu)

Department of Psychology,
University of California, Berkeley, USA

Abstract

Design from first principles begins by evaluating the problem that a designed object or system will solve — the goals, any constraints imposed by the environment or by human factors, and the surrounding context, broadly construed. Here, we introduce *design from zeroth principles*, a form of human-in-the-loop computation that leverages users' inductive biases to synthesize a design without a designer. The technique begins by constructing a transmission chain seeded with a random design. Each user in the chain is exposed to the design and then recreates it, passing along their recreation to the next user, who does the same. Through this iterative process, the users' inductive biases directly transform the initial design into one that is a better fit to human cognition. We evaluated the approach in three domains — mappings from light switches to lights, vanity phone numbers, and letter spacing in typeset words — and show that it produces high-quality designs in each of them.

Keywords: design, cognitive ergonomics, inductive bias, transmission chain, user interface