Developing a 3D Collect-to-Score Game in Unity 3D to Implement Research in Cognitive Science through Foraging

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BACKGROUND

- Foraging
  - Common function of Cognition
  - Search process defined as:
    - One or more agents moving through a space to find targets that are relatively finite and have unknown locations
    - Agents: Humans, eyes, nose
  - Random or correlated 'searching'
  - Means to reduce movement, conserve energy, save time, or risk minimization
- Cognitive Science
  - Mental action to acquire through thinking, experience, and senses
  - Spatial memory - recording information around the subject
- Gaming
  - Used on entertainment and research
  - Unity 3D software
  - Engaging and easy

OBJECTIVE

To create a 3D video game so that we have maximum experimental control over foraging conditions

SIGNIFICANCE

- Conducting research and manipulating conditions at ease
- 'Virtual' Reality
  - natural and realistic

MATERIALS & METHODS

Hardware and Software Used

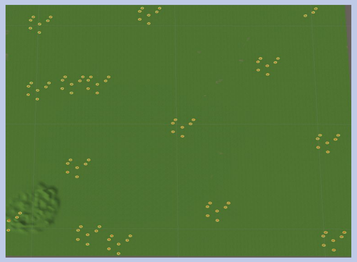
- 3.1 GHz Intel Core i7 Processor
- 16gb 2133MHz LPDDR3 Memory
- Graphics:
  - Radeon Pro 560 4096MB
  - Intel HD Graphics 630 1536 MB
- Unity 3D software

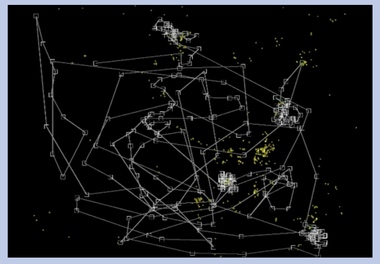
Unity 3D

- 2D or 3D
- Cross-platform Game Engine
- ASSET Store - Prefabs
  - 3D models
  - Code
  - Paid or free
- MonoDevelop by Unity
  - C# or Javascript

Game Description

- A 3D First Person POV
- Mouse/Keyboard controls
- Written in C#
- User is required to 'forage' around open space
- Objective:
  - Coins are to be collected
    - Randomly scattered
  - Time limit
- Experimental Data
  - Score, Time, X & Z loc.





RESULTS

- Game is done
  - Code snippets combined into one
  - No errors building and running
- Key game features:
  - Pick Up
  - Time Left
  - Score Data extraction
- Platform compatibility:
  - OS, Windows, Linux
- Purpose:
  - Entertainment value
  - Experimental value
- Conditions can be vary
- Software is user friendly
- Naturally embodied

CONCLUSION

- Game is playable
- Familiarity is key to use Unity with little difficulty
- Needs a little more work to kickstart an experiment

CHALLENGES

- Time constraint
- Working with Unity program
  - API Scripting
  - 3D models, color
  - Camera and other effects

FUTURE WORKS

- Joystick / VR Implementation
- Experimental improvements:
  - Camera angles
  - Coin spawn clustered or random

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