**1. INTRODUCTION**

**1.1 Purpose of this Document**

This document describes the requirements for the angry birds ai project for CS39440. It should be read in the context of the ai birds contest(ai-birds.org).

**1.2 Scope**

This requirements specification describes the functions of the software to complete unseen levels of angry birds and the associated interfaces. It also describes the requirements for the process of constructing the system.

**1.3 Objectives**

**The objectives of this document are:**

* To describe the background of the ai birds project
* To provide details of the criteria that the project must meet
* To describe the functions that the system must support

**2. GENERAL DESCRIPTION**

**2.1 Product perspective**

The angry birds project is a neural network based ai designed to automatically complete levels in the game angry birds. A heuristic based agent will be created to help gather training data for this project. A user interface for running the agents as well as customising the neural network and displaying gathered data will also be created.

**2.2 Product Functions**

The product will provide the following features:

* A heustic based agent to complete levels and gather information on successful shots.
* This will include:
* Storing the data gathered on these shots
* An agent capable of completing some levels successfully
* Some feature extraction to help generate a heuristic
* A neural network based agent capable of completing levels successfully in a reasonable amount of time
* A user interface which:
* Displays information about the neural network
* Allows the running of agents without the use of the command line
* A way to customise the neural network

**2.3 User Characteristics**

The system will mainly be used for research purposes into the area of ai to solve problems in a dynamic environment and as such will be used by experts in the area of artificial intelligence, who should be familiar with specialist computer interfaces.

**3. SPECIFIC REQUIREMENTS**

**3.1 Functional Requirements**

**3.1.1 Heuristic agent**

*FR1 Feature extraction*

The heuristic agent should perform some feature extract about the current level to determine the heuristic value for a shot. This may include features such as number of objects above impact location, estimated damage etc.

*FR2 A working heuristic agent*

A heurstic based agent that uses greedy search to determine which shot is the best available shot and use this to successfully complete levels.

*FR3 store the data*

A way to extract and store the information gathered from successful shots by the heuristic based agent so as to be used to train the neural network agent.

**3.1.2 Neural network**

*FR4 Implement a neural network*

The creation of a neural network capable of determining whether a shot is a good shot or not based on some features extracted from the current level.

**3.1.3 User interface**

*FR5 A user interface to run the agents*

An user interface to allow clear and simple running of either the heuristic based agent or the neural network agent.

*FR6 Gather and display data*

Gather information on how the neural network is performing and display this information graphically using graphs and other mediums in an easy to read way.

*FR7 customisable user interface*

A user interface to allow the customisation of the neural network.

**3.2 External Interface Requirements**

*EIR1 Appearance of the interface*

The interface should be intuitive to experts in the field of machine learning

**3.3 Performance Requirements**

*PR1 time to run the agent*

The neural network based agent should run in a reasonable amount of time, i.e train within 10minutes