Edith Cowan University

CSG2341
Intelligent Systems

Assignment 1B

Saucers Part 2

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1 Introduction

This report examines fuzzy logic using Sugeno style inference, and its practical use in a video game called Saucers. Saucers is a multiplayer game where each player indirectly controls their flying saucer using a fuzzy logic controller. The saucers meet on a battle space, a rectangular xy plane, with the purpose of destroying each other. The walls of this space cannot be travelled through, and will cause the saucer to ricochet off the wall when hit.

Up to twelve saucers spawn at the start of the game, and each saucer begins with equal amounts of energy. This energy is consumed as they fly around, fire their auto aiming cannon mounted on a rotating turret, or use their shield to protect themselves from energy blasts. When a saucer is hit by an energy blast, energy is depleted. The amount of energy depletion depends on the amount of energy committed to firing, and how far away it was fired. Energy blasts lose energy the further they travel.

Saucers cannot stop flying and will always consume energy. However, the speed of a saucer can be controlled. The slowest speed consumes the least amount of energy, while the fastest speed consumes the most. The saucer's heading can also be controlled, and can turn left or right in any direction. There is however, a small energy penalty for turning.

Each saucer is equipped with multiple sensors to provide inputs for fuzzy logic. There is a sensor for all current enemy saucers, providing information about their distance, their direction in relation to the player, their current heading in relation to the player's heading, their current speed, their current energy level, and their ID number. Similarly, there is a sensor for power ups that randomly appear in the battle space, providing an energy boost to the first saucer that touches it, and a sensor for all energy blasts. These sensors provide the same information as the enemy saucer sensor. There is also a sensor providing information about the player's own energy level.

When a saucer loses all of its energy, it disappears from the battle space and loses. Each game round has a limited time, and if multiple saucers are still alive at the end of the round, it results in a tie for that spot in the ladder. The goal of this report is to design a fuzzy logic controller so that it's saucer will be the last saucer remaining during the end of a game round.

2 Idea

3 Fuzzy variables

4 Learnings

5 Conclusion