

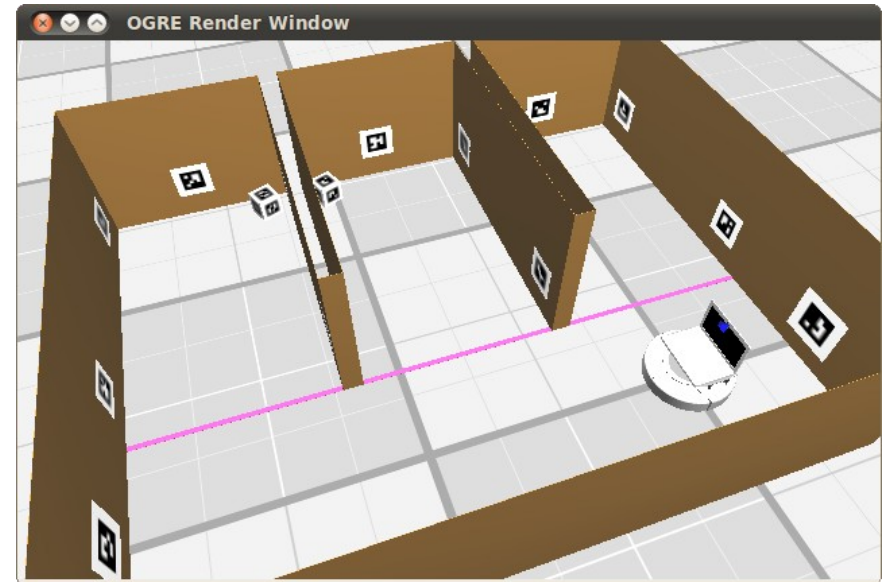
The Mirage Simulator and Virtual Worlds

15-494 Cognitive Robotics
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Spring 2011

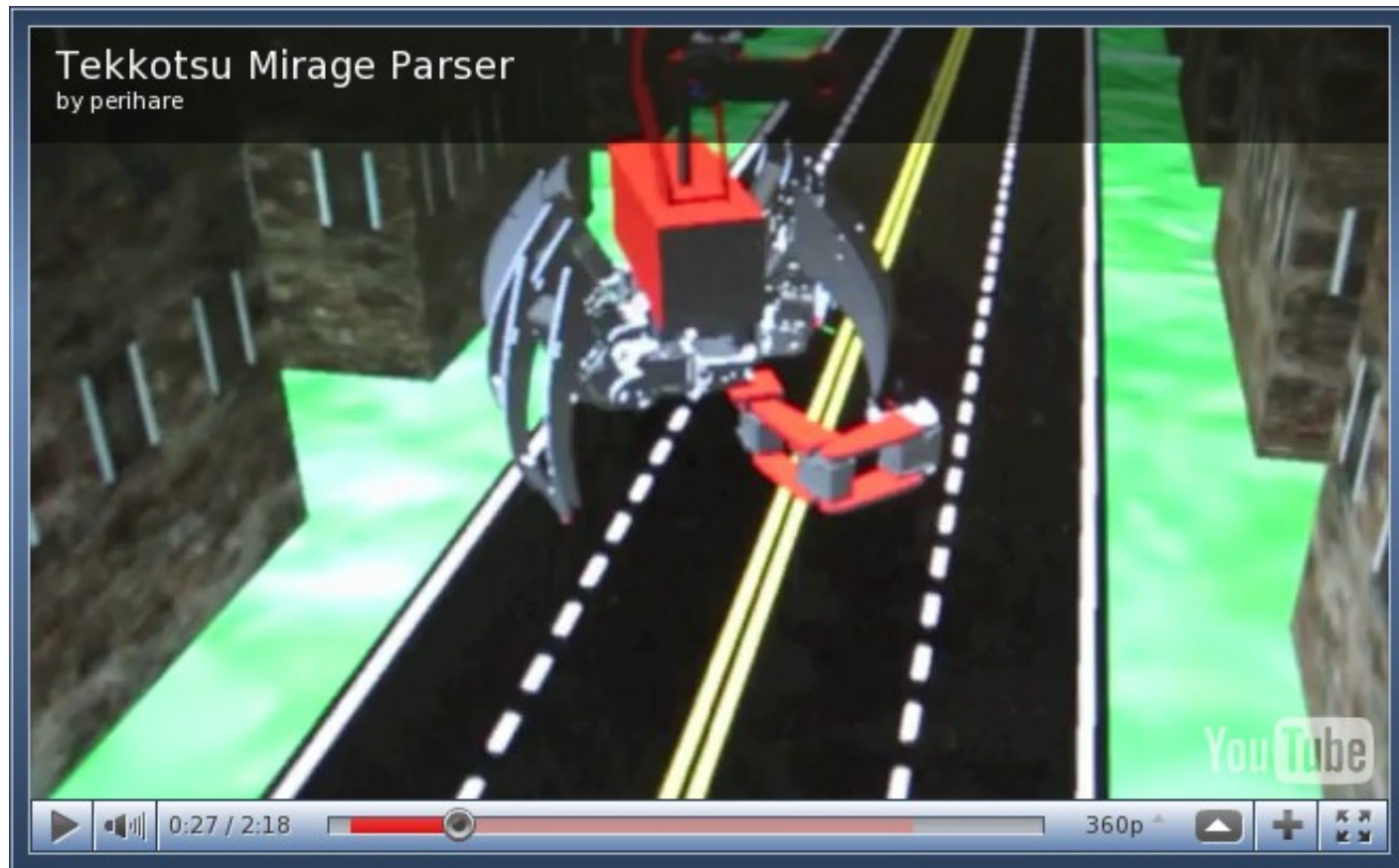
What is Mirage?

- A virtual environment simulator for Tekkotsu.
- Built on top of:
 - OGRE3D rendering engine
 - Bullet physics engine



- Provides Tekkotsu with simulated camera images and sensory inputs (e.g., bump sensors on the Create).
- Provides the user with a 3D rendering of a simulated robot and its environment.
- See the Tekkotsu wiki for documentation.

Mirage Demo Video



Running Mirage

Make three tabs in your terminal window:

- Third tab:

```
$ ControllerGUI localhost
```

- Second tab:

```
$ cd /usr/local/Tekkotsu/tools/mirage
```

```
$ ./mirage worlds/tic-tac-toe.mirage
```

- First tab:

```
$ cd ~/project
```

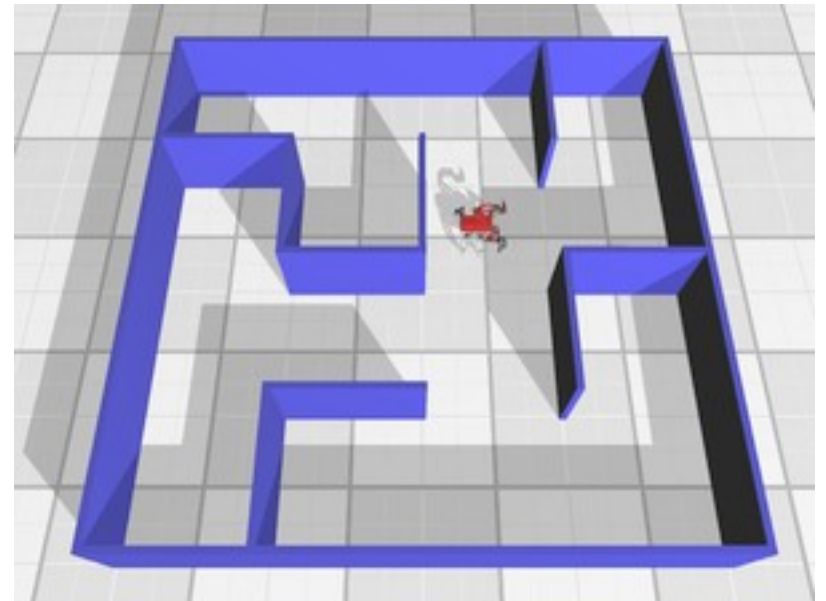
```
$ ./tekkotsu-CREATE -c mirage.plist
```

Mirage Command Summary

- Viewpoint motion:
 - w = forward, s = back
 - a = move left, d = move right
 - PageUp = climb, PageDown = descend
 - Arrow keys = pitch and yaw
- Other basic commands:
 - r = reload the world
 - control-f = follow mode (view follows the robot)
 - u = unfollow / view reset
 - t = print statistics
 - q = quit
- See the Tekkotsu wiki for additional commands.

Mirage Worlds

- World files with extension .mirage are xml files: human readable but ugly.
- Specify world file on the command line and it will be loaded by Mirage during startup.
- Tekkotsu includes a collection of predefined worlds in `/usr/local/Tekkotsu/tools/mirage/worlds`
- Mazegen is a tool for generating maze worlds of various sizes; it outputs the maze as a .mirage file.



Mirage World Builder Tool

- Provides a convenient, simple syntax for constructing Mirage worlds.
- Source files have extension .ian.
- WorldBuilder tool translates these into .mirage files.
- Most Mirage worlds are built using this tool; the source for these worlds can be found in:

`/usr/local/Tekkotsu/tools/mirage/worlds/src`

- Users can put their own world files in
`~/project/worlds`

World Builder Language

```
define gridcube cube scale=(20,20,20) material=Pink
```

```
gridcube location=(0,0,0)
```

```
gridcube location=(-40,0,0)
```

```
gridcube location=(40,0,0)
```

```
gridcube location=(0,40,0)
```

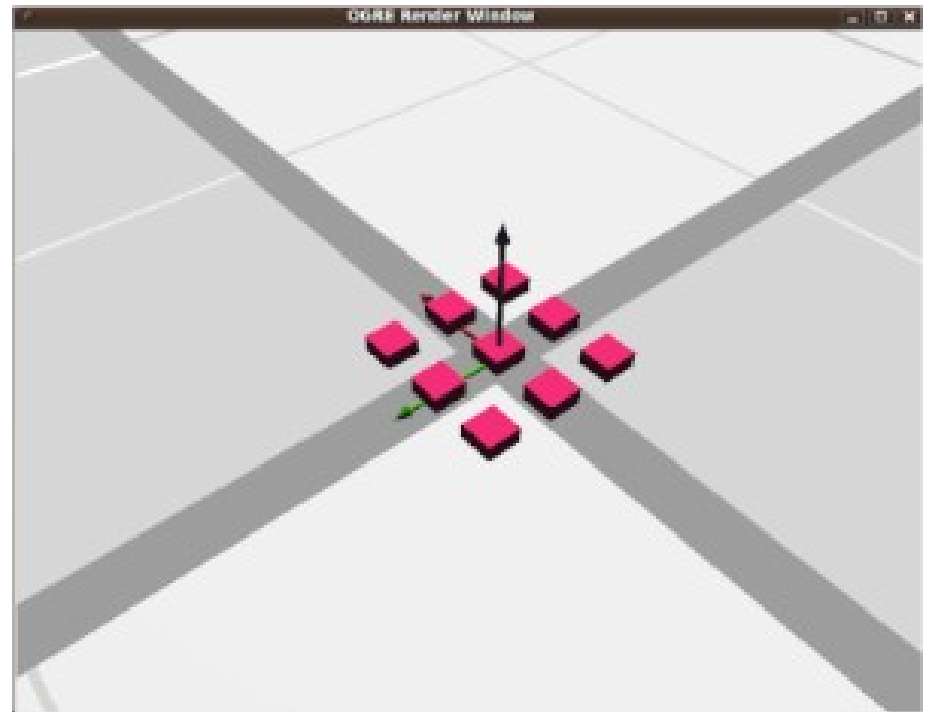
```
gridcube location=(-40,40,0)
```

```
gridcube location=(40,40,0)
```

```
gridcube location=(0,-40,0)
```

```
gridcube location=(-40,-40,0)
```

```
gridcube location=(40,-40,0)
```



There are many other features, such as control of light sources, gravity, mass of objects, etc. See the Tekkotsu wiki for link to the world builder page.