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| COMP 521  Winter 2015 | Guillaume Labranche  260585371 |

Project Proposal

# Topics

Genetic algorithm and physics simulation: I am interested in applying techniques from a subfield of artificial intelligence called “evolutionary algorithm”. There are two main parts I will need to focus on. First, the genetic aspect which includes two processes: reproduction between the test subjects, and making offspring with crossover and mutation. Second, the selecting aspect. This selection process is important in the success of evolution. I plan on implementing a physics-based (visual) simulation which will act as the fitness function and will determine the selection of the best individuals.

# Implementation

My simulation will most likely be more basic than the reference below. It will not be advanced muscle-based locomotion in 3 dimensions but will definitely incorporate some sort of realistic motion in 2 dimensions. I expect a significant part of the work will be building the simulation environment. In order to help with that, I will rely on an existing physics engine, most likely Unity as I have built up a fair amount of experience with it in this course already.

# Challenges

It is likely (though I do not yet know to what degree) that most starting values will not work and the algorithm will be stuck either in a local maximum or not targeted enough. Therefore another big part of this project will consist of tweaking the values and algorithms to make the evolution successful.

# References / Inspiration

[Flexible Muscle-Based Locomotion for Bipedal Creatures](http://www.goatstream.com/research/papers/SA2013/) in 2013 by three researchers, including  [Michiel van de Panne](http://www.cs.ubc.ca/~van/) of UBC.