**SCHOOL OF COMPUTING**

**UNIVERSITY OF TEESSIDE**

**MIDDLESBROUGH**

**TS1 3BA**

**Artificial Evolution**

**BSc Computer Science**

**Abelether Germa**

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**Supervisor: Eudes Diemoz**

**Second Reader:**

# Abstract

Artificial Intelligence Research Project which aims to establish whether Darwin’s theory of natural selection can be used to solve algorithmic problems. Using the Agile Methodology, my first goal is building an environment to force the agents (something that perceive its environment through sensors and acts upon it) to evolve and test out whether they modify with each generation. I will be looking to see if they adapt to the environment just as animals do according to Darwin’s theory. I will be using Java to store agents DNA, Clojure to retrieve DNA, translate it into commands, and send it to NetLogo where agents interact with the set environment. Challenges agents will face includes getting to food first. This will require them not only to be fast but also sense food that is far. The agents that performed well will continue to live and also have offspring. The expected output is agents will evolve to sense food that is really far away and also are really fast. . All results will be stored to see how the agents evolved over time. I will also be looking at how this evolution process can be used to solve real life problems.

# Acknowledgements

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# Introduction

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Fig. 6. Schiele, Egon. (1914). *Façade of a house* [Oil painting] In: Comini, A *Egon Schiele.* Plate 43. London: Thames and Hudson.

# Methodology

# Research

## Netlogo

## Java

## Clojure

## Integration

## Choice of software development tools used

### IntelliJ IDEA

IntelliJ IDEA is a java Integrated development environment (IDE). I first used intelliJ for working on a project using the programming language Clojure that is when I became accustomed to the environment.

### Netlogo

Netlogo is an agent-based programming language and integrated modelling environment.

### Github

For this project, I have chosen to use GitHub for Version control. I have realised that I will be using the university computers as well as my laptop home. While working on previous projects I found version control is one of the baggiest problems when working on multiple computers. I often found myself having multiple version not know in which version I implemented a feature. By using Github, not only would I be able to work on one version using multiple computers, it would also be backed up and I would have constant access to it as long as I have an internet access.

I first used git hub for my Software architecture group work and became accustomed with the advantages and disadvantages of using GitHub. For my project to efficiently use GitHub I took it upon myself to do a tutorial so I am aware of all the features it has to offer and I can use them efficiently.

### Pandoc

Pandoc is a universal document converter. I have looked into version control software for Microsoft word and found out it has a built in, version control but does not always work, as I would like them to. To make sure am not making any changes I would not want I am using Pandoc by editing the following files as shown in the figure below.



Figure : Using Microsoft Word with git, Martin Fenner, (2014)

Using Pandoc I can now view all the changes I make before I save them, everything I have deleted and everything I have added. I did find other tools to make word version controllable using git but they were too complicated to set up and since I am the only person working on this, they were not necessary

# Design

This is the design section

## Concept Design

## Netlogo

## Java

## Clojure

## Integration

# Implementation

## NetLogo

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# Testing

## NetLogo

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# Evaluation

# Recommendations

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