Block Diagram of a Simple Autonomous Robots

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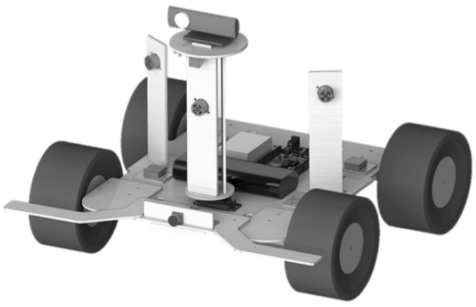
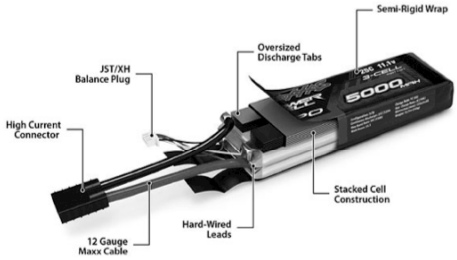
Major Systems

- 1. Platform – the physical system which holds the motors, electronics, sensors and batteries. In IMDL these are usually drawn using CAD software and cutout on the T-Tech Machine using high grade balsa wood strips.



Major Systems

- 2. Power: Most IMDL robots will use rechargeable batteries (DC). No IMDL robot can be tethered (no power cord (AC), no USB or other cable(s) connected to a free standing laptop, etc.)

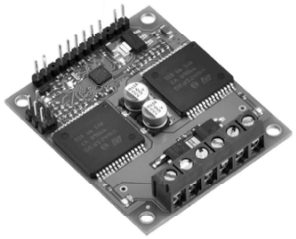


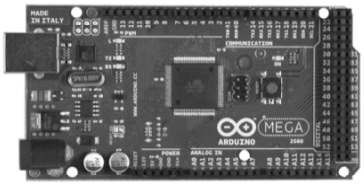
Major Systems

- 3. Actuation: Robots move and perform actions that involve motion (dynamic systems). DC motors and servos are typically used for these purposes.

Major Systems

- 4. Embedded Processor Board: All robots require either a micro-controller board, or a micro-processor board or both. You require the use of I/O pins (analog & digital) to read and manipulate sensors, PWM signals to control motors and servos, and the ability to use serial communication.



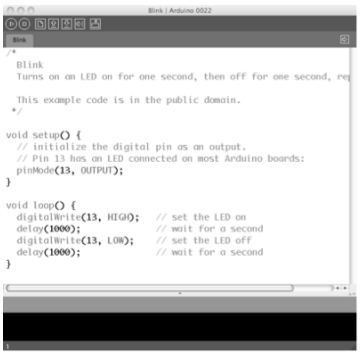


Major Systems

- 5. Sensors: These are the devices that measure something in the real world and provide information to the autonomous agent to change its behavior or affect the environment in some way.
  - Distance
  - Imaging / Cameras
  - Bump
  - Inertial/Magnetic
  - Temperature
  - Environmental


Major Systems

- 6. Software: All autonomous agents must have real-time software which is unique to the agent. Typically these software modules are written using C, C++, Python, etc. We usually use an Integrated Development Environment (IDE) to write, debug, and test their code. Examples: Eclipse, Microsoft Visual Studio, Arduino Sketch Pad, Atmel Studio, and Linux based tools.



Demo

- This is the robot used in EGN-1935 and we will turn it on and demonstrate its capability to do obstacle avoidance.

See Critter 02-18-2014.mov

Or

Examples from Previous Semesters

Questions