

EMERGENT BEHAVIOR ROBOT

Category: Engineering, Computer, and Mathematical Sciences

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Emergent Behavior Occurs

when multiple simple behavior modules combine to create a sophisticated, intelligent response that is greater than the sum of the parts.

Where Does It Appear?

Emergent behavior can be found in weather phenomena, geographical patterns, and animal behaviors such as swarming and colonies.

What Are We Using It For?

We are exploring the use of emergent behavior in robotics. EBR has several independent behaviors interacting to cause a more sophisticated behavior to emerge.

Our Robot Platform

As part of our Senior Capstone Project, the robot platform was built from the ground up. This enabled customization of the robot to exact specifications and gave a full experience of the design process from beginning to end.

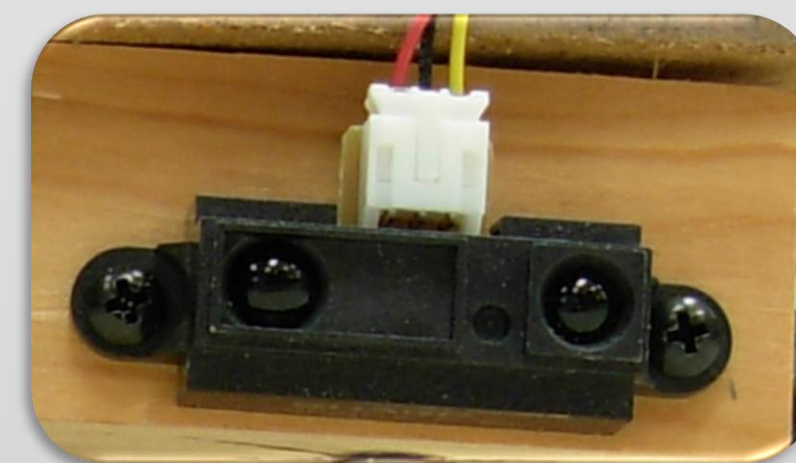
BRADLEY
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Electrical & Computer Engineering Department

Simple behaviors combine to create an emergent behavior:

Obstacle Avoidance

EBR uses infrared sensors to avoid obstacles in its path



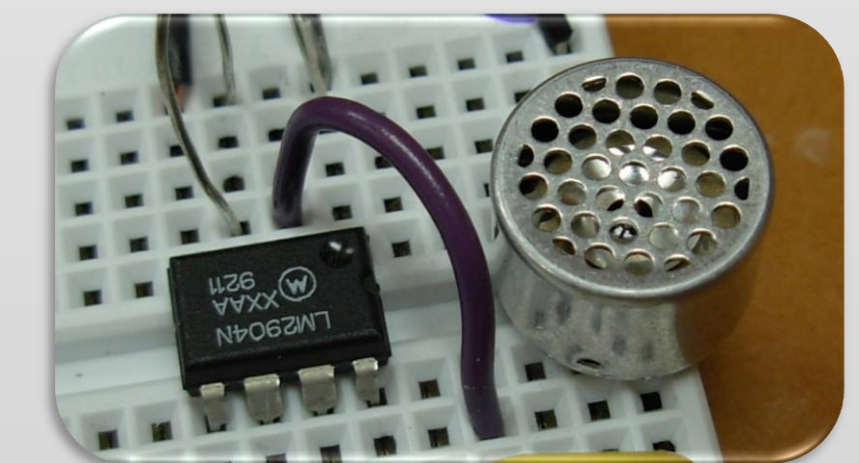
Sound Avoidance

EBR uses an array of microphones to detect loud sounds and evade the source



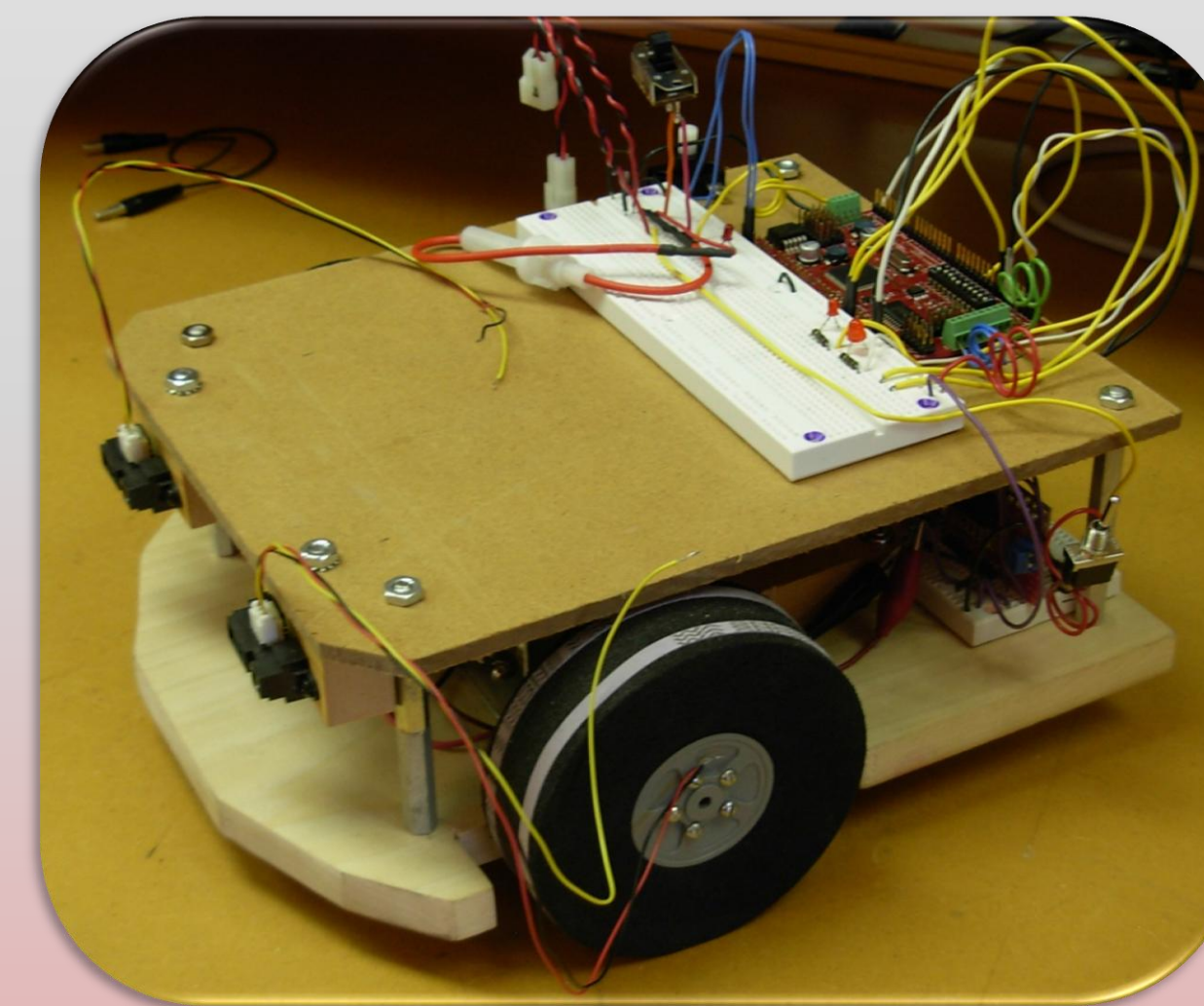
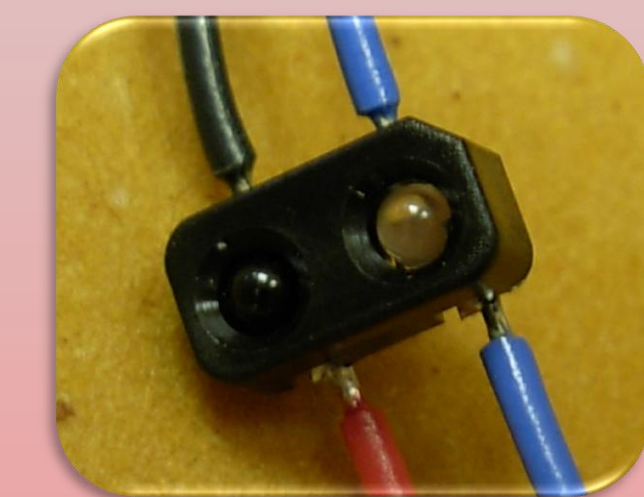
Beacon Tracking

EBR seeks and travels to an ultrasonic beacon

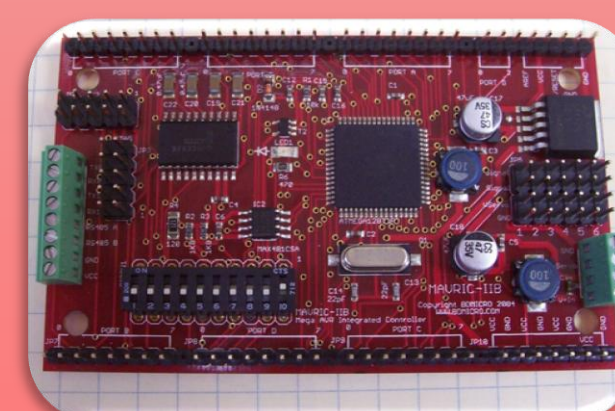


Floor Reflectivity

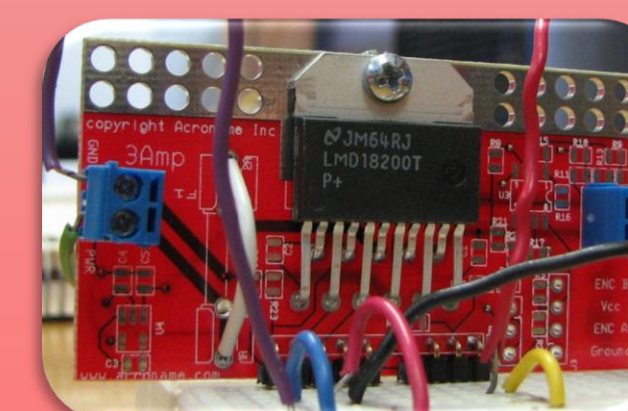
EBR uses reflective light sensors to determine the shade of the floor tile



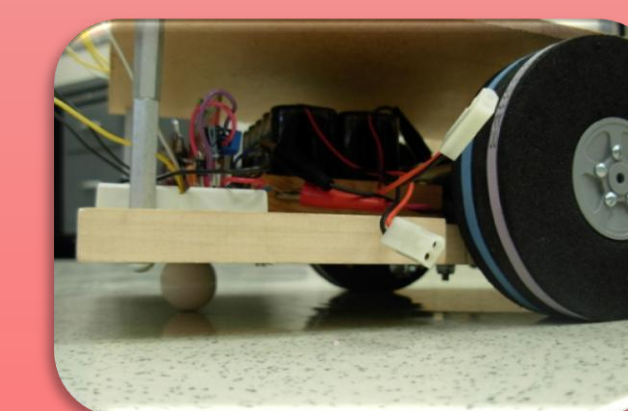
The ATmega128 microcontroller is programmed with behaviors that control the robot. The behaviors influence the path of travel based on their respective priority level.



LMD18200 H-Bridges control the speed and direction of the motors. These essential components give the robot mobility.



EBR has two foam wheels that are each driven by a 31:1 geared DC motor. The support castor is a round ceramic drawer pull.



EBR is powered by two 12V NiMH batteries. They are connected in series to generate 24V to power the motors, while the microcontroller only uses 12V.

