

I-GUIDE

Intelligent Guide Robot

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Objective:

To design an autonomous robot that acts as a tour guide for visitors of the Electrical and Computer Engineering (ECE) Department at Bradley University.

Project Requirements:

- Reach goals within a 4' radius
- Avoid all obstacles
- Detect when battery is at 10%
- Max for software loop < 180 ms
- Avg. drive speed = 31.5 in/sec
- Able to select 28 locations or 3 floor tours

System Hardware:

Localization:

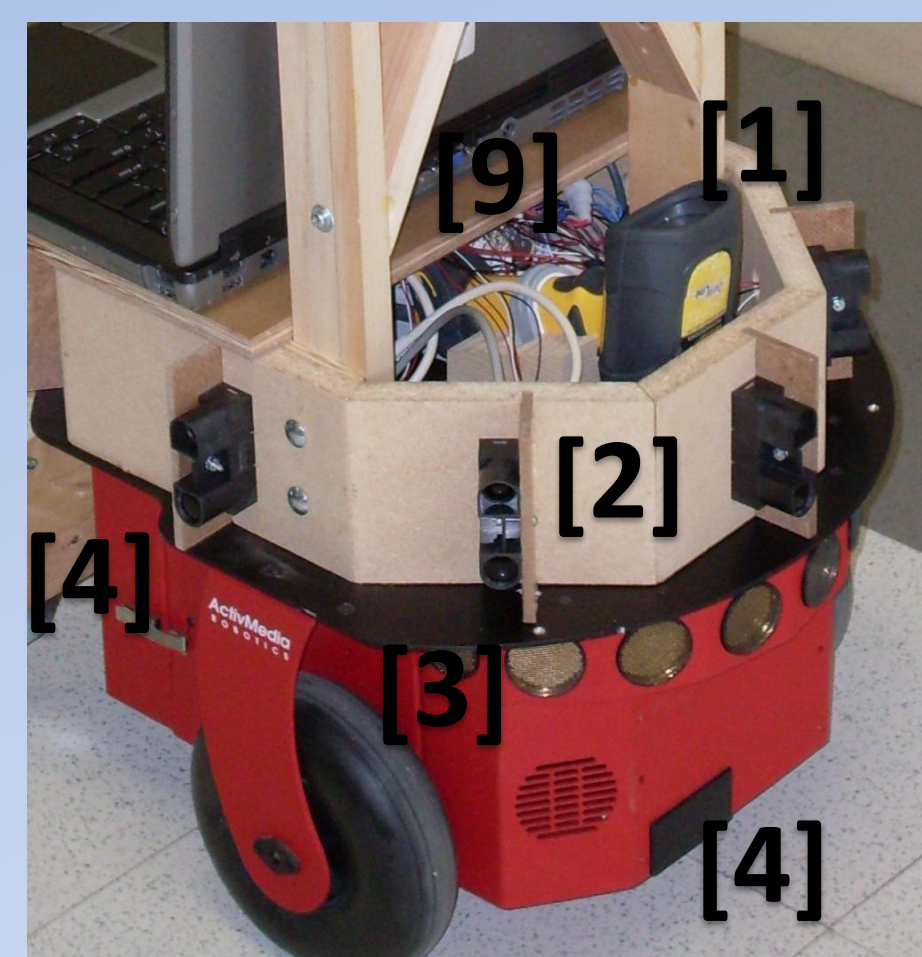
- UV barcodes on ceiling
- Barcode Scanner [1]

Wall Follow:

- Infrared Sensors [2]

Obstacle Detection:

- Sonar Sensors [3]
- Bump Sensors [4]*
- Infrared Sensors [2]



*Not yet installed
**Cannot be seen

User Interface:

- User keypad [5]*
- "Kiosk" Monitor [6]
- Speakers [7]

Platform:

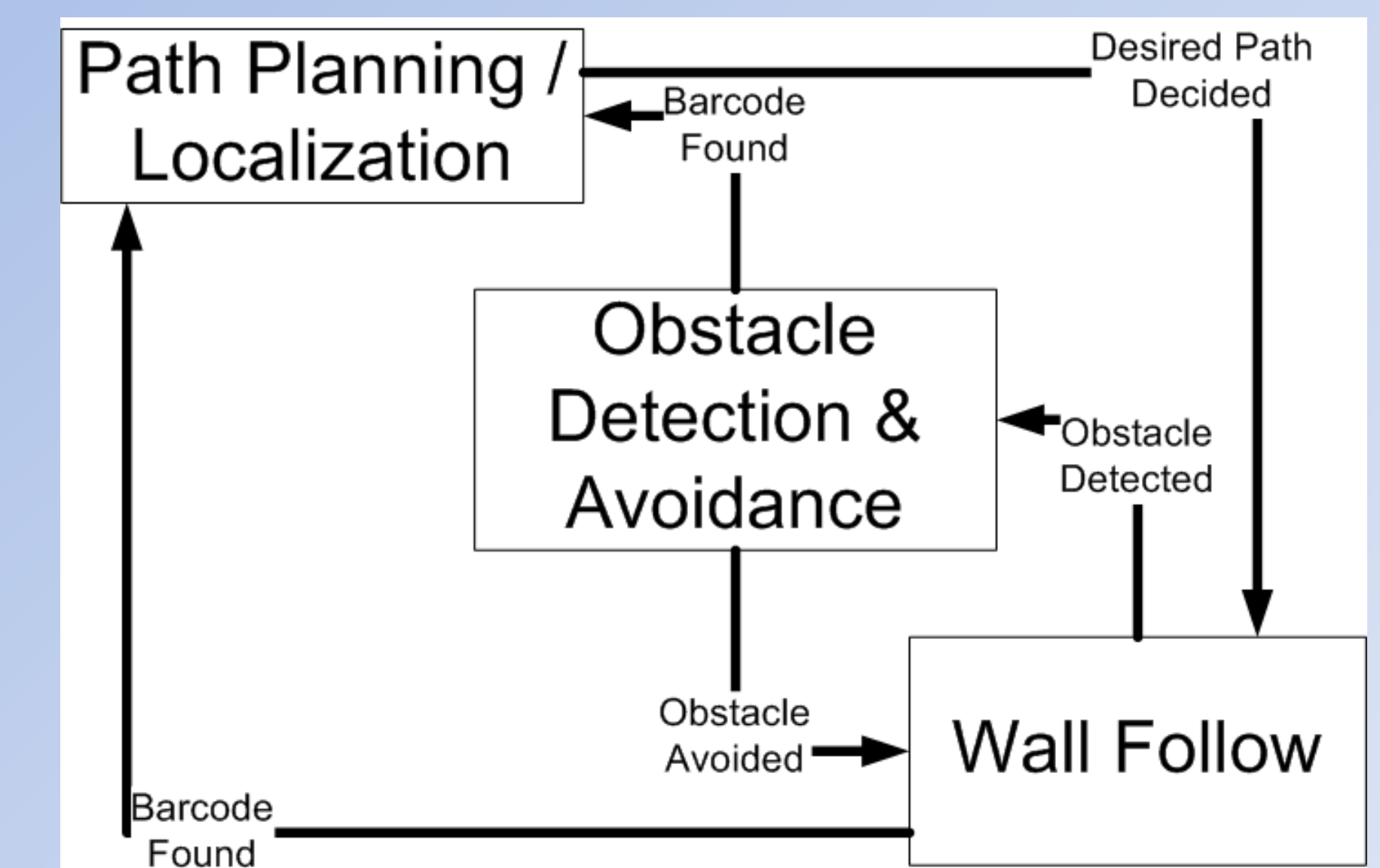
- Pioneer 3 Robot [8]

Data Collection:

- Analog to Digital to USB [9]**

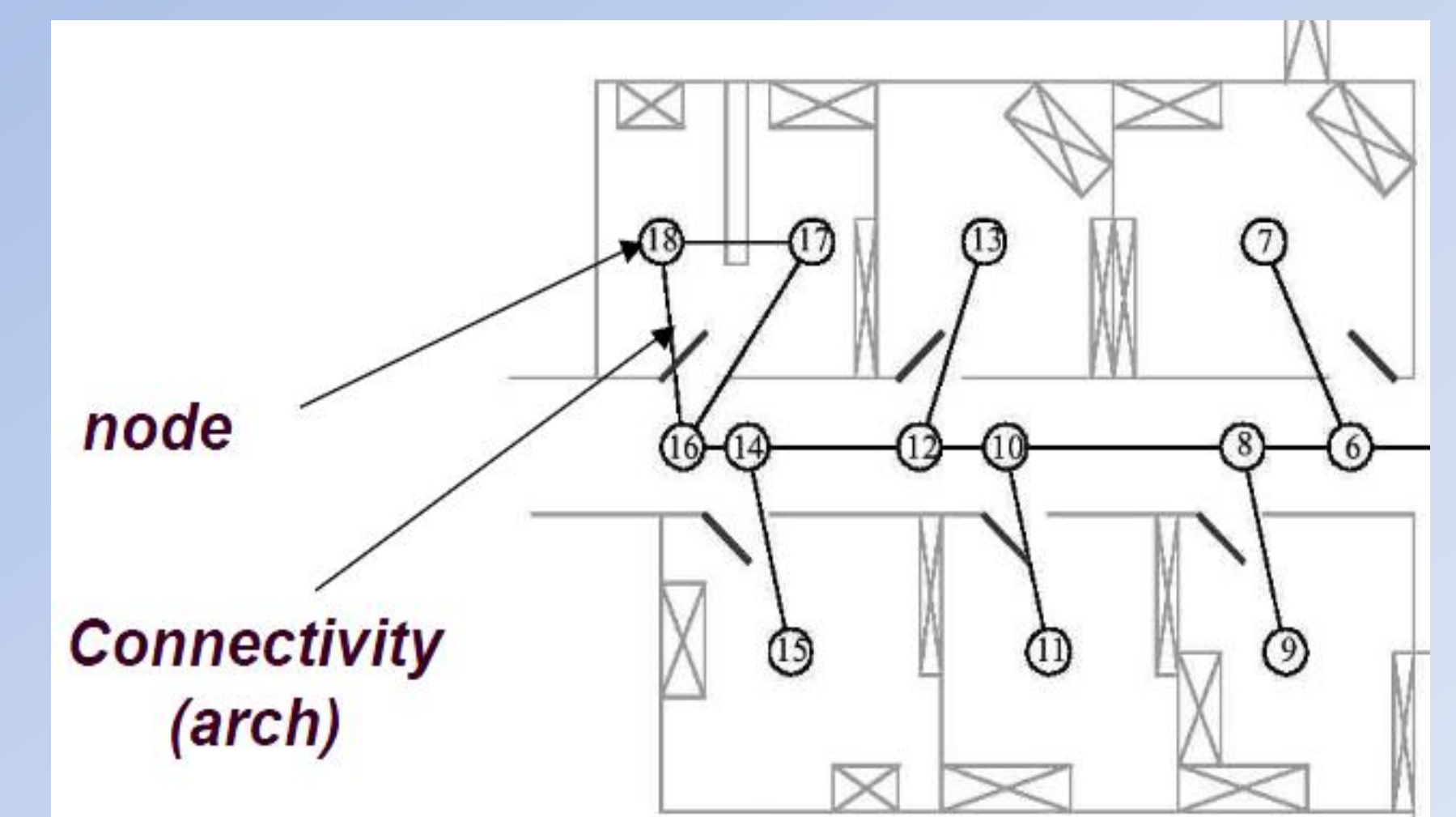
Software:

Microsoft Visual Studio and ARIA MobileSim software packages are used to program and simulate the Pioneer 3 in C++ utilizing a subsumption architecture.



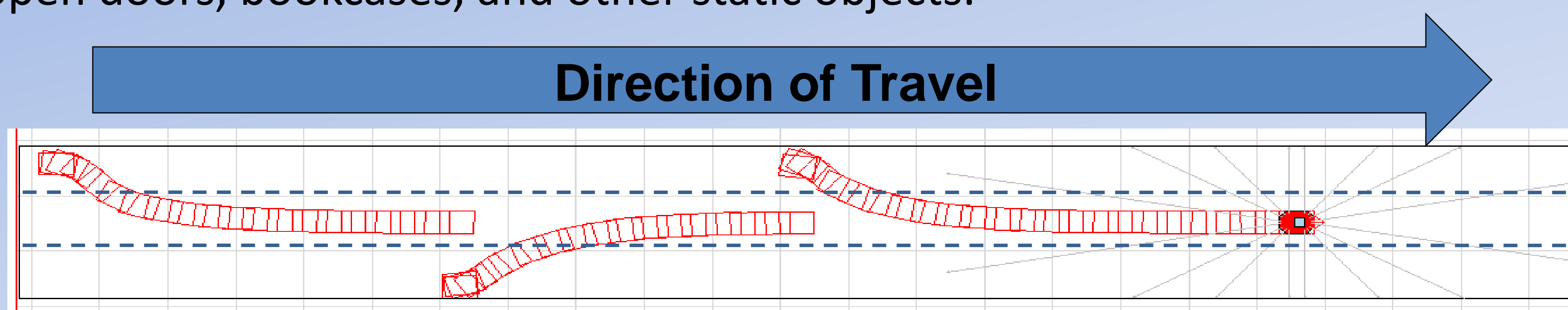
Path planning:

Accomplished using an internal topological decomposition map, where each node corresponds to a unique landmark.



Wall Follow:

Attempts to drive in the middle third of the hallway, indicated by the dotted blue lines, while ignoring open doors, bookcases, and other static objects.



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