Team 10:
Automatic Lego Sorting Machine

BY:
AUSTIN SHORR
ERIC PISCIOTTA
TRISTIAN VIGUERIA

Project description

- Design and construct an apparatus capable of automatically sorting Lego pieces by block type

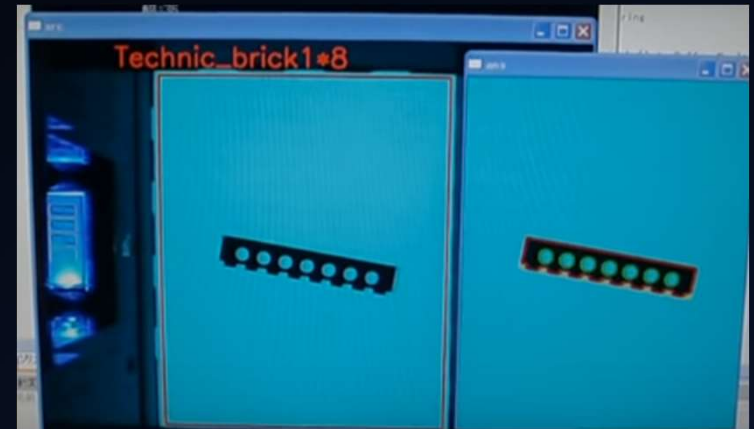- Sponsored by David Willy in effort to reduce user time spent sorting Legos

Competitor 1: Lego Mindstorms NXT Vision Guided Brick Sorter

Pros

- Dump 'N Go

- Little User Input

- Recognizes a large variety of Legos

Cons

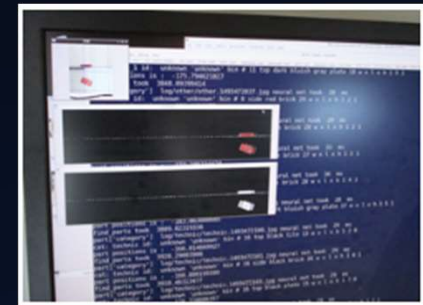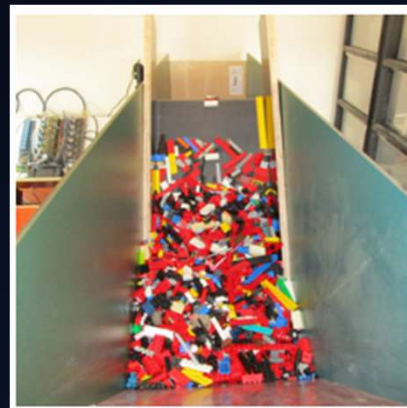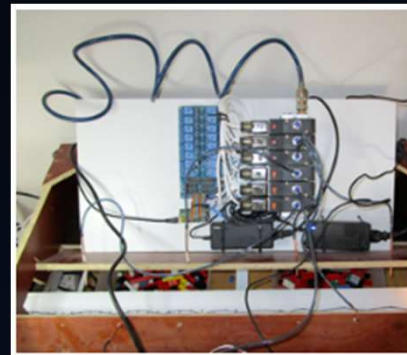- Made of Legos

- Small Variety of Legos

Competitor 2: AI sorter

Pros

- Dump 'N go
- Not made of Legos
- Durable
- Usability
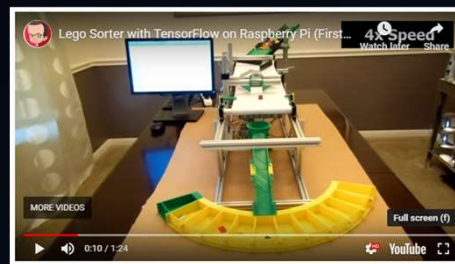- Large variety

Cons

- Portability

Competitor 3: Tensor Flow Raspberry PI

Pros

- Portable
- Not made of Legos
- Durable
- Usability
- Accurate

Cons

- Not Dump 'N go
- Small input
- Small variety

Competitor 4: Lego Parts Sorter Version 1.0

Pros

- Accurate
- Durable

Cons

- Small Input volume
- Small Variety of Legos
- Not User Friendly
- Made of Legos
- Not Dump 'N go

Research

Eric Pisciotta

- Textbooks
  - Shigley's Mechanical Engineering Design
  - Electric Circuits by Nilsson and Riedel

- Articles
  - In-line sorting of irregular potatoes by using automated computer-based machine vision system Gamal ElMasry, Sergio Cubero , Enrique Moltó , José Blasco
  - Which way to convey: Everything you ever wanted to know about conveyor sortation systems but were afraid to ask by Norman Saenz Jr.
  - Comparison of Industrial Vision Sensors to Standard Photoelectric Sensors in Complex Sorting, Checking and Evaluating Applications by Pepperl and Fuchs

Research

Austin Shorr

- Textbooks
  - SolidWorks 2014 for Designers by Sham Tickoo
  - Design of Machinery: An Introduction to the Synthesis and Analysis of Mechanisms and Machines by Robert L. Norton

- Articles
  - Conveyor belt side curtains: by Arthur C. Ostman
  - A Bragg grating-tuned fiber laser strain sensor system: By S.M. Melle , A.T. Alavie , S. Karr , T. Coroy , K. Liu , R.M. Measures
  - Measuring of feature for photo interpretation: By Henry A. Thompson, Clifford Kottman, Walter H. Mueller, Robert E. Phebus,

Research

<u>Tristian Vigueria</u>

- Textbooks
  - Practical Electronics For Inventors
  - Programming Arduino: Getting Started with Sketches
  - Programming Arduino Next Steps: Going Further with Sketches
  - Programming the Raspberry Pi: Getting Started with Python

- Articles
  - Portable smart sorting and grading machine for fruits using computer vision
  - OBJECT SORTING SYSTEM USING ROBOTIC ARM
  - Object Sorting System in Matlab using Robotic Arm

Project Requirements

CR

- Runs off standard wall power
- Safe enough for a child to operate
- Sorts automatically
- Fits on 4-6-person table
- Accurate
- Durable

ER

- 120VAC, 15A, 60Hz
- Two step user interface
- 1 cubic foot input for Legos
- 1800 in^2 footprint
- 95 percentile
- No Lego structure
- Must last 3 years

Schedule & Budget

The team estimates that we are on schedule

Justification

- Large volume of resources
- Variety of competitor comparisons
- A large partition of team effort devoted to sensor research and software development which will be instrumental to the final design

Budget

$500 budget ($150 for prototype, $350 final product)
reusable products between prototype and final product
 software, imaging equipment

Questions?