Investigation Into The Representation Of 4D Shapes

18/11/2021

The 2 Weeks Progress Report

- Implemented 3D Rotors with the grab ball and swipe rotation
- Developed intuitive manipulation mechanics
  - Swipe and grab balls
- Create polyvision inspired multi-rotational view of 4D objects
- Began an outline script for how I will conduct tests
  - This will instruct how I develop the testing framework.
- Little more research into rotors and how to multiply multivectors
  - Still need to derive expressions for rotating a vector by a rotor
- Created a match-the-pose game that will work in 4D
- Created a modular scene that will be the foundation for testing users

Questions

- My rotor is obviously based on Bosch. Where should I credit him?
  - In the dissertation?
  - In the code with a comment?
- Opinions on my plan for testing:

Plan Ahead

Take 2 weeks (Weeks 3 and 4) to research papers focused in the fields of geometrical representation and interaction.

Week 4: take first steps into intuitive rotation

Week 5: rotation mechanic using click-and-drag and an arc/grab ball. - FAIRLY SUCCESSFUL - needs work - Week 8

Week 6: Implement Rotors - FAIL. Begin new Unity project for more polished scenes

Week 7: Implement and test onion skin interpretation of the 4th dimension. Implement a 3D perspective that in real time mimics the 4D rotation.

Week 8: Create intuitive UI/UX for users to manipulate shapes with.

Week 9: Create a demo to "match the shapes pose". Add more shapes - **4D cylinder,** cone, capsule, **pentachoron**.

Week 10: Plan and script a walk through for users to play with shapes and attempt to identify them. Set up a new demo for shape matching.

Week 11-12: Tutorial videos that explain why shapes behave they do, and traits to identify what the shape is. Polish the program to be a "final product".

Am I on schedule

Yes, I am balancing a few aspects of the project at the moment which is freeing up time if any problems arise.

Improving with rotors but progress is slow. I have been taken a bit of a break but I am making progress.

I will still be able to do most of the tests I have planned without 4D rotors, but I am still determined to implement them, as I think the pose matching will be a really valuable test