Computation as an Expressive Medium

Lab 12: The Car Goes Vroom Vroom

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Agenda

- Braitenberg Vehicles
- Project 5 Brainstorming and Work Session
What are Braitenberg Vehicles?

- Cute little car-things that respond to
  - Light
  - Each other
- That’s it!!!
Why Do We Give a Frack?

- Complex patterns can emerge from lots of simple units exhibiting simple behaviors
  - Cells
  - Geese
  - Ant colonies
  - Borg
  - etc.
Four Types of BVs

- Aggressor
- Coward
- Explorer
- Lover
Type 1: Aggressor

- Charges toward a light source
- Rests in darkness
Type 2: Coward

- Flees from a light source
- *UNLESS* the light source is directly in front
- Rests in darkness
Type 3: Explorer

- *ALWAYS* moves away from a light source
- Moves in darkness
Type 4: Lover

- Lovingly moves toward a light source
- Rests at the source
- Moves in darkness
## Summary

<table>
<thead>
<tr>
<th>Type</th>
<th>Source Directly in Front</th>
<th>Source Not in Front</th>
<th>Darkness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressor</td>
<td>Toward</td>
<td>Toward</td>
<td>Rests</td>
</tr>
<tr>
<td>Coward</td>
<td>Toward</td>
<td>Away</td>
<td>Rests</td>
</tr>
<tr>
<td>Explorer</td>
<td>Away</td>
<td>Away</td>
<td>Moves</td>
</tr>
<tr>
<td>Lover</td>
<td>Toward</td>
<td>Toward</td>
<td>Moves</td>
</tr>
</tbody>
</table>
BV Breakdown

Inverter

Sensor

Wheel
Programming BVs

- Vehicles: Type, color, size, wheels, sensors

- Light Source: Position, range, strength

- SensoryField: Contains the cumulative light influence at each pixel on the screen
Review

- Braitenberg Vehicles = simple AI agents
- Four types
- You can control
  - The appearance of the vehicle
  - The type, number of sensors, etc of the vehicle
  - The light sources
I've gotta cut back on the caffeine
A Little Processing...
Project 5

The field of artificial intelligence (AI) builds computational systems that model the intelligent behavior of people and animals. AI architectures can be extremely generative, able to produce complex responses to environmental changes, including user interaction. In computational art, AI approaches have been used to build work ranging from robotic sculpture, to drawing and painting generators, from generative interactive stories to music composition. In the popular art form of computer games, AI approaches are used extensively to build tactical and strategic opponents, non-player characters and player modeling systems. In this project, build a collection of simple AI agents that interact with the user, each other and their ecosystem to give the illusion of life. You can build upon the provided framework of Braitenberg vehicles, which can produce complex agent behaviors, or code your own simulation.
Project 5 Translated

- Build a collection of simple AI agents
- Make them interact with
  - The user
  - Each other
  - The environment
- Can use Braitenberg or code your own
Project Grading Criteria

- Concept
  - 1 if not well thought-out

- Technical Realization
  - 1 if it crashes
  - 1 if the interface is counterintuitive or hard to use

- Visual Design
  - 1 if does not fit or works against your idea