Sumo Robot

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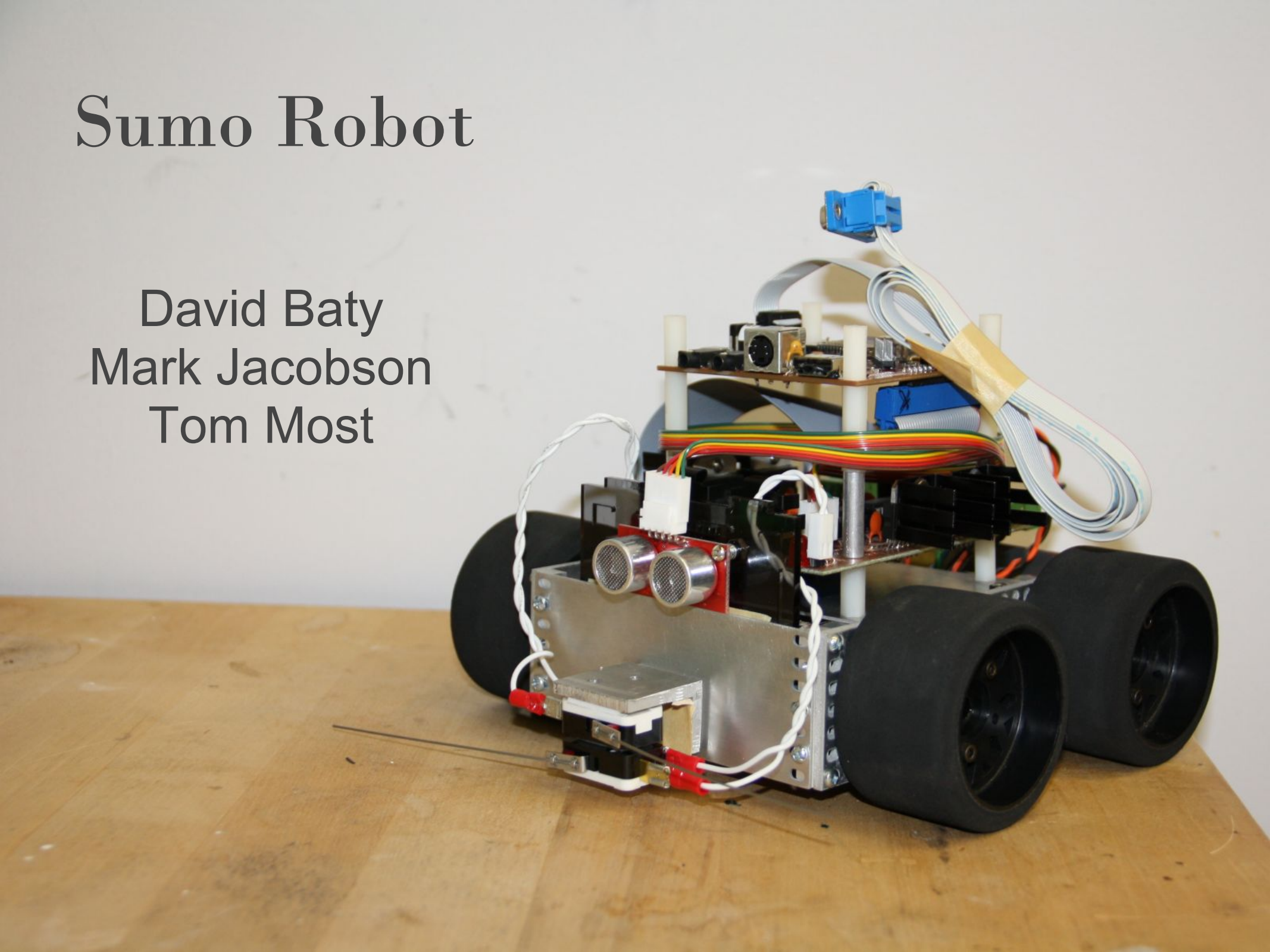

Sumo Competition

- Similar to sumo wrestling, but with robots
- Different weight classes:
  - Standard (3kg, 20cm x 20cm, any height)
  - A variety of smaller categories
- A black ring is used
- Typically use an angled front to push the opponent
- Remote controlled and autonomous categories

Hardware

- 4 motors
- Custom metal chassis
- Very low ground clearance

Interface Board

- 5V regulator (linear LDO) for Beagle and components
- 3.3V regulator for logic drive
- Level shifters
- Analog to digital converter
  - Infrared distance sensor connectors
  - Optical sensors (to detect ring)
- I2C
  - Ultrasonic range finders
  - Headers for expandability
- Bump sensors
- Motor drivers and control logic
- Battery connector (7.2V)

Software

- Angstrom distribution with a custom kernel
- PWM to control motor direction and speed
- I2C to interface with peripherals
  - Ultrasonic range finders
  - Analog to digital converter
- GPIO for the bump sensors
- Searching algorithm to find and attack opponent
  - "strafe" left and right until something is seen with the rangefinder

More Software

- Match started by user button on Beagleboard
- Uses ultrasonic range finder to locate opponent (<30cm)
- Charges opponent
- Match concluded by same user button

Issues

- Board milling issues and delay
- Parts room gave us the wrong part
- Schematic error
- Missing part

Future Work

- Acquire and solder ADC
- Add scoop/blade to the front of the robot
- Remote control via Bluetooth for remote control categories (if USB cooperates)
- Test with another robot to refine software

Questions?