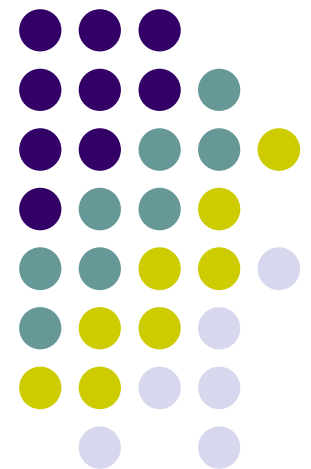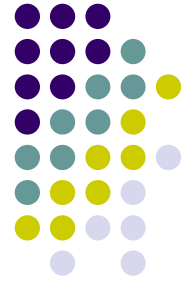# Robo-Organizer

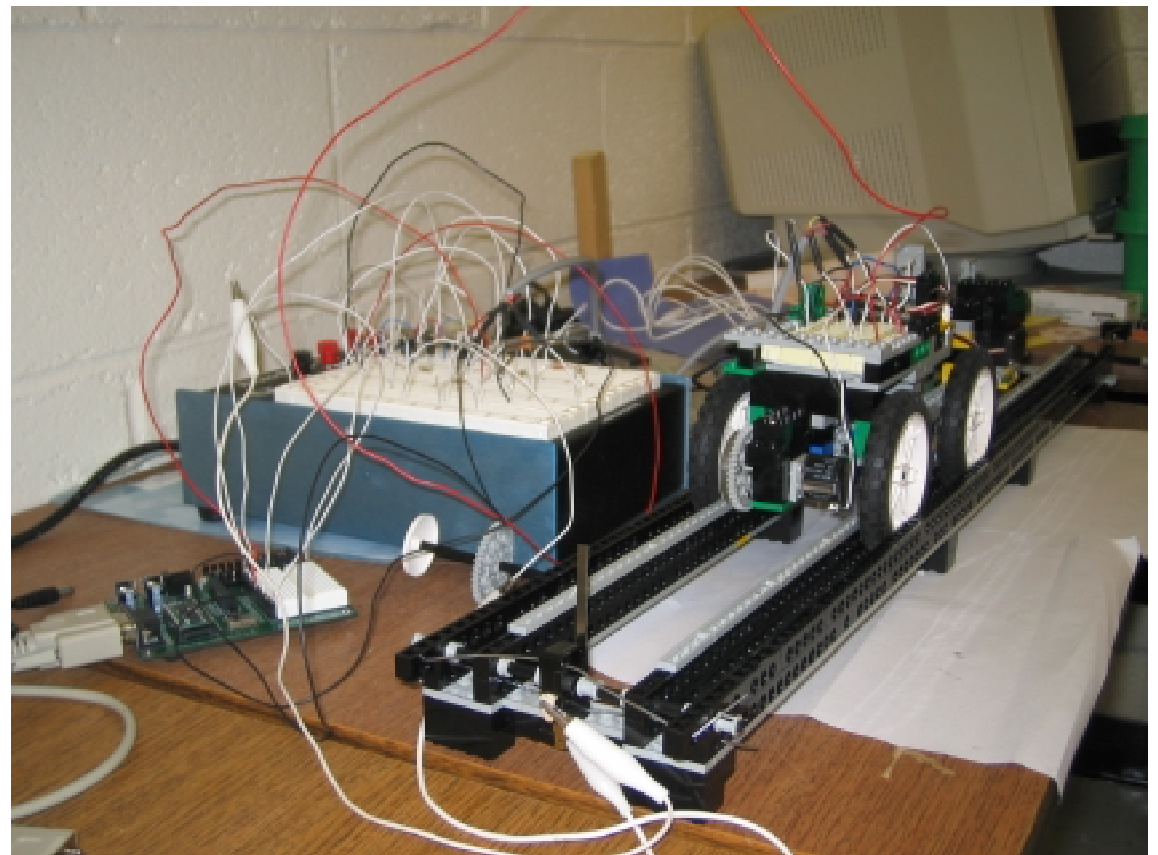Benjamin Kreuter, Joshua Wohl

Professor Kapila

8/13/04

Overview

- Description of Project
- How it works
  - Positioning
  - Detecting
  - Moving Objects
- Progress Report
- Future Research

Robo-organizer on its track
(taken by Josh Wohl)

Description of Project

- Robot that organizes objects by color
- Useful in an industrial setting
  - Objects on an assembly line
  - A conveyer belt carrying fruit
- Efficiency of each algorithm is dependant on several factors
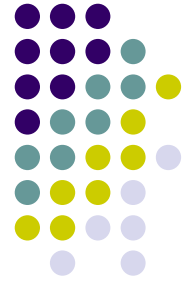
How it figures out its position

- Potentiometer – a variable resistor

- A 10-turn potentiometer is physically connected to the driving axel

- Potentiometer is electronically connected to a capacitor

Charge Time vs. Distance
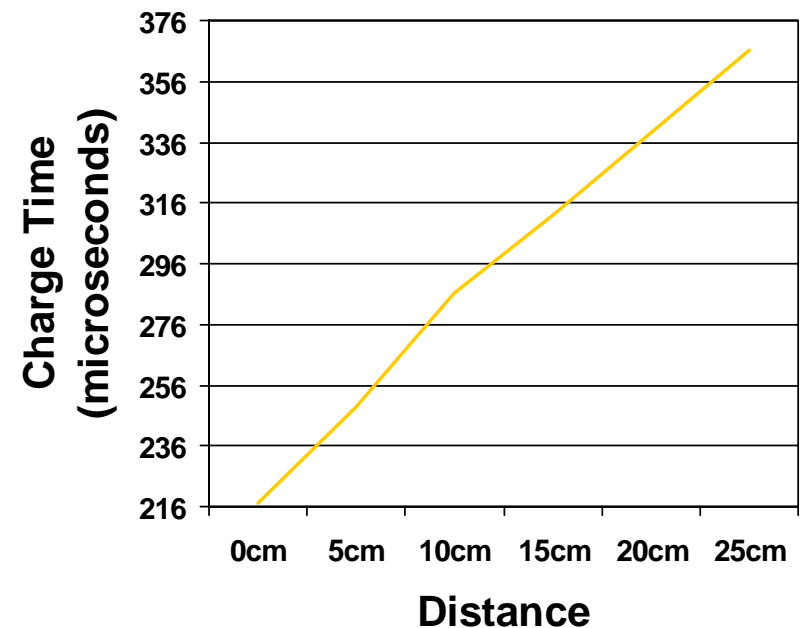
Linear relationship between resistance and capacitor charge/discharge time. This time can be measured by the basic stamp.
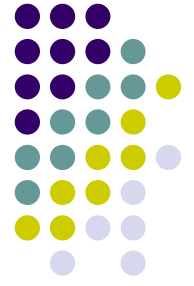
The CMUCam

- Developed at Carnegie Mellon University
- General Purpose Vision Sensor
- Controlled from the Basic Stamp via Serial Communication
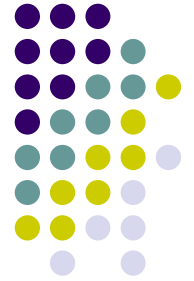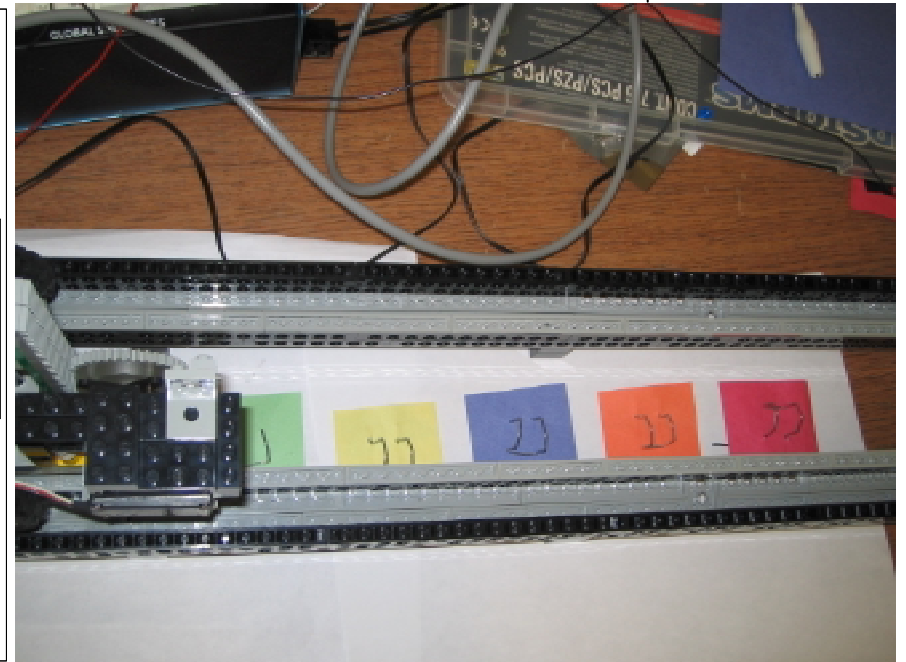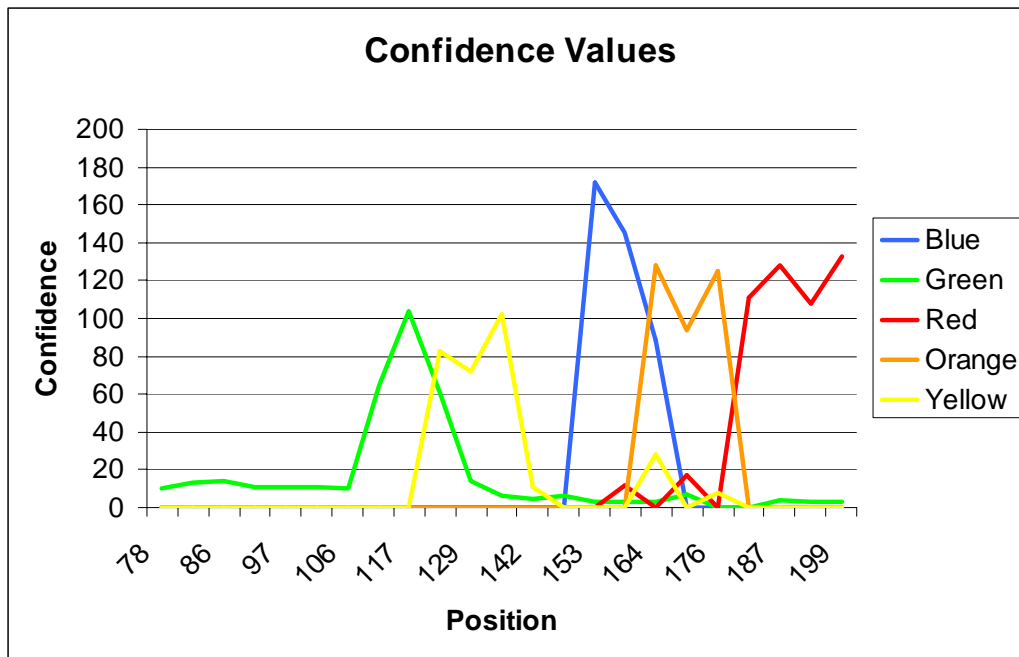- Can track color and size



A CMUCam (version 1)

How it sees the objects

- The CMUCam is used as an eye
- The CMUCam is very sensitive to changes in light level, so a white LED light is used to improve the clarity of the colors
- Certain colors, especially primary colors, are detected better
- A confidence value is returned

What the CMUCam detects

Graph of the confidence values the CMUCam detected, and the corresponding arrangement of colored objects. (Picture by Joshua Wohl)
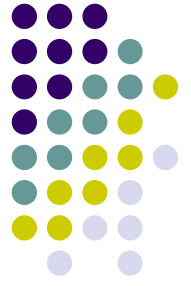
How it lifts objects

- The objects have steel paperclips attached to them

- A hook is used to pick up the paperclip, along with the object

- The hook is attached to a shaft, which can be lowered and raised

Lowers Shaft

Raises Shaft with Object

Moves Hook into Metal Loop
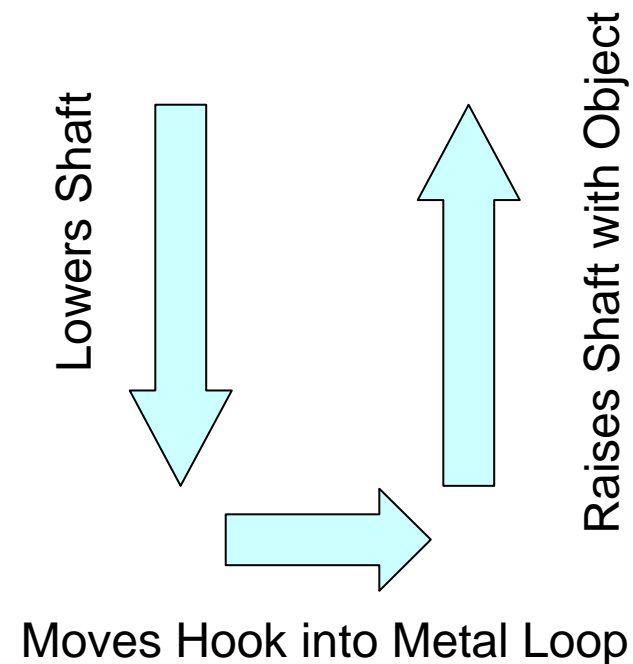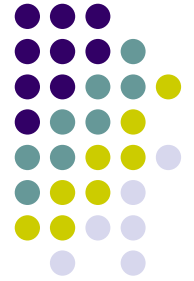
Progress Report

- Attached electronic control components
- Calibrated CMUCam
  - Added white LED light to improve color recognition
- Built shaft for hook
- Coded lifting and dropping algorithm
- Coded first sorting algorithm (insertion sort)
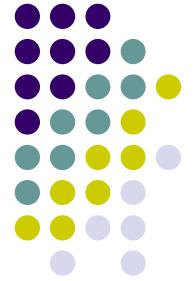
Future Research

- Test different algorithms
- Mount robot on a gantry instead of a straight track, to arrange objects in 2 dimensions
- Make software "bullet-proof" – add error handling abilities

Acknowledgements

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- Sang-Hoon (Nathan) Lee
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