

Capstone Proposal
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Preface:

When I first began conceiving of this project, I realized that it would not be something that I could complete in one or two semesters of work. I also realized the importance of being able to take this work with me to graduate school. It is for these reasons that I have attempted to set very clear goals, and clarified that this will not be a complete “product” when I’m finished I will have created what I hope to be the foundations for future work.

Goals:

What I hope to accomplish is the ground work for a “artificial intelligence engine.” Graphics engines have long been a staple idea in computer science. A graphics engine takes information about a world and then allows movement through that world. What I hope to create is a system in which a world can be described, inhabitant types can be created, and specific entities can exist. Of utmost importance in this system is the ability for the inhabitants to customize and adjust their actions based upon experience and evolution.

Many researchers have devoted themselves to the creation of “learning” algorithms, and methods my which agents can accumulate “knowledge.” Other researchers have examined the methods of interaction and evolution of entities. I would like to make use of these existing technologies for use in my project, however I think because of the ever changing process that these technologies can take I would like to make my model abstract enough to allow for the incorporation of new algorithms.

Artificial intelligence as a discipline has divorced itself from the idea that an intelligent agent is deeply rooted in its environment. I would propose instead that intelligent agents must be deeply rooted in their environment, and that environment includes information about the environment of the self. This basic premise separates my work from other areas of current research, because it denies many of the premises of “intelligence in a vacuum” that have been followed for many years. I believe that for intelligence, you must first have awareness of one’s surroundings and self.

My capstone project will revolve around laying the foundations for this work. I do not believe that this project will be complete upon my graduation. Instead, I would like to take the foundations created through this project with me to graduate school. I feel that actual implementations of a fully robust system is not only beyond my current abilities, but that given time constraints it would not live up to my personal expectations.

What I believe can be completed before my departure from Drake University will be the foundations for the future of this project. My goals will be the creation of ways to describe the world, species and species instantiations. This must also include a method for keeping track of the algorithms created by a given individual “creature” inside the system. The second goal will

be a graphical means by which I can create and modify all of the information regarding the world, species and species instantiations. The third goal will be the ability to graphically view from a first person perspective any given creatures viewpoint. The final goal will be the beginnings to the underlying system, where entities can interact with one another and the world around them. This will be the most primitive aspect of the project, as the implementation of many of the necessary algorithms will not have sufficient time to be completely implemented.

The genetic algorithm creation and machine learning concepts are virtually completely unknown to myself, and this project represents my first foray into this field. This is why I have chosen to give these topics a back seat while I first focus my attention on the completion of a system based upon my accumulated knowledge before focusing on topics unknown.

Goal One (02/14/2001):

Diagrams and description of software system as a whole

Goal Two (02/28/2001):

Description of World Creation Methods

Description of Species Creation Methods

Description of Entity Creation Methods

Method for storing accumulated algorithm storage

Goal Three (03/14/2001):

Reading and writing these files in GUI environment

Goal Four (03/28/2001):

Graphical perspective based views for in simulation viewing

Goal Five (04/04/2001):

Foundations of Genetic Algorithms and improvement of simulator core

Goal Six (04/18/2001):

Presentation of system, methods, ideas and methods

Texts Needed:

Machine Learning

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