Final Year Project Definition Form

Student's name: Ishmail Qasim
Course: Computer Science BSc
Project title: Evolving Virtual Creatures
What is the project about? Evolving Virtual Creatures is about experimentation with computational intelligence in order to design a device (the creature) that may iteratively improve efficiency towards completing a task. Is the human body the most efficient implementation of a body that can carry out tasks that are becoming invariably more complex or difficult in the human world? Are current technologies used on production lines or industry, the best use of electricity or can complete tasks with the lowest cost? What about AI in interactive softwares or games? Are they the most realistic and competent that they can be? This project is designed to make a start on producing what may later be used in searching for the most efficient actions or creature for particular tasks. Later objectives may involve subjecting the evolutionary algorithms explored in this project to particular tasks that may have real world application but for this project, the results will not be so complex.
What is the project deliverable? The Deliverable of this project is to exhibit evolutionary behaviour and development of a virtual creature within a virtual space. This will include: - Creating a graphical testing space for this project's development and future experimentations. - Creating a basic creature, able to travel along the virtual, horizontal and potentially z plane. - Creating a creature able to execute pre-determined tasks with variably improving efficiency. - Producing an evolutionary algorithm to house virtual development of a virtual organism based on the principle of random search. - Simulating non-linearity in a virtual system through the successful use of an evolutionary algorithm. - A virtual creature that can perform 3 tasks listed below. To show this: - The creature's first task is to travel from point A to point B in a virtual space. - Once the creature is able to make a straight line between the points (fastest route), obstacles will be introduced to make the task more difficult but ultimately will display iterative improvement in the creatures travel route. - Once the above task has been completed, the creature will be tasked with collecting an object from point B and moving the object to point C. Later developments to this project should include extra layers of complexity and ultimately an increasing library of code that allow the creature to become competent at a variety of tasks and to test creature designs to determine efficiency.

What is original about this project?

This project is inspired by Karl Sims' Evolution Simulation where the virtual space allowed virtual organisms to evolve, reproduce and the results of these evolutions were pitted against each other in order to complete a task much like how this project plans to. However, in Sims' project, Sims was not particular about the creatures that were made to compete to complete a simple task.

In this project, the aim is to be able to produce competencies in the creature under evolution. With these competencies, it will be possible to produce a creature that is specifically designed for that task. Later interations will allows industry or digital businesses to test their own designs for an efficient creature in this evolutionary work space and observe what improvements could be made to them.

Timetable showing main stages in work plan

TBD

Student's signature _____ _____ _____ *Date* ___16/10/2020___

Supervisor's signature _____ *Date* _____

Computer Science, SEAS, Aston University