Introduction to Multi-Agent Programming

Exercise 1

Organization, introduction to Rescue Simulation, and first Exercise

Christian Dornhege, Dapeng Zhang
Organization I

- Written exercises + Programming (Rescue Simulation)
  - Others, for example OOP, design patterns?

- Group of [maximum] five students
  one group one submission

- Time slot?
Organization II (today)

- An introduction to rescue simulation
- A Tutorial for the simulation software
Goals

• RoboCup
  – RoboCupSoccer
    • Simulation
    • Small Size
    • Middle Size
    • Four-Legged
    • Humanoid

• MAS
  – Individual
  – Coalition
Scenario

• RoboCupRescue
  – Infrastructure
  – Simulation
  – Virtual Robots
  – Robot

• Background
  – Earthquake
    • Polices
    • Ambulances
    • Firefighters
    • Victims
Simulation

• Simplified
Architecture

Simulators
- Blockade
- Traffic
- Collapse
- Fire

KERNEL

Geographic Information-System (GIS)

UDP/IP

Civilians

Viewer

Field agents
Stations
The Running System

<table>
<thead>
<tr>
<th>Service</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Brigade</td>
<td>15</td>
</tr>
<tr>
<td>Police Force</td>
<td>15</td>
</tr>
<tr>
<td>Ambulance</td>
<td>8</td>
</tr>
<tr>
<td>Civilian</td>
<td>90</td>
</tr>
<tr>
<td>Fire Brigade Center</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulance Center</td>
<td>1</td>
</tr>
<tr>
<td>Police Force Center</td>
<td>1</td>
</tr>
<tr>
<td>Refuge</td>
<td>2</td>
</tr>
<tr>
<td>Ignition points</td>
<td>6</td>
</tr>
</tbody>
</table>

SUNTORI: Kobe 2008 2nd place
The Exercises

• Setup the system
• Individual
  – Path finding
• Coalition
  – Exploration
  – Cooperation etc.
Organization II (today)

• An introduction to rescue simulation

• A Tutorial for the simulation software
  1. Get the software
  2. Compile the software
  3. Run the simulation
  4. Exercise 1
Step 1

- Linux systems
  - Packages
    - java
    - C/C++
- Get the source package
  - Download from exercises page
Step 2

• Directories
  – boot, docs, maps, programs
  – Programs/rescuecor/mas08

• Compile the software
  $> cd rescue/rescue-0.50.0/programs/
  $> make
  • Warnings …
  • Errors…
Step 3

- Run the program
  
  ```bash
  $> cd rescue-0.50.0/boot
  $> ./allNoEarthquake.sh
  $> ./sampleexplorationagents.sh
  $> ./killall.sh
  ```

- Environment variable

  ```bash
  export RESCUE_KERNEL_HOME=[your path to]/rescue-0.50.0
  ```
Simplified Simulation

• No disaster (earthquake, blockades, fires)
• Only ambulance (exploration), civilians (targets)
• Ground truth are defined in text files
  – maps/Kobe_expl/civstates.txt targetlocs.txt
Step 4

- Exercise
  - Log files
    - In boot directory
  - Java package
    - rescuecore.mas08 → rescuecore.grp[X]
    - Derive from BaseExplorationAgents to create your own agents (for now, they can do exactly the same as SampleExplorationAgent)
    - Change sampleexplorationagents.sh to start your agents