Social Network Generator

Team members:

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Theme:

AI as Author/Adversary to the Singularity

Overview:

The foundation of our idea lies in expanding the representation of “DNA” used by genetic algorithms so as to be a better representation of reality. Our DNA will instead consist of an array of utility curves rather than an array of arbitrary integer values. The *author,* then -- taking its most rewarding instances -- looks to replicate this reward with regard to both the law of diminishing returns and maintaining a quality of “uniqueness”.

It then falls upon the skeptic (the *adversary*) to judge the output of the author. It will do these things with reference to a baseline acceptance function, as well as a replication-detector function (or series, thereof).

In order to entertainingly present these ideas, the simulation will exhibit a “mother AI” haphazardly creating humanoid robots, or androids, in hopes of fooling humans such that the robots can take over. If an android does not satisfy the baseline requirements, it will be destroyed. If too many androids that satisfy the baseline are introduced into the world and exhibit too similar of a genetic makeup relative to the number of individuals expressing it, the humans will become suspicious and revolt. Only by delivering a steady stream of believable, yet different, androids can the robots achieve the Singularity.

Novelty:

From what we have encountered within this course, genetic algorithms are simplified to arrays of integers. While this is a benefit to on-the-fly performance, we hope to better reflect reality with maintaining pseudo-continuous utility curves, instead. Additionally, our adversarial AI utilizes economic principles, calculus, algebra, and trigonometry to assert whether any of the offspring are either **(a)** not believable (due to *our* stipulation that no sharp curves should exist in any of of the android’s utility curves), and/or **(b)** are not translations (subtle, or otherwise) of previously successfully integrated androids. With (**a**) leaving the evaluation function up to the designer, what is baseline acceptable can be easily altered to suit the game. With (**b**), we guarantee that new progeny are distinct such that their individuality appear both legitimate and reasonable.

Value:

- Players would be able to experience a greater variety of gameplay
- Designers would obtain a tool that automatically generates believable and singular personalities that they can use in diverse domains.

Technology:

The main technical problems are to implement an algorithm that satisfies the uniqueness of each NPC and to provide a support to illustrate their different personalities. Therefore, we plan to use the following technologies:

- A *genetic algorithm* that will provide singular NPCs
- *Utility-based decision making*: the DNA of the characters is depicted by the shapes of utility curves.
- *Social network graph theory* in order to illustrate their singular behaviors.

We will implement our prototype on the Minecraft game by using the existing Citizens2 API provided for Bukkit (a Minecraft developing server).

Breakdown:

- First, we will both set up and learn the tools that we have found in order to achieve our prototype.
- We will also begin to think about the criteria that we will use for the DNA values with the objective to illustrate our work.
- Then, Gerald will focus on the genetic algorithm that will spawn NPCs with noticeable different personalities based on a DNA producing “unique” utility curves.
- In the meantime, Florian will develop an application to illustrate how these generated personalities can interact with each other and with the player, therefore building a social network.