Australian National University

Jurassic Ducks

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Course Code: COMP8780 IHCC Project

Outline

- Introduction
- Motivation
- Choices made
- Techniques
- Key achievements
- Conclusion and future work

Introduction

- Visually immersive gaming environments.
- The next step?
- The problems for novice.

Motivation

- Building a 3D interactive system.
- Can AI algorithms works well on 3D games?
- Shaders compared to a fixed-function pipeline
- Game development in software engineering.

Choices made

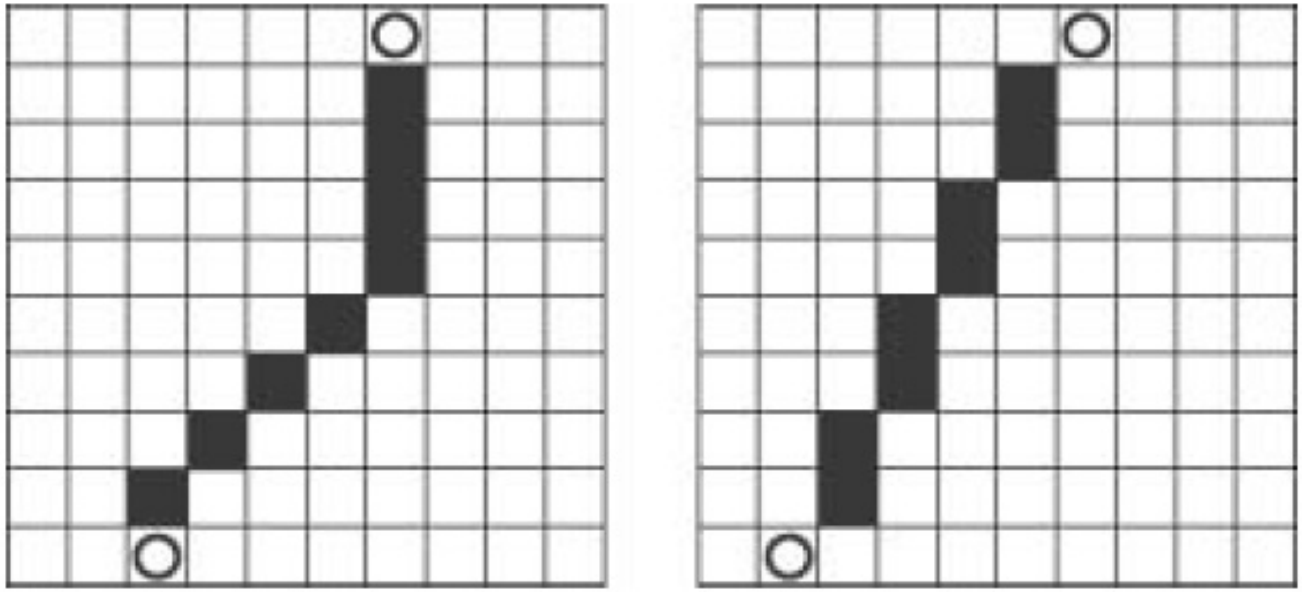
- Rendering package: OpenGL
- Computer Language:
  - C++
  - GLSL: OpenGL shading language
- GUI: QT4
- Project Version Control: Git, Bitbucket (https://bitbucket.org/RenDing/jurassicducks)

Techniques

- AI Algorithms in the game
  - Basic chasing and evading
  - Line-of-Sight Chasing
  - Interception
  - Pattern movement
  - Flocking

Techniques

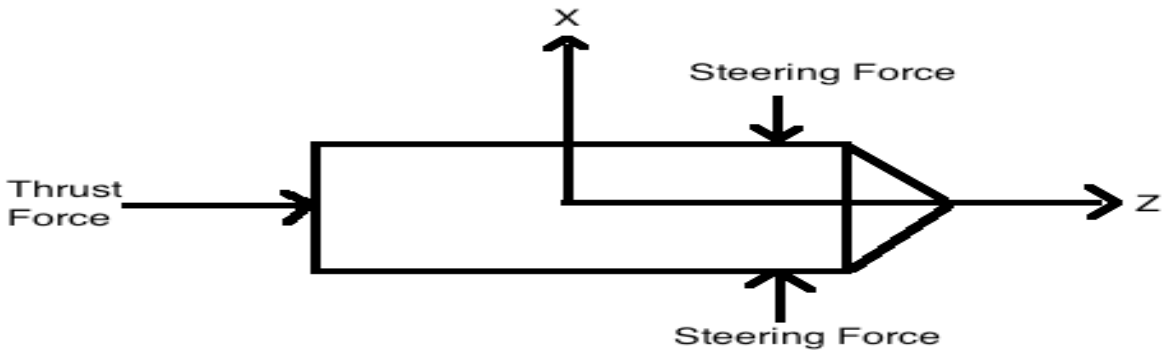
- Basic Chasing vs Line-of-Sight Chasing



From: http://commons.wikimedia.org/wiki/File:Simple_chasing_vs_line_of_sight_chasing.jpg

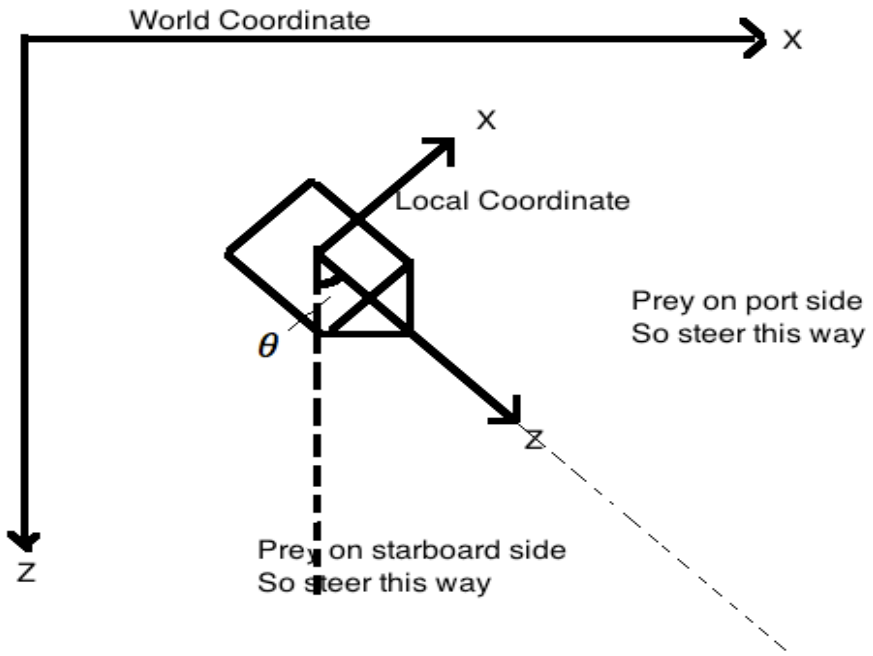
Techniques

- Game Environment
  - Tiled environment
  - Continuous environment



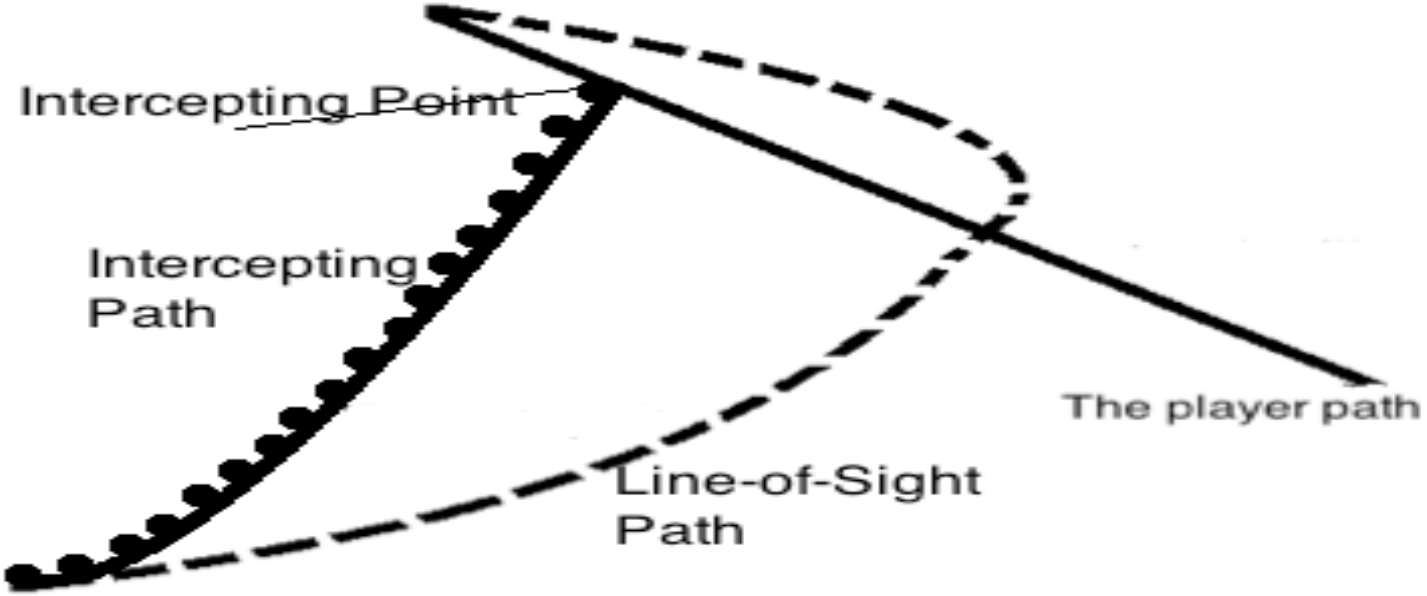
Techniques

- Global coordinate and local coordinate



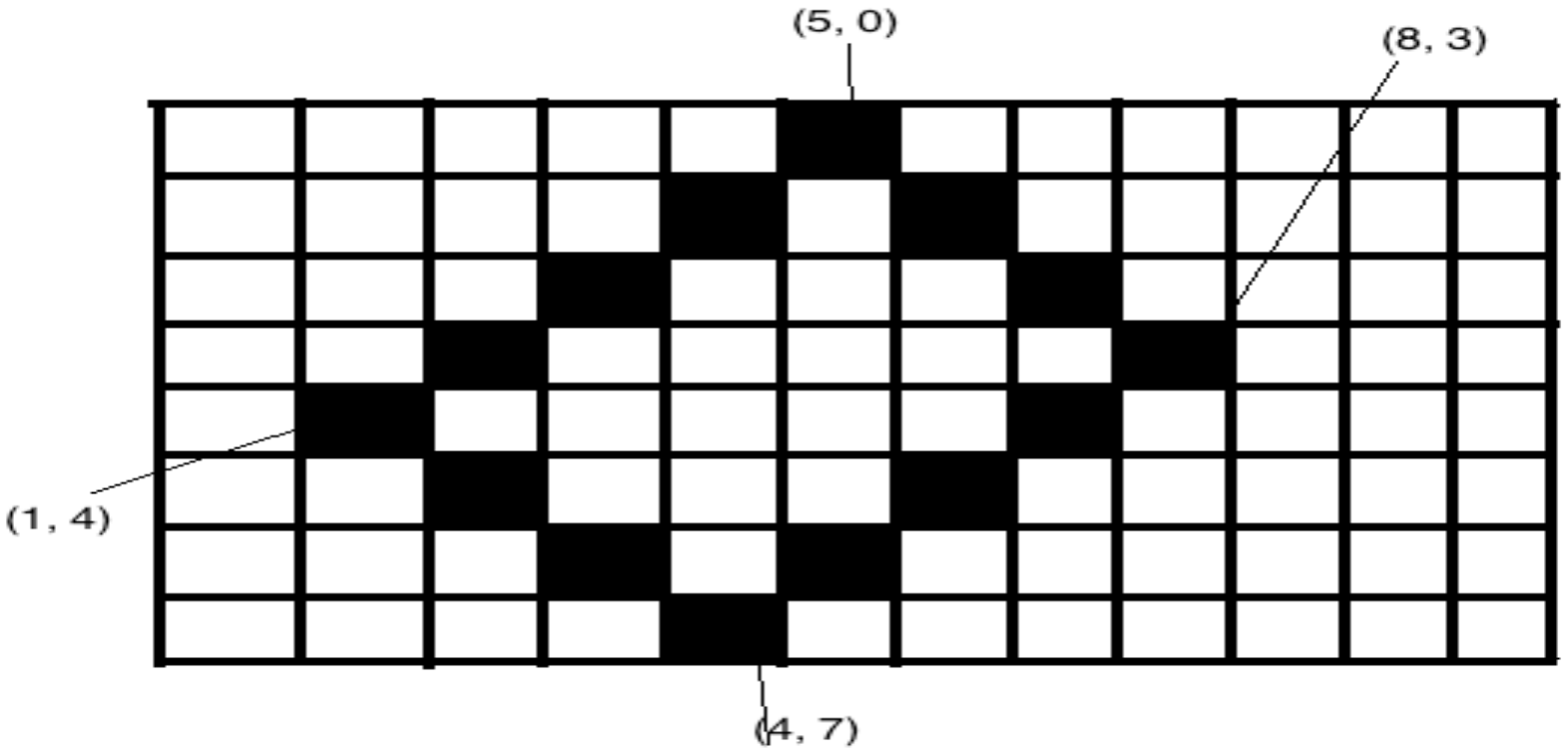
Techniques

- Line-of-Sight chasing interception in continuous environment.



Techniques

- Pattern movement in square path

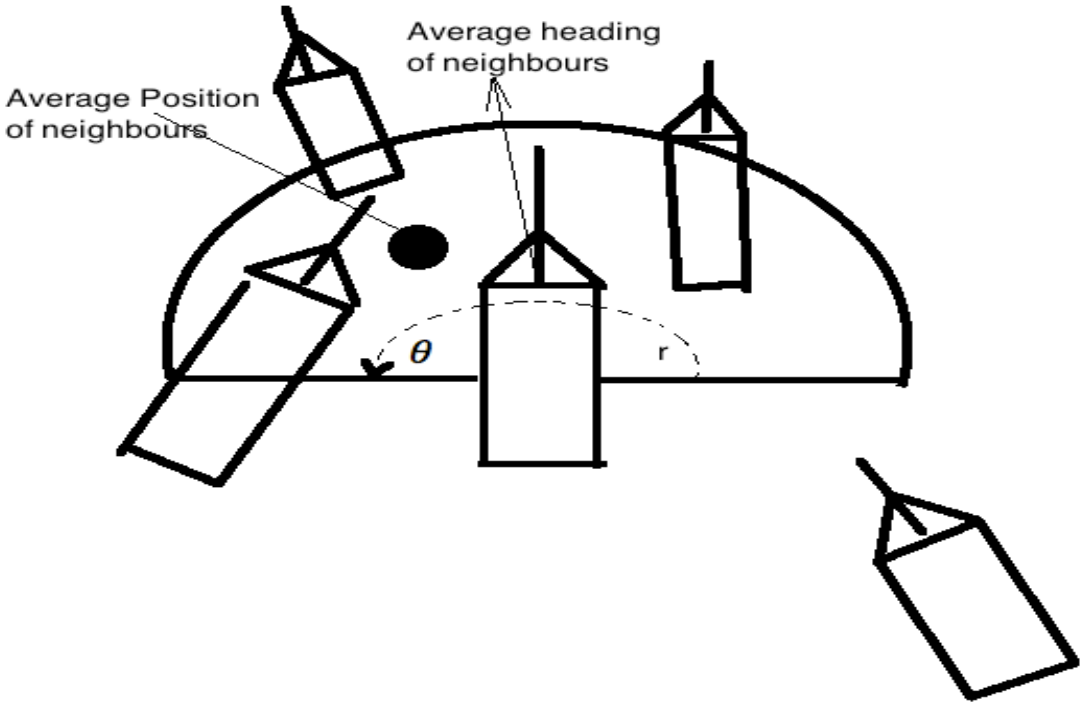


Techniques

- Flocking
  - Cohesion: each duck steers to the average position of its neighbors
  - Alignment: each duck steers to align itself to the average heading of its neighbors.
  - Separation: each duck steers to avoid touching its neighbors.

Techniques

- Cohesion: each duck steers to the average position of its neighbors



Techniques

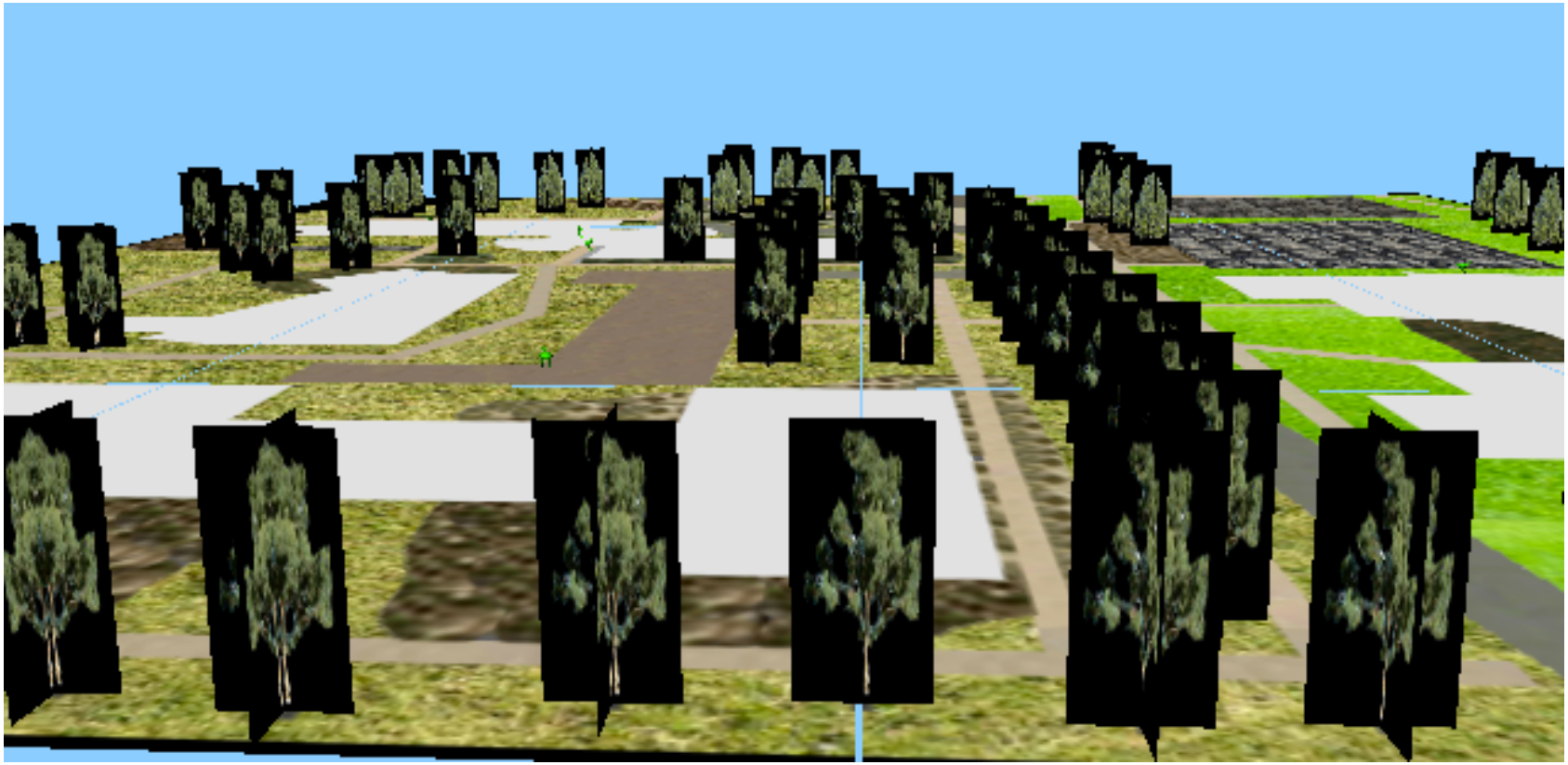
- Abandoned AI algorithms (David and Glenn, 2004)
  - Fuzzy Logic Algorithms
  - Genetic Algorithms
  - Neural Networks

Techniques

- Computer Graphics
  - Map loader
    - Break into tiles
    - Image loader in Qt (Qimage's byte order)
  - Shaders
    - Handle transparency

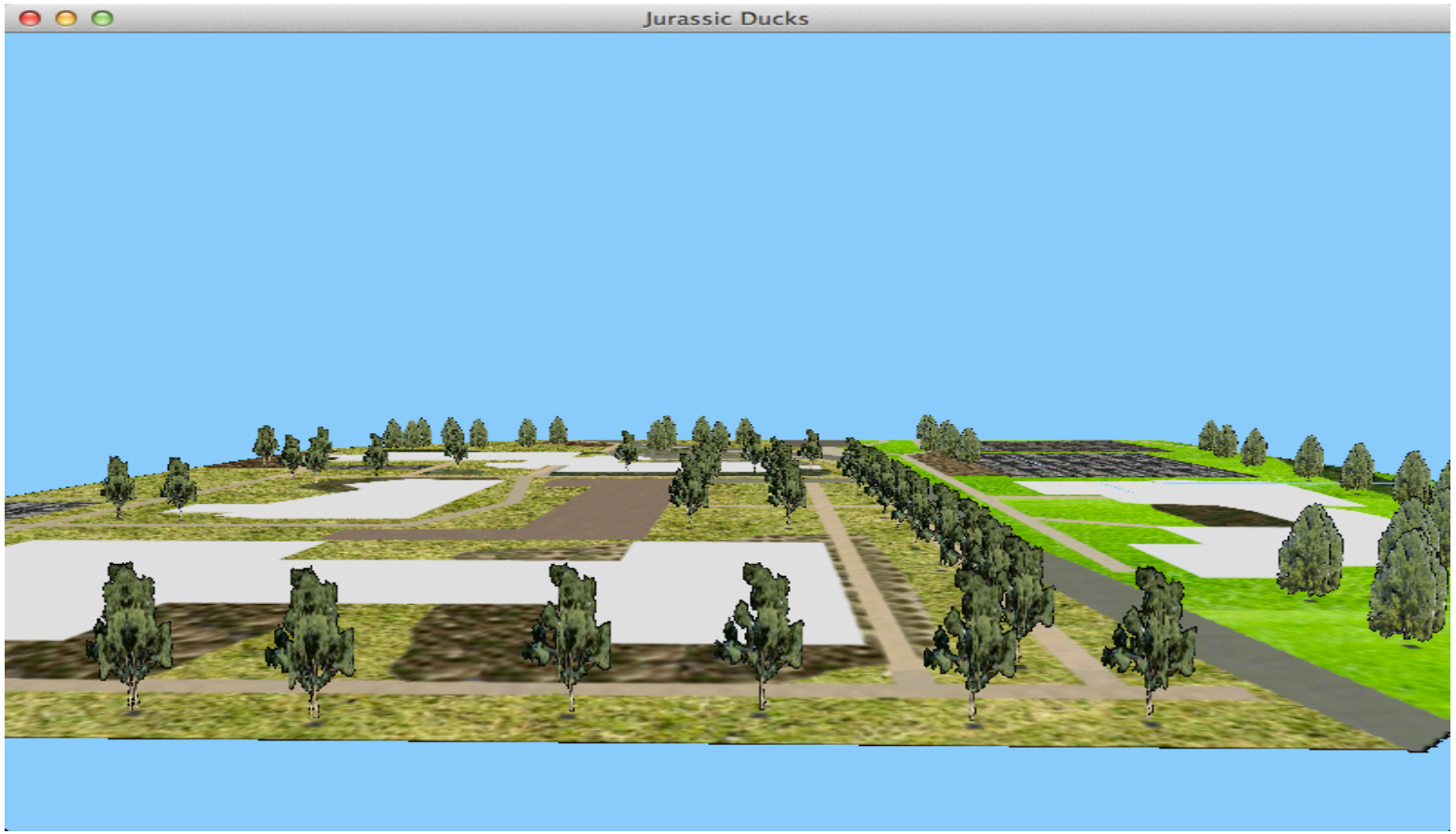
Techniques

- Transparency problem



Techniques

- Transparency problem



Key achievements

- Completed the Jurassic Ducks game
- Implemented AI algorithms
- Reported common mistakes and bugs

Conclusion and future work

- The combination of CG and AI

- Further work
  - Add more buildings
  - Extend both the player behaviors and the duck's behaviors
  - Improve the shader programs
  - Change the game into an online game