This chapter describes a novel type of artistic artificial life software environment. Agents that have the ability to make and listen to sound populate a synthetic world. An evolvable, rule-based classifier system drives agent behavior. Agents compete for limited resources in a virtual environment that is influenced by the presence and movement of people observing the system. Electronic sensors create a link between the real and virtual spaces, virtual agents evolve implicitly to try to maintain the interest of the human audience, whose presence provides them with life-sustaining food.

13.1 Introduction

One thing that foreigners, computers and poets have in common is that they make unexpected linguistic associations.

Jasia Reichardt [26]

Music and art are undoubtedly fundamental qualities that help define the human condition. While many different discourses contribute to our understanding of art making and art interpretation, two implicit themes connect all artworks. The first is the act of creation. Even the most abstract or conceptual artworks cannot escape the fact that, as ideas, objects, or configurations, they must be made. Second, the importance of novelty, either perceived or real, is a fundamental driving force behind any creative impetus or gesture. Artists do not seek to create works that are identical to their previous creations or the previous work of others.

Artificial life (AL) methodologies can play an important role in developing new modes of artistic enquiry and musical composition. For artists, AL can offer new methodologies for the creative arts. For the first time in the history of art, AL suggests that, in theory at least, it may be possible to create artificial organisms that develop their own autonomous creative practices –
to paraphrase the terminology of Langton [16], life-as-it-could-be creating art-as-it-could-be.

In addition, AL has important contributions to make in our understanding of genuine novelty,\(^1\) often referred to under the generalized term emergence [6, 11, 21].

\subsection*{13.1.1 Artificial Life Art}

Techniques from cybernetics and artificial life have found numerous applications in the creative arts. General contemporary overviews can be found in [2, 3, 32, 39], for example.

Cybernetics has a rich and often overlooked history in terms of computing and the arts. The seminal ICA exhibition Cybernetic Serendipity, held in London in the summer of 1968, was one of the first major exhibitions to look at connections between creativity and technology [25]. Even the title suggests notions of novelty and discovery, a key theme for many works and critics in the decades that have followed the exhibition. Interestingly, the curators shunned distinctions between art and science and instead focused on ideas and methodologies that connected the two.

One particularly relevant concept from cybernetics is that of open-ended behavior, what Ashby referred to as Descartes dictum: How can a designer build a device that outperforms the designer’s specifications [1]? Cyberneticist Gordon Pask built an “ear” that developed, not through direct design, but by establishing certain electrochemical processes whereby the ear formed and developed in response to external stimuli [7].

The goal of the work described here is to create an open-ended artistic system that is reactive to its environment. In order to address this goal, two important problems were explored during the design and development of the work: first, how we can create a virtual AL world that evolves toward some subjective criteria of the audience experiencing it, without the audience needing to explicitly perform fitness selection and, second, how the relationship between real and virtual spaces can be realised in a way that integrates those spaces phenomenologically. The resultant artwork developed by the author is titled Eden.

\(^1\) The concept of novelty is a vexed one with many different interpretations in the literature and could easily occupy an entire chapter in itself. Some authors argue that novelty and emergence have no relation [23], whereas others see them as fundamentally the same [6]. In the sense that the term is used in this chapter, novelty suggests that which has never existed before, hence the issues surrounding novelty are connected with determinism [11]. For art, almost every new artwork is in some sense novel; however, we may at least be able to apply criteria that suggest a degree of novelty, such as descriptive causality and explainable causality. Moreover, in an AL sense, we require not only the artwork to be novel, but the behavior of the virtual agents to be novel as well.