



welcome to

GAMELET DESIGN

for education

Objectives

- ◆ V & L awards
- ◆ Discussion: rest of this course
- ◆ Game AI: finish Collaborative Diffusion
 - ◆ From simple diffusion & hill climbing to collaboration
- ◆ Project: Collaboration game





V & L Awards

Discussion: rest of this course

- ◆ Tuesday projects: game -> education sims -> educational games
- ◆ Topics for workshops
 - ◆ Game art for CS: image file types, color models, Photoshop techniques, 3d model tools (poser)
 - ◆ Animations: how to combine simulations and animations
 - ◆ 3D gamelets
- ◆ Backends to games: db with geographic info,





Collaborative Diffusion

Collaborative Diffusion

$$u_{0,t+1} = \lambda \left[u_{0,t} + D \sum_{i=1}^n (u_{i,t} - u_{0,t}) \right]$$

λ	Agent Interaction
$\gg 1$	Extreme Collaboration
> 1	Collaboration
$= 1$	Autonomy
< 1	Competition
$\ll 1$	Extreme Competition

n = number of neighboring agents used as input for the diffusion equation

$u_{0,t}$ = diffusion value of center agent

$u_{i,t}$ = diffusion value of neighbor agent ($i > 0$)

D = diffusion coefficient [0..0.5]



Diffusion programming tidbits

- ◆ Use agent attribute editor
- ◆ Use MAP action to colorize
- ◆ Use plotters (value = $f(t)$)



characteristics

- ◆ Simple to Program: algorithms are computationally expensive but relatively simple to built and tweak.
- ◆ Ecological
 - ◆ traditional AI: AI in agent, e.g., robot
 - ◆ distributed AI: AI in agents \Rightarrow flocking...
 - ◆ ecological AI: AI everywhere: agents & environment
- ◆ Parallel: no chess-like turn taking
- ◆ Incremental: AI state is part of environment and continuously updated
- ◆ Robust: likely to work with situations not anticipated, e.g., soccer with n goals, m balls for $n, m \neq 2$





Homework # 5

Your game: based on Collaborative
Diffusion



Homework

- ◆ Due: Feb 22: 11:59pm in GORP
- ◆ 150 points
 - ◆ Needs to exhibit collaboration: sport game, robot battle, smart ant hill, smar sims.
- ◆ 20 extra
 - ◆ Educational ideas