Human-Like AI in RTS Games

Feasibility Demo

by Duncan Bunting

Game Design

Core Gameplay

Each player starts with a home planet.

Units spawn from planets owned.

Players must send units to conquer other planets by eliminating the opposing forces, be it neutral (unowned) or another player.
When units collide with a defended planet or other hostile units, the victor is decided by how many is on each side.
Ie: P1 has 50 units, attacks P2 who has 20 units. P1 wins and is left with 30 units.

Goal is to eliminate all other players by capturing all of their planets.

Game Design

Inspiration

Galcon, 2008 (10,000 - 50,000 downloads)
https://www.youtube.com/watch?v=r-z-Pd9RcGM

Winner of 2009 award for Innovation in Mobile Game Design

Original idea behind these series of games that feature similar core gameplay.

Auralux, 2010 (1,000,000 - 5,000,000)
https://www.youtube.com/watch?v=3XXfRSivSEo

Inspired by Galcon.
Most popular adaption of the game.

Auralux developer “Edward McNeill” wrote a paper on his new “FlexibleAI” for Auralux.

Auralux takes the original idea and adds a minimalist style and incorporates audio interaction, actions in the game produces sounds which create a melody to play over the top of the background ambient music, which also affects the gameplay itself.

Little Stars For Little Wars 2, 2012 (10,000 - 50,000 downloads)
https://www.youtube.com/watch?v=wQ_znGCET-M

Smaller, less successful adaption of the game.

Instead of free-moving units, units may only follow pre-defined connections between planets.

Download Statistics are based on the Google Play Store.
https://play.google.com

Game Design

Additional Features

Factions

Although never a focus in the game design, the previous examples all featured colours representing each player.
I plan on incorporating a more detailed system which allows the player to essentially pick a character play, a faction leader.
This will have no impact on gameplay at all, and is purely to allow players to more personally associate themselves with their faction/other factions in an attempt to satisfy the need to “Show don’t Tell” and important factor to consider. Down the line, doing this may allow a clearer way to express emotion to the player.

Reputation

Inspired by Total War: ROME II, which features two labels given to each faction within the game, these labels are determined by the factions actions in the game and are globally seen by other players.
In TW:R2: Playstyle | Trustworthiness / Reliability
(note sc
Affects decisions made by AI.
Instead of globally, local individual opinions towards each player will be stored for each AI in the game.

Game Design & Evaluation

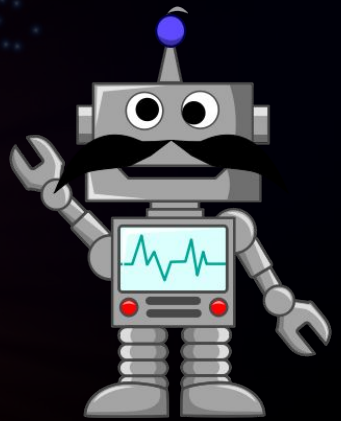
Additional Features

The Turing Test

To test the believability of the AIs it is a high possibility that implementation of a Turing Test like mode may be implemented. Currently 3 options exist. It's a possibility all will be performed if enough test subjects are available.

1. Make user believe they are joining a multiplayer match, see if they can figure out that they are playing against AIs.
2. Tell the user they are taking part in the Turing Test, have the user play against 1 other human and several AIs. It is then up to the user to find out which of the players is human.
3. Same as 2 but without telling the user that they are taking part in the Turing Test, after the game is complete, reveal to the user that one of their opponents was human, see if they know which one it was.

Most likely option 2 will be done. But it is worth considering the other options. A discussion is to be had whether tricking the user into thinking they are not playing against AIs (or vice-versa) may not be the correct route.



Evaluation

Recording Data

Stat Tracking

The game will feature two forms of recording data.

The first being recording important information every couple of seconds of game-time. Information ranging from owners of planets and how many units they hold to the current opinions the AI holds at that time. This data will be used for finding a better understanding of what happened at specific times during the game.

The second form of information gathered will be when vital changes or decisions are made by the AI. For example, if an AIs opinion of another player changes, it will output a timestamp along with relevant information.
It will likely be presented in a form similar to this:

<00:18:25:07> Player 2 opinion of Player 3 | 20 > -35 (-55) | Player 3 Attacked Ally

This can be broken down into:
<gametime (hh:mm:ss:msms)> [Player Affected] [Stat Changing] [Extra Info (ie who towards)]
| [Previous Value] > [New Value] (Difference) | [Reason For Action]

Evaluation

Feedback

Discussion > Rating

Recently I have made the decision not to have a survey in the form of a rating system, as there are many factors that can corrupt results (such as skill, familiarity with games etc). Instead a discussion will be had with each test subject to discuss their thoughts on each AI and how they found the game.

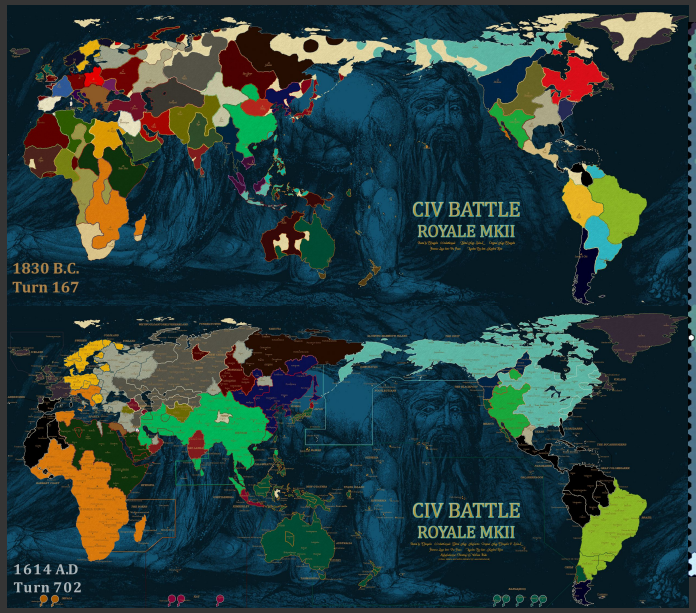
How did you find the game experience in general?
Do you have any thoughts on the AI?
How did you find this AI compared to the others?
Do you believe the actions performed by the AI were human-like?
Were there any areas that you thought were explicitly unhuman-like? (see below)

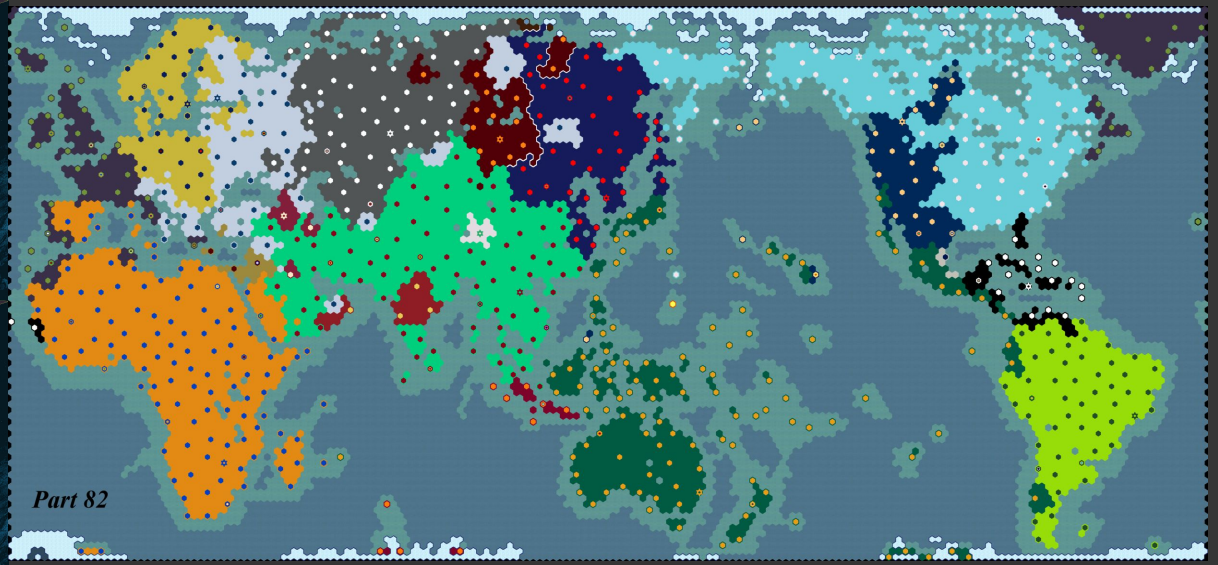
If possible this discussion will always be face to face, and I will also observe and take notes of the test subject playing the game as it will provide greater insight rather than remote unsupervised testing.

Evaluation

Battle Royale

Inspired by the large scale AI battle royale hosted in Sid Meier's Civilization V, all AI's developed and variations of each will compete against each other to determine which one will win in a large scale game. This test will be performed only after all other tasks are complete and the AIs have finished development. The simulation will also be performed multiple times to produce sufficient results. Unlike the Civilization Battle Royale, this simulation will take place on an even playing field with only the differences in AI design making the decision on which AI will win.





Additional Work

The Game

In summer I began working on a game, the project was shelved but having not being able to do my original plan or backup plan, this game falls into line for the best environment to test the AI. The game was meant to be a remake of “Little Stars For Little Wars 2” but I will now be remaking it to better suit the honours project. The total time spent on this is no more than two working days total

This is what was done previously. I am currently in the process of remaking this in a newer version of Unity. This is strictly to show progression, there are many bugs and problems as things were halted in the middle of implementation, but this should serve a clearer understanding of what I can achieve in just two work days of development.

Questions?