The Autonomous Metal Distinguisher

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Background

- Board of education— circuit board that consists of a breadboard for circuitry and a basic stamp or *microcontroller*
- Servomotor— a motor used for motion control
- Infrared object detection— an infrared LED and infrared detector which sense objects and obstacles
- Inductive sensor- sensor which can detect objects made of metal
- Conductivity sensor— sensor which can sense different conductivities
- Serial LCD- a small screen which provides basic text wrapping
- Piezo speaker— small, round speaker which can emit different pitched sounds

Goal of Project

- A robot will be constructed, which can differentiate between different metals, display the name of the metal on an LCD, and emit a sound specific to that metal with a speaker

Methodology

- Two platforms constructed out of Plexiglas
- The robot moved on three wheels
- Three infrared sensors were used to detect objects
- An inductive sensor was used to detect metals
- A conductivity sensor was used to test electrical conductivity
- A piezo speaker was used to emit a sound and the LCD Panel displayed the name of the metal
- Programming for the Basic Stamp II was done in PBASIC

Methodology (Continued)

LCD Panel

Conductivity sensor

Servo motor

Wheel

Infrared sensors

Piezo speaker

Inductive sensor
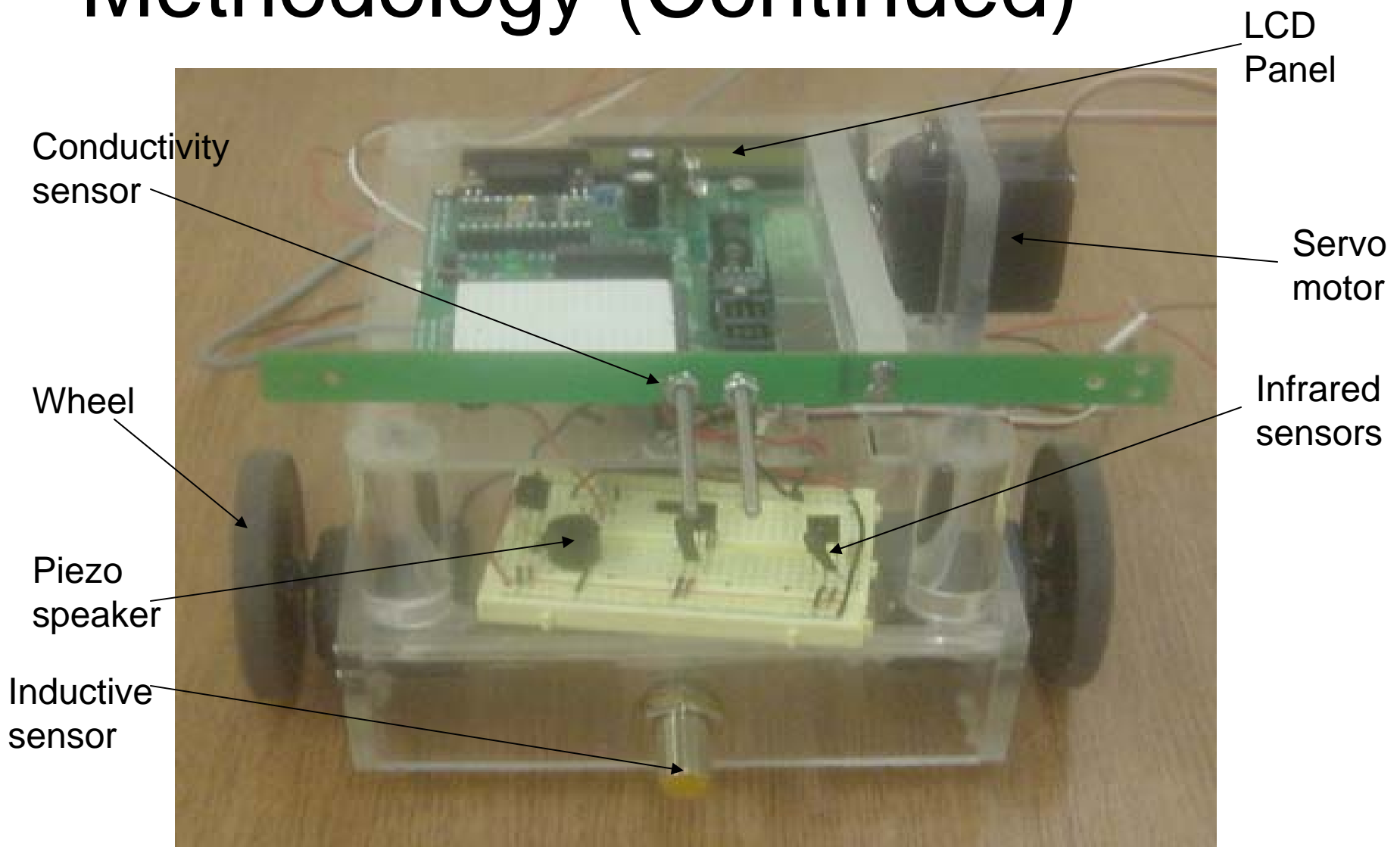
Data

Object	Electrical Conductivity
Aluminum	376.676 1/mohm-cm
Copper	595.8 1/mohm-cm
Iron	102.987 1/mohm-cm
Wood	0 1/mohm-cm

Discussion & Conclusions

- **This research advances current methods of metal detection**
  - Previously, metal detectors were only able to differentiate metals in general from nonmetals
  - With this project it is now possible to differentiate different metals from each other

Applications/Future Research

- Useful in bomb detection
- Useful in mining fields
- Add a camera so the metals can be viewed on a computer

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