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Section 4

Description of World:

My world is an underwater environment filled with fish that flock together, a turtle that follows the ocean current, and a crab that goes from algae patch to algae patch to eat. It is surrounded by some mountainous regions.

World Exploration:

The user can cycle through 9 separate cameras. The first camera is a main overview of the scene. 3 cameras are dedicated to views of the flow field and flow field follower. They are an overhead view, a side view, and a view following the turtle. There are 3 views for the path follower. There is an overhead view of the path, an overhead view of the field of resistance, and a view following the path follower. There is a view following the center of the flocking population. There is a view showing the 3D model of my face.

Steering Behavior Description

Flocking:

The fish are my flocking population. They continually move throughout the world using a wander force that is a slight rotation of their forward vector, therefore giving them an overall incentive to move forward while also applying a slight variation in the individual movement of the fish.

Path Following:

The crab is my path following population. He is going between algae patches, stopping at each one to eat. I designed the path to be interesting but still appear natural. I also made sure it crossed my resistance field.

Flow Field Following:

The turtle is my flow field follower, which follows the ocean current. To calculate the flow field vectors, I first randomly generated a point in each of 4 sectors. I then calculated the vectors necessary to form a path between each point. I then cycled through each cube of the flow field and got the center of that cube. I found which path vectors were within a set distance, if none were, I got the closest vector. If the center was behind the vector, I calculated the distance to the vertex instead of to the vector. If no vectors were in the set distance or only one was, the vector for that cube is the linear interpolation of the vector that was used to calculate the distance, which is either the normal vector or the vector to the vertex, and the closest vector. The value of the interpolation is based on the distance to the vector, the further it is, the closer the cube’s flow field vector is to the normal vector or vector to vertex. The same operation is applied to find it vector if there were multiple vectors within the set distance. If multiple were found, however, the flow field vector would be a weighted average of the linear interpolations with the weights being inversely related to the distance to the original path vectors that the linear interpolations were calculated on.

Area of Resistance:

The area of resistance is the wet, darker sand on the sea floor. The crab, which is the path follower, goes through the area of resistance. The area applies a force against the velocity, which slows agent down.

Resources:

Resources used to guide steering algorithms:

I used the in-class notes as the basis of my steering algorithms. The steering algorithms are similar to the way described. I did, however, expand flow fields and flocking to three dimensions. I also used Unity Documentation to understand linear interpolation.

Asset Resources

Crab: <https://www.assetstore.unity3d.com/en/#!/content/53706>

Fish: <https://www.assetstore.unity3d.com/en/#!/content/46132>

Turtle: Made by myself

Sand: <http://bgfons.com/uploads/sand/sand_texture1033.jpg>

Wet Sand: <https://d2gg9evh47fn9z.cloudfront.net/800px_COLOURBOX3278381.jpg>

My Face: Generated using Agisoft. <http://www.agisoft.com/>