AI for IMGD Final Project Report

Cole Granof Joseph Petitti Matthew Puentes

December 12, 2019

1 What We Did

For the final AI for IMGD project we created a procedurally generated, top-down, twin stick shooter game, inspired by games like *The Binding of Isaac* and *Nuclear Throne*. In the game, the player controls a small eyeball-like character that can move around the game world, a large series of caves. There are several types of enemies that inhabit the caves, including some that chase the player, others that wander around randomly, and even some that can shoot bullets. Players fight these enemies while exploring the cave to track down three Boss enemies, which must be defeated to win. They can also find power ups hidden the caves, powerful artifacts that increase the player's abilities in unique ways.

The hero is controlled with a keyboard or gamepad, and can move around and shoot in any direction. Like all game entities in our custom engine, the hero has a velocity, acceleration, and drag. This allows it realistically reach a maximum speed in a way that is simple to program and maintain.

There are three main enemy types: Chase, Scatter, and Shooter. Chase enemies sleep until the player comes close or shoots at them, but chase after the hero as soon as they wake up. Scatter enemies wander around the board in random and unpredictable ways. Shooter enemies maintain their distance and fire slow-moving projectiles at the hero. Each enemy has a random chance to be bigger. Bigger enemies split into several smaller enemies when they are killed, providing varying levels of difficulty.

Each enemy type has a different type of face, which is further modified by randomly generated parameters. For example, Chase enemies have one large eye in the center of their face, but the size and positioning of their eye and mouth is tweaked by parameters. The game world has randomly generated color scheme, which is applied to the cave environment as well as enemies.

The game also features a robust power up system. All power ups are applicable to both the hero and the enemies—both are abstracted to a Crea-

ture superclass. All Creatures share functionality such as speed, shot rate, and bullet damage. In this way, it's easy to create unique and challenging enemies by applying randomized power ups to them.

2 Why We Did It

3 How It Works

4 Evaluation Results

5 What Those Results Mean

6 What We Learned