

Sensors

IMDL Fall 2009

Mike Pridgen

Common Sensors

- IR
- Sonar
- Bump
- CdS
- Tilt
- Motor Encoder
- Accelerometer
- Gyro
- Thermistor
- Hall Effect

Special Sensors

- Pyroelectric
- Pressure
- Magnetic Sensor
- Metal Detector
- CMU Camera

IR – Rangefinder

- 4 – 150 cm
- Varies due to lighting
- Analog voltage
- Easy to make
 - IR LED
 - IR detector
- Pre-made modules available
 - <http://www.sparkfun.com> ~\$15
 - Must buy cable

Sonar – Rangefinder

- 5 – 6000 cm
- Noisy
- Extra programming for Ping/Echo
 - <http://robot-electronics.co.uk> ~\$25
 - SRF05
- Alternatively, use A/D
 - <http://www.sparkfun.com> ~28
 - Maxbotix LV-EZ series (beam width)

Bump – Contact Sensor

- Extremely Cheap
- Easy to implement
- Available in lab

CdS – Light intensity

- Varies resistance based on light intensity
 - Uses Dr. Arroyo's PhD level circuit
- www.digikey.com ~\$2

Tilt Switch - Positioning

- Easy to use
- Typically used in groups
 - More accuracy
- Cheap
 - \$1 use Google

Motor Encoder - positioning

- Counts RPMs
- Requires some software
- Use for general positioning, not exact

Accelerometer

- Varying ranges
 - +/- .5g to +/- 250g
- Up to 3 axis
- Analog voltage
- www.digikey.com ~\$10+

Gyro

- Positioning
- Single or Dual Axis
- Analog voltage
- www.sparkfun.com > \$40

Thermistor – Temperature

- Range – 0 to 100 °C
- Easy to implement
- Analog voltage
- Cheap
 - www.digikey.com < \$1

Hall Effect – Current

- Measures current remotely
- Cheap
 - www.digikey.com ~\$2

Pyroelectric – motion

- Detects “moving” heat
- Hack a motion sensor light
 - Lowes ~\$20
- Buy module
 - <http://www.sparkfun.com> ~\$10

CMU Camera

- Detect color
- Track a color
- Serial communication
- <http://www.seattlerobotics.com/> ~ \$110