Entertainment agents

- Current Applications
  - Games
    - Creatures
  - Companionship
    - Cobot, BoB
  - Virtual reality applications
    - simulations (Tears and fears)
  - Movies
    - The two towers

The two towers – the movie

- Battle of Helm’s Deep
  - 50,000 creatures
  - Balance chaos and purposeful action
  - Tough to hand code each frame
- Solution
  - Each fighter is an autonomous agent
- Characters are truly fighting!!
- Movie – result was fixed but the frames themselves was not under direct control of the director

The Two Towers

- Software called Massive used
- Agents in massive
  - Biological characteristics (hearing, sight)
  - Behaviors (aggressive)
  - Actions (sword up, move back, run)
  - Brain or the controlling part– not much detail
    - Rule based system based on fuzzy logic
- Results
  - Surprisingly good..so don’t miss the movie!!
  - Test runs – a group of agents – it was better not to fight and run away

Believable Agents

– "*[Agents that] provide the illusion of life, thus permitting….[an] audience's suspension of disbelief*"

- Coined by Joseph Bates
  - From the arts - characters
- Requirements
  - Broad behavior
  - Suspend disbelief
  - Artistically interesting
- What other factors – for an agent to be believable?

The Oz World

- World
  - Simulated physical environment
    - Objects – methods to use them
    - Topological relationship
    - Sensing through sense objects
  - Automated agents inhabiting it
- Agents
  - Goal directed reactive behavior
  - Emotional state
  - Social knowledge
  - Some NLP
- Evaluation
  - subjective, depends on the user feedback

Oz

- Emotions – key component in Oz agents

- Emotions – from success or failure of goals
  - Happy / Sad : when goal succeeds / fails
  - Hope : chance that the goal succeeds
  - Degree : the importance of goal to the agent

- Emotions affect behavior
- <Interaction with Lyotard>

- Bates founded a company – zoesis studios (www.zoesis.com)

Believable Agents

- Believable agents
  - Emotions necessary.
- Is it advisable to put emotions into machines?
  - Privacy issues!!
  - trust

Tears and Fears

- Two models brought into one
  - Emotion affects behavior
    - Model non-verbal behavior
    - Behavior should be consistent
  - Emotion arises from the result of a behavior
- Built into characters in a virtual world
- Used in military simulations. Mission Rehearsal Exercise system.

BoB – Music Companion

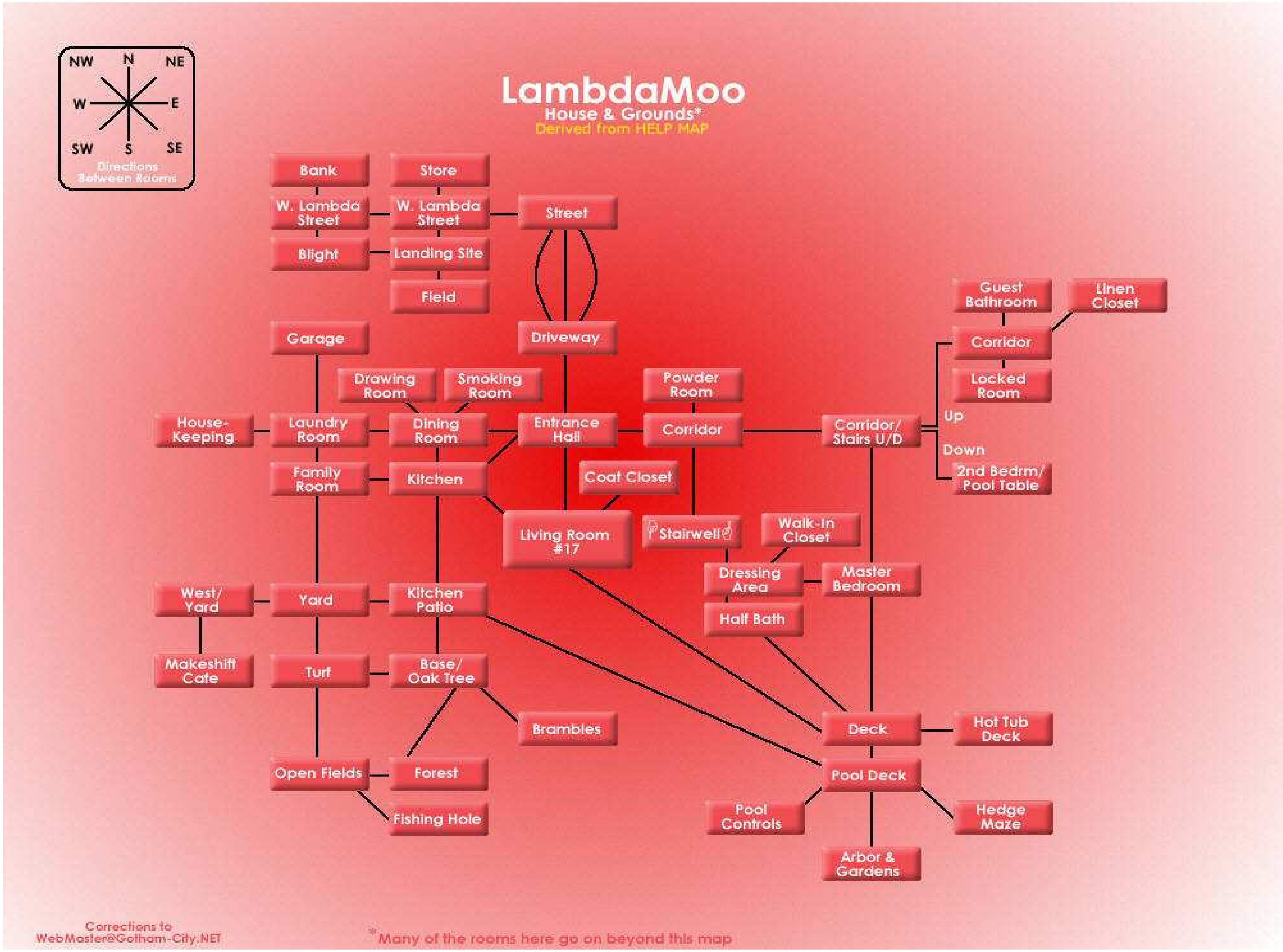
- Improvisational companionship for Jazz players
- Trades solos by configuring itself to the users musical sense
- BoB and believable agents
  - Similarities
    - Specificity
    - Evaluation – based on audience response
    - Assumes audience is willing to suspend their disbelief
  - Differences
    - Time constraint

BoB

- Represents melodic content in <pitch, duration> pairs
- 3 components
  - Offline learned knowledge
  - Perception
  - Generation
- Uses unsupervised learning.
  - Why?

Cobot

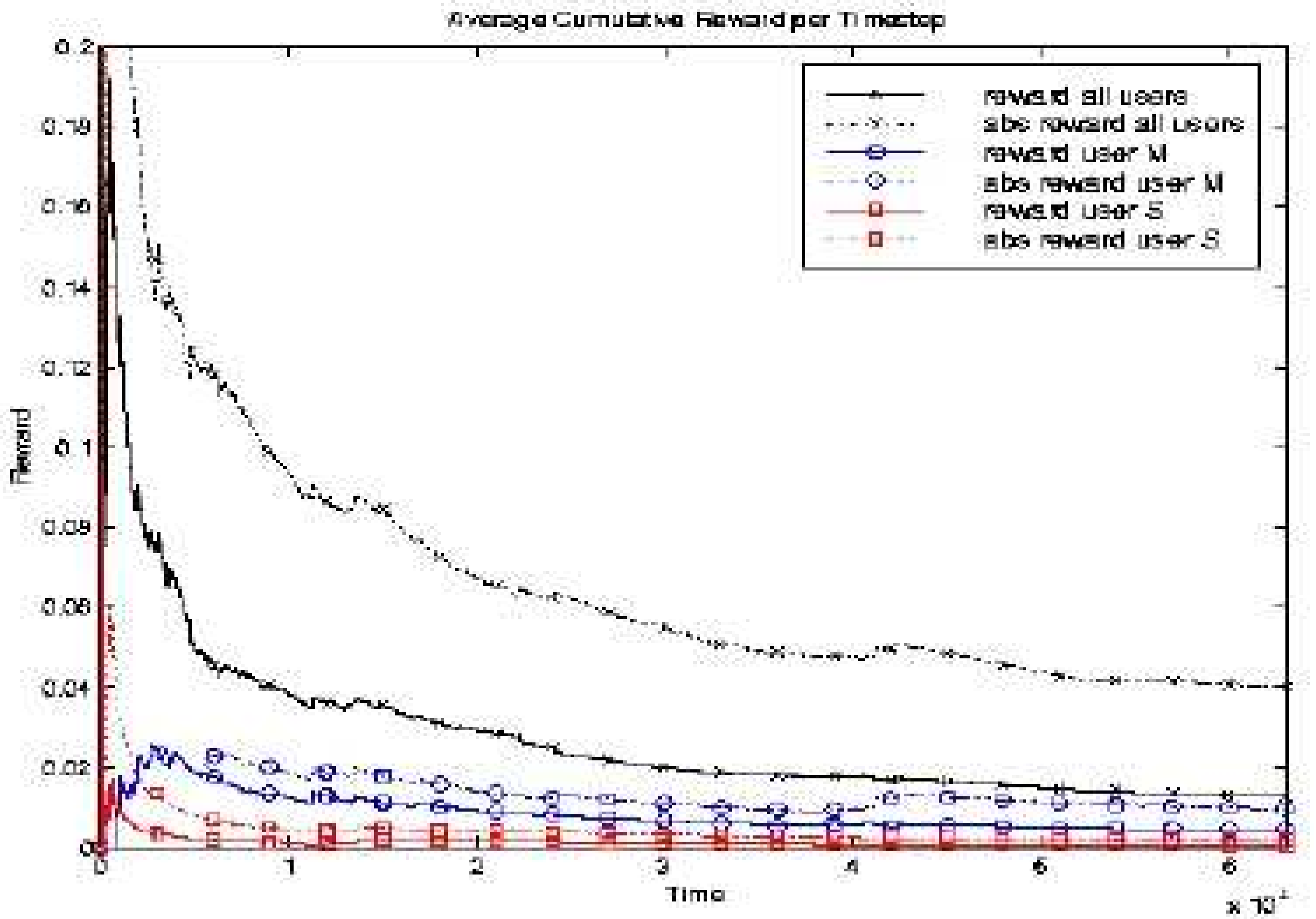
- Agent resides in the LambdaMoo chat community
  - Multi user text based virtual world
  - Speech + emotion (verbs)
  - Interconnected rooms modeled as a mansion
  - Rooms, objects(118,154) and behaviors
  - Test bed for AI experiments
- Primary functionality of Cobot
  - Extensive logging and recording
  - Social statistics and queries
  - Emote and chat abilities


LambdaMoo
House & Grounds*
Derived from HELP MAP
NW
N
NE
W
E
SW
S
SE
Directions Between Rooms
Bank
Store
W. Lambda Street
W. Lambda Street
Street
Blight
Landing Site
Field
Garage
Driveway
Drawing Room
Smoking Room
Powder Room
House-Keeping
Laundry Room
Dining Room
Entrance Hall
Corridor
Corridor/ Stairs U/D
Up
Down
Guest Bathroom
Linen Closet
Corridor
Locked Room
2nd Bedrm/ Pool Table
Family Room
Kitchen
Coat Closet
Living Room #17
Stairwell
Walk-In Closet
Dressing Area
Master Bedroom
Half Bath
West/ Yard
Yard
Kitchen Patio
Makeshift Cafe
Turf
Base/ Oak Tree
Brambles
Deck
Hot Tub Deck
Open Fields
Forest
Pool Deck
Fishing Hole
Pool Controls
Hedge Maze
Arbor & Gardens
Corrections to WebMaster@Gotham-City.NET
*Many of the rooms here go on beyond this map

Cobot

- Aim: agent to take unprompted, meaningful actions which is fun to users
- Reinforcement learning
- Challenges
  - Choice of state space
  - Multiple reward sources
  - Inconsistency
  - Irreproducibility of experiments
- Reward function
  - Learn a single function for all users?
  - Both direct (reward and punish verbs) and indirect (spank, hug..)
- State features
  - Need to gauge social activity

Cobot - Experiments



Results

- Encouraging
- Cobot learned successfully for those who exhibited clear preferences.
- Cobot responds to dedicated parents
- Inappropriateness of average reward
  - Users stopped giving rewards.
    - Habituated or too bored