FRIteza

Predator-Prey Simulation Using Boids Model

Matija Ojo, Miha Krajnc, Marko Adžaga, and Janez Kuhar

Collective behaviour course research seminar report

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Iztok Lebar Bajec | Associate Professor | mentor

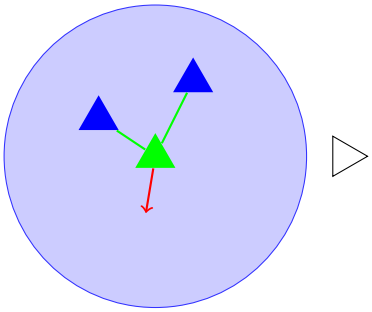
ToDo: Add abstract.

Collective Behaviour | Boids | Simulation | Prey-Predator | Escape patterns

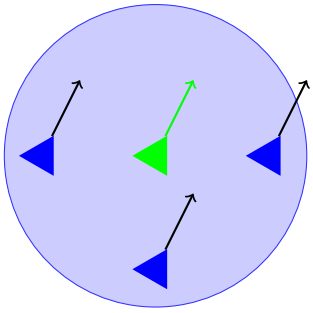
Introduction

In 1987, Reynolds [2] proposed a simple algorithm to model the flocking behavior of birds, herding of sheep, and similar phenomena, known as the Boids (Bird-oid objects) model. In contrast to controlling the interactions of the entire flock, the Boids simulation focuses on dictating the behavior of each individual boid. Despite consisting of a few simple rules, this algorithm produces complex and lifelike behaviors similar to those observed in nature.
Every boid abides by three simple rules:

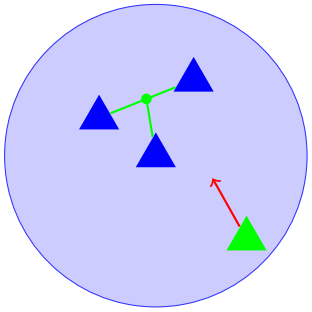
1. Avoid collisions.



2. Maintain the same heading and speed as the neighboring boids.



3. Gravitate toward the center of the flock.



We will present how we implemented such Boid simulation, with an additional step which will make simulating different Boids (prey, predator) easier.

Methods

ToDo: Add Methods.

Procedural generation of a tropic island and coral reef

In computer graphics there is frequent need for displaying large vistas of natural looking terrain. Designing such terrain by hand is typically time consuming. With procedural generation, on the other hand, larger areas of natural looking terrain can be generated with or without minimal intervention in a relatively short time. In this work we present a process of procedural generation of a tropical island with the associated corral reef. We start by generating a heightmap for the base terrain. The heightmap is then transformed by simulating the processes of hydraulic and thermal erosion to achieve a more natural look of the terrain. As coral reefs often grow around tropical islands, we also simulate their growth as part of the last step. Real-time visualization is enabled during the simulation, so that one can observe the evolution of the terrain. Here we dynamically apply textures to the terrain based on its local characteristics. The result is a natural looking model of the textured tropical island and corral reef.

Procedural generation | Terrain generation | Thermal and hydraulic erosion | Coral reef | Simulation | GPU

Results

ToDo: Add Results.

Discussion

ToDo: Conclusion/Discussion.

CONTRIBUTIONS. ToDo: division of work.

Bibliography

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2. Reynolds CW (1987) Flocks, herds and schools: A distributed behavioral model in *Proceedings of the 14th annual conference on Computer graphics and interactive techniques*. pp. 25–34.