find the light source

SIS - Signals, Instruments and Systems

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Introduction

• objective

• set-up Webots/real world
find the light source

avoid obstacles
Braitenberg

\[
speed_{\text{left}} = \sum_{i=0}^{n} \alpha_{\text{left},i} \left(1 - \frac{\text{value}_i}{\text{range}}\right) \quad \text{speed}_{\text{right}} = \sum_{i=0}^{n} \alpha_{\text{right},i} \left(1 - \frac{\text{value}_i}{\text{range}}\right)
\]

<table>
<thead>
<tr>
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<th>0</th>
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<th>3</th>
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<th>5</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>Right wheel</td>
<td>-160</td>
<td>-90</td>
<td>-90</td>
<td>-10</td>
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<td>60</td>
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<td>coefficient</td>
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<td>Left wheel</td>
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<td>-140</td>
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</table>

**no light**

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<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
<th>(\Sigma)</th>
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<td>0</td>
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<tr>
<td>Left wheel</td>
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**light on the right side**

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<tr>
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<td>0</td>
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</table>
Initial decision tree

Start → Problem? → no → Light? → yes → Obstacle? → no → go to light

Start → Problem? → yes → debug

Light? → no → Obstacle? → no → go straight

Light? → yes → Obstacle? → yes → to be solved

Obstacle? → no → follow wall

Obstacle? → yes → to be solved

Obstacle? → no → follow wall
Follow wall difficulty
getting stuck

• definition
• inner orientation
• corner sensing
• addition to the supervisor
• noise implementation
Adapted decision tree

Start → Problem? no → Light? yes → Obstacle? no → go to light

Problem? yes → debug

Light? no → Obstacle? yes → avoid obstacle

Obstacle? no → go straight

Obstacle? yes → follow wall
Final decision tree

Start → Light?
- **Light?**
  - **yes** → Obstacle?
    - **Obstacle?**
      - **yes** → avoid obstacle
      - **no** → go straight
  - **no** → go to light

- **Obstacle?**
  - **yes** → avoid obstacle
  - **no** → go straight
Functions

• `go_to_light(speed, ls_value)`
• `avoidObstacle(speed, ds_value)`
• `backlight()`
• `straight()`
Video 1
Video 2
Video 3
Stuck in a gap
Conclusion

• one code for both worlds
• much unused ideas and code
• possible applications