COMMANDER: A WEB-BASED GAME OF THE GENERALS-INSPIRED GAME WITH A.I

A Thesis

Presented to the Faculty of the
College of Science
Technological University of the Philippines
Ayala Blvd., Manila

By

JERALD C. CASIMSIMAN
MHARI ALLEN E. LIMIN
GABRIEL C. MARAON
CHRISTIAN NOEL C. NACARIO

In Partial Fulfillment of the
Requirements for the Degree of
Bachelor of Science in Computer Science

June 2024

INTRODUCTION

The study aims to develop a web-based multiplayer game inspired by the Game of the Generals and implement an A.I. The AI will be used as the decision maker of the opponent, in order to enhance the experiences of the player. The study will contribute to the gaming community by offering a novel online multiplayer experience inspired by a classic game, "Game of theGenerals" The study is based on the popular board game ?Game of The Generals? (GG) which is also known as the ?Filipino Chess? "Commander" is a web-based multiplayer game inspired by "Game of the Generals" with an integrated A.I General. The game was developed by Mawkins Entertainment and is available on Google Play. It is a military simulation in which players strategically maneuver their pieces, in an attempt to outsmart their opponent and seize the enemy's flag. It also delves into the world of artificial intelligence, focusing on creating a responsive and adaptable opponent that can enhance the game's overall appeal.

METHOD

The application will employ an AI to the second player in order to battle against the user. The game will then proceed as normal until one player wins. The researchers used the Godot Game Engine and Visual Studio to write and implement the necessary algorithms for the game. The following are the scripts that were created for Commander: Board Script ? This script creates the abstracted board that syncs with the TileMap used in the game Engine. Map Script ? It records the move counter of the player since each player has 6 moves per turn. Commander is a web-based Game of the Generals-inspired game with A.I. The design aims to merge strategic depth of the game with the capabilities of Godot and the convenience of GitHub Pages. The evaluation that will be used to assess the acceptability of the application will be based on the ISO 25010 which the ?Systems and software engineering ? Systems and software Quality? is based on. The following procedure will be conducted to test if the system features are working properly. The game is designed to be played by two players. The game has eight phases of development, including design, testing, and exit. The player is incentivized to take and avoid certain actions by rewarding and punishing the neural network. To ensure that the system reflects their vision and receives user feedback, users are involved in the project. The gameplay begins with a setup phase where alternating players place their respective pieces on their side of the board which are then hidden to the opponent depending on whose turn it is. The game denotes an engaging combination of the original rules and mechanics of the orousinspiration game with added twists as well as a more engaging set of units and maps to play. The music used in this thesis is accessible and licensable through platforms such as Pixabay, Envato.com, and Freesound.org, where the artists have made their work available to the public. The program should now be re-delivered to users after completing all prior development steps. The code is based on an iterative procedure. The goal of any neural network is to maximize the rewards that it can achieve. The code defines a function called on_offensive_pressed() likely used in a game for a defensive strategy. It also includes the training statistics such as the learning rate, which determines how fast the model learns from the data it has been given. The respondents will be invited to

evaluate the application based on the given evaluation sheets using a 4-point Satisfaction scale.

RESULTS

The game is played by clicking on the button ?Play? to start the game. The player can then select a map to play on and the number of pieces to place on the board. The game can also be played by placing pieces on a hiding board. This screen can also familiarize the user with the game?s unit hierarchy system. The map selection screen will appear when the player presses the "Play" button on the Main Menu screen. The user can also adjust the volume of either the master music, or just the sound effects. The game's multiple map options are shown on this screen. This screen offers the user 2 game mode selection, one is to play with another player, and another is toplay against an AI bot. All three ratings are classified as "Highly Acceptable," leading to an overall mean rating of 3.4 for Maintainability. The mean rating for Usability is 3.42, placing it in the "Highley Acceptable" range. In terms of Usability, the system's Learnability received a rating of 3.57, indicating it is " highly acceptable"

DISCUSSION

Commander board game was comprehensively evaluated using the criteria of ISO 25010. The software received an overall weighted mean of 3.37 with a descriptive rating of Very Acceptable. The game features two different map layouts, each with their own unique design and tile set. Extensive testing was conducted on the application, which successfully met the criteria. The following suggestions are provided for future enhancement of the game, based on the findings and conclusions of the study. The suggestions include adding functionality to pause and even leave while in the middle of an ongoing match.