Herd of Sheep?
Group members

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Outline

• Overview of the game
• Tools
• An introduction to Herding
• Other sheep herding games
• The components that make up our game
• Look and feel
Game Overview

• To create a sheep dog simulator
  – Goal is to herd sheep into the pen or some other designate location
  – Sheep have a ‘mind of their own’
  – Dog is controlled either
    • in First Person (as though the player IS the dog)
    • zoomed out to Third Person
    • as an autonomous agent that learns the best way to herd sheep
Software Tools

• Ogre Libraries
• SDL
• 3D Studio max
Graphics

- Want 3d graphics with lighting, terrain, textures, sheep and dog models, fences, etc.
- Too much work in raw OpenGL - need existing 3d graphics engine
- Chose OGRE
OGRE

- OGRE: Object-Oriented Graphics Rendering Engine
- Free, open source, highly featured graphics engine
- Not a full game engine – still need sound, physics, AI, networking (?) etc.
OGRE Examples (1)
OGRE Examples (2)
OGRE Examples (3)
SDL

• Simple Direct Media Layer
• Cross Platform Multimedia Layer that provides low level access to
  – Audio
  – Keyboard
  – Mouse
  – Joystick
  – OpenGL
• Works on almost any platform; from OS X to Dreamcast
3DS max

Examples of sheep
What is herding?

- Herding is an action by which a controlling object exerts forces upon multiple target objects in order to direct them to a particular location.
Existing Sheep Herding Games

• david-lewes.com
• Cursor pushes the sheep away
Existing Sheep herding Games (cont)

- www.thepcmanwebsite.com
- Sheep are attracted towards each other
- Dogs repulse the sheep
- Sheep naturally want to group together
Herding Sheep is ‘Serious’

• Simulates herding behaviour.
  – Herding is somewhat relevant to crowd, traffic and other particle effects.

• The characters of the game (minus the player character) are intelligent agents that make decisions based on their environment and their goals.
Game Play

• Level Based. Sheep get progressively more difficult to herd.
  – Use a genetic algorithm to make a new population of sheep that are less co-operative than the previous one.
  – Alternatively make the sheep dumber if the game gets too hard for the player

• Game could be:
  – ‘against the clock’.
  – against an AI opponent (another sheep dog)
Intelligent agents

- Can perceive the environment and be able to take actions that change the environment in order to reach a goal state.

Steps
1. Interpret the world
2. Determine an action that will advance the goal state
3. Execute the action
Intelligent Agents (cont)

• Sheep have a desire to
  – flock (stay close together)
  – avoid collisions
  – Match speed with their flockmates
  – If the flock is moving, then align their velocities

• Sheepdog has a desire to
  – Direct the sheep towards the desired destination (pen)
Intelligent Agents (cont)

- A competing Sheepdog would ideally be able to learn from experience.
  - Update its beliefs when the sheep don't act as expected
- For randomness, the AI characters (sheep and dog(s)) have attributes that affect their beliefs and desires, and their ability to execute actions
  - Speed
  - Acceleration
  - Fear (of dog)
  - Herd Mentality (desire to stay with flock)
  - Independence (wandering away from flock)
Herding by Force

- Attractive forces between sheep (or centre of flock)
- Dog influences velocity of flock by exerting a repulsive force against it, either by movement or barking
- Obstacles also exert repulsive forces
- Repulsive forces have the potential to split the flock.
Look and Feel

• Semi cartoon feel
• Makes the simulation feel more like a game
• Target audience will be youngsters
  – Probably more appreciative of a fun cartoon style as opposed to a 'real-world' simulation
By the way we know it’s a *flock* of sheep, not a *herd*