Chapter 12
SL–Bots: Automated and Autonomous Performance Art in Second Life

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ABSTRACT
This chapter explores the history, state-of-the art, and interactive aesthetic potential of “SL-Bots”. SL-Bots are avatars (i.e. “agents”) that are designed and controlled using Artificial Intelligence (AI) in Second Life. Many of these SL-Bots were originally created in Second Life for purposes such as: rudimentary chat inventory management and copying, asset curation, embodied customer service, generic responsive environments, scripted objects, or as proxy-audience members (aka “camper”). However, virtual performance and installation artists – including two of the chapter’s authors [ca. 2011-present] - have created their own SL-Bots for aesthetic purposes. This chapter suggests ways in which SL-Bots are gradually being extended beyond their conventional applications as avatar-placeholders. This book chapter concludes with the speculation that future virtual agents (including next generation SL-Bots) might one day transcend their teleological aesthetic purpose as mere automated-objects by evolving into more complex autonomous aesthetic personas.

OVERVIEW
We will begin this book chapter by defining bots in the larger context of artificial agent research, and then specifically in the context of the virtual world Second Life as SL-Bots. We will situate SL-Bots in the context of Second Life’s corporate and artistic history. This includes an explanation of the finite-state affordances of Second Life’s proprietary programming language, Linden Scripting Language (LSL). Then, we will distinguish between automation and autonomy. In brief, automation involves the direct execution of programmed commands and occasionally supervision, while...
autonomy implies unsupervised and self-directed/self-generated behavior. Then, we situate automation and autonomy within the context of SL-Bots. This history and conventional application of early SL-Bots will be analyzed through the utilitarian lens of automation and also the recent genre of “code performance”. Mid-way through the chapter, we will summarize early artistic experiments in Second Life with SL-Bots. These experiments include implementations for automated storytelling and theatrical performance [2006-2008] (Unterman & Turner, 2014). Further, this history will acknowledge Gazira Babeli’s treatment of SL-Bots as scripted objects [2006], Adam Nash’s intelligent responsive environments [2007-2008] and Alan Sondheim’s usage of a large number of customized SL-Bot swarms for environmental impact [ca. 2007-present]. We will also show examples of those state-of-the-art SL-Bots used for artistic purposes that were designed with some level of “autonomy”, however rudimentary. These include exhibitions such as Ascott et al 2012, Stelarc 2012, Ellsmere/Mounsey 2012, Turner/Nixon 2011, Glasauer 2010, Ayiter/Glasauer/Moswitzer 2010, and Moswitzer 2009. Then, we will mention the state-of-the-art of SL-Bots outside of an explicitly artistic domain. To conclude, we will speculate on future implementations of autonomous SL-Bots based on a consideration of historical examples and the current state-of-the-art. The primary purpose of this chapter is to contextualize the perceived evolution from contemporary automated SL-Bots using more narrow Artificial Intelligence (AI) systems towards the next-generation of autonomous bots that employ a broader and less specialized Artificial General Intelligence (AGI).

**BOTS IN THE ARTIFICIAL INTELLIGENCE (AI, AGI) CONTEXT**

Artificial agents have been defined as computer systems capable of flexible autonomous action in some environment in order to meet their design objectives (Wooldridge, 2009). Their properties include the following (Wooldridge & Jennings, 1995a):

- **Autonomy**: agents operate without direct intervention,
- **Social ability**: agents interact with other agents (and possibly humans),
- **Reactivity**: agents perceive their environment and respond,
- **Pro-activeness**: agents follow goal-directed behavior.

While this “weak” definition of agency can apply to a variety of low-level system tools, agents are more usefully understood with a stronger definition that refers to systems that are conceptualized and implemented using anthropomorphic terms. Typically, this involves designing an agent around human mental notions such as knowledge, belief, intentions, obligations, and even emotions (Wooldridge & Jennings, 1995a). There is a spectrum of approaches to control structures for such agents, from reactive to cognitive strategies. These control systems provide the appropriate degree of reasoning required for the agent to perform tasks in a given environment. Agents that are intended for social and narrative contexts take on whole new kinds of behavior-related “tasks” to perform as an actor in those scenarios.

The most straightforward kind of system responds directly to sensed stimuli with an action, and is therefore called a reactive system. The most popular example of reactivity is the so-called subsumption approach. Brooks designed this approach, originally for autonomous mobile robots, based on the principle of embodiment and the importance of embodiment in the development of artificial intelligence (Brooks, 1991). A recent example of this approach is that of Isla et al. who propose a layered model for an artificial brain, where different layers communicate via a shared blackboard, allowing high-level functions to
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