CS 461 - Fall 2016 - Requirements Document

Project DevAI

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Abstract

This project is to create an agent to play the game Starcraft Brood War, a real time strategy game created by Blizzard Entertainment. After this project is complete, it could be expanded upon by future students in a club setting. This project will be a template so that future students can strive to develop better solutions than those developed within this project. This document will provide the details of the project as well as provide a list of tasks the development team must complete. The goal of this document is to specify the requirements for the system to be developed.

CONTENTS

I. Introduction

II. Technologies

A. Programming paradigm for functions

1) Options:

Paradigm	Description	Reason for Selection
Modular	Paradigm focused on separating functions into independent modules.	Modular has a high focus on independence of functions.
Object Oriented	Paradigm focused on objects such as data and attributes rather than actions.	Objects can help to section off parts of the program.
Recursion	Paradigm focused on solving a larger problem using solution from multiple smaller problems.	The program requires the solution of many smaller sections.

B. Programming language

1) Options:

Language	Description	Reason for Selection
C++	Commonly used programming language with many functionalities derived from C.	It is commonly taught and used and is the recommended language from BWAPI.
Java	Class-based programming language that promotes few implementation dependencies.	It can be run on many different systems.
C Sharp	Programming language derived from C mainly used for object oriented code.	It has a high focus on objects while keeping a lot of the functions of C.

C. Environment and IDEs

1) Options:

IDE	Description	Reason for Selection
Visual Studio[1]	IDE created by Microsoft that can create Windows programs.	Highly popular IDE for C++ and C Sharp and recommended by BWAPI.
Eclipse[2]	Cross-platform IDE mainly used for Java. Eclipse requires plugins in order to customize the environment.	Popular IDE for both Java and C++ projects.
IntelliJ IDEA[3]	Java integrated IDE that supports cross-platform and was created by JetBrains.	Thorough tools and development centered around Java.

D. APIs

1) Options:

API	Description	Reason for Selection
BWAPI	BWAPI designed to build AI agents.	Includes functionality to automate necessary game mechanics and use information on the current state of the game.
Brood Data API	API focused on data mining for future use in machine-learning algorithms for AI or competitive player training.	Useful for gathering data for design algorithms.
BW Spectator Interface API	API designed for spectator-mode interface customization with real-time game stats and interaction with units.	Useful for observing performance of AI.

E. Documentation for API

1) Options:

Source	Description	Reason for Selection
BWAPI	Commonly used programming language with many functionalities derived from C.	It is commonly taught and used and is the recommended language from BWAPI.
BWAPI Wiki	Web page with links to BWAPI source code documentations as well as other links to other BWAPI related information such as extensions, tutorials and game fundamentals.	Useful for identifying and explaining all of the tools available to the project.
Source Code Comments	Explanations of code functionality directly within the code.	Concise explanation of code located inside of the code for easy access.

F. Choice algorithm

1) Options:

Type	Description	Reason for Selection
Scripted Tree Selection	Creating a tree with scripted strategies to alternate between in response to game data.	Significantly easier implementation that still provides flexibility between strategies.
Machine Learning - Supervised	AI would base decisions on outcomes of previous instances of decisions and those outcomes.	Identifies patterns in outcomes and can eventually identify the appropriate response based on previous successes or mistakes.
Machine Learning - Reinforcement Learning	Creates a reward system for which the program will attempt to maximize reward by responding to each point of data given.	Powerful when making decisions and evaluating the effectiveness of that decision given the current state of the game.

G. *Extensions to the API*

H. *Compiling environment*

I. *Compiling type*

III. Conclusion

IV. BIBLIOGRAPHY