

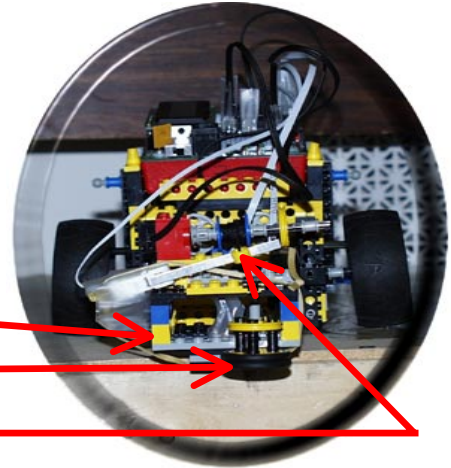
AVWAI

Autonomous Vehicle With Artificial Intelligence

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Finds the edge of the surface and measures the depth of the drop.

- 1) Infrared Sensor(IR) detects edge of surface
- 2) Weight drops to measure depth
- 3) Contact sensor detects end of drop



Sensors:

- **Infrared:** (Analog) This sensor is used to detect a change in elevation.



- **Contact:** (Digital) This sensor is used to detect when the weight has hit solid ground.

- **Shaft Encoder:** This sensor is used to measure the drop.



2 DC Motors:

- Used to power a series of gears connected to the wheels.
- Used to spin the reel that is used to measure the distance of the drop.



AVWA's Components:

- A vehicle created using Lego pieces.
- Contains its own miniature processor (HandyBoard).
- AVWAI can detect a sudden drop in elevation using an analog sensor.
- Digital sensor and shaft encoder aid in measuring the depth of drop.

Real World Uses:

- Prevents an autonomous vehicle from falling off a cliff.
- Measurement tells the vehicle how far of a drop it needs to climb down.
- Replace people in dangerous atmospheric environments, e.g. Mars.



Problems Encountered:

- Black surfaces cause AVWAI to think it has found an edge.
 - ➔ Inherent problem with IR.
- Designing the robot architecture to make it as accurate and efficient as possible.
 - ➔ Careful hardware design complements the software for a complete system.
- Accurately calculating the drop distance.
 - ➔ Combined use of the encoder with touch sensor to detect when weight touches lower surface.

Credits:

Dr. Jennifer Kay of the Rowan University Computer Science Department.