

CSM IEEE Robotics Team Grant Request

Kristin Farris

Daichi Jameson

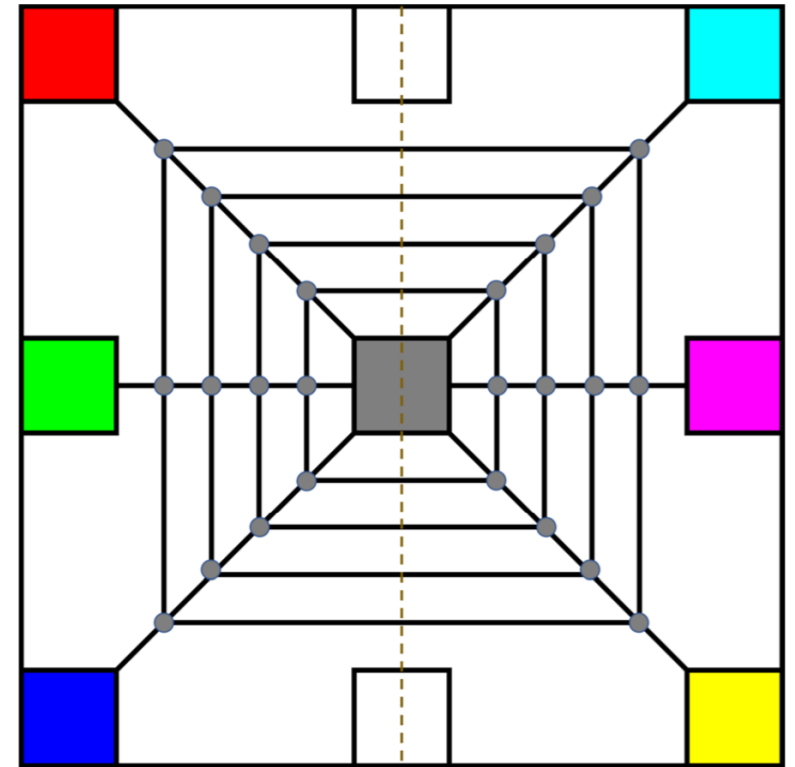
Colin Young

Agenda

- Competition overview
- Goals analysis
- Design discussion
- Schedule and Deliverables
- Budget and Request

IEEE R5 2018 Competition

- April 7, 2018
- Austin, Texas
- Autonomous navigation
- Extraction of embedded tokens
- Color identification



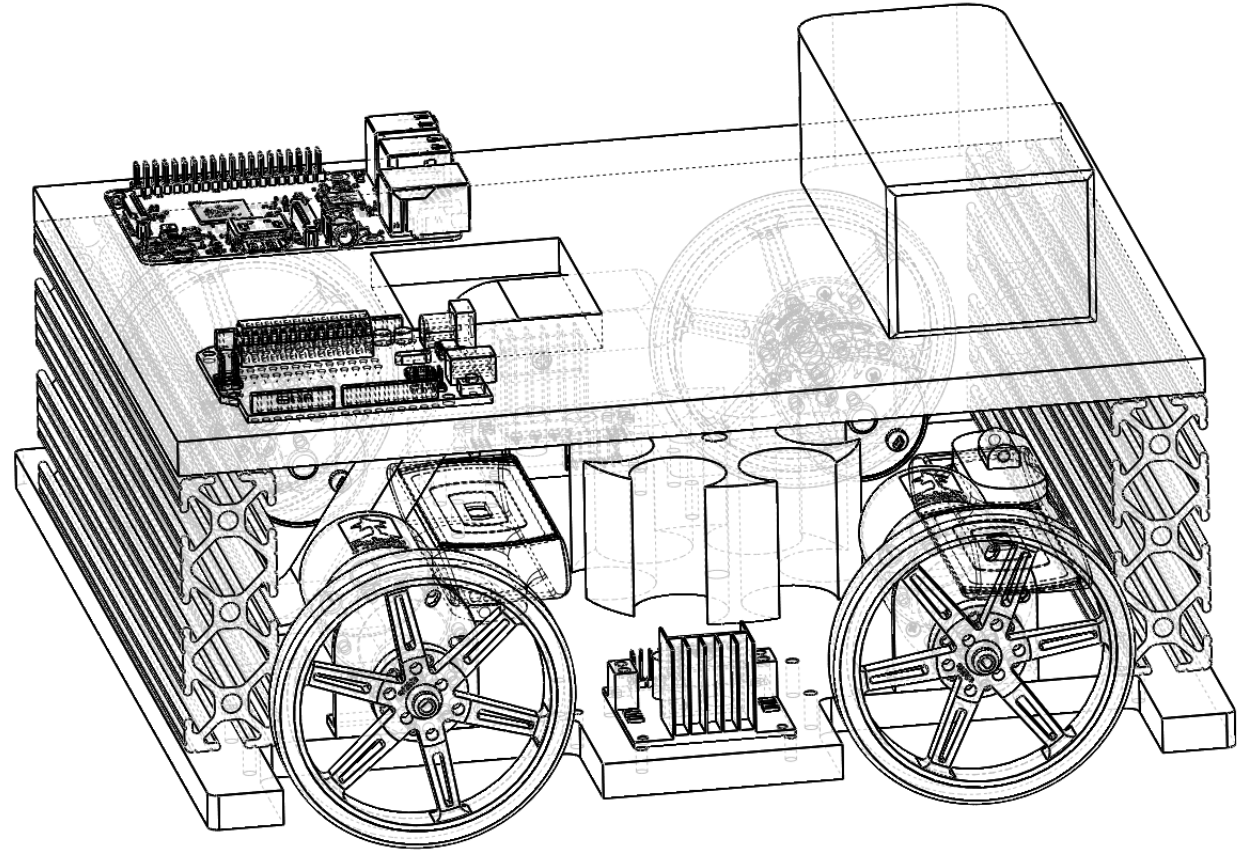
Goals for Improvement

- Simplicity and Accessibility
- Iterative Design Process
- Improved Planning
- Better Research

Goals for Learning and Success

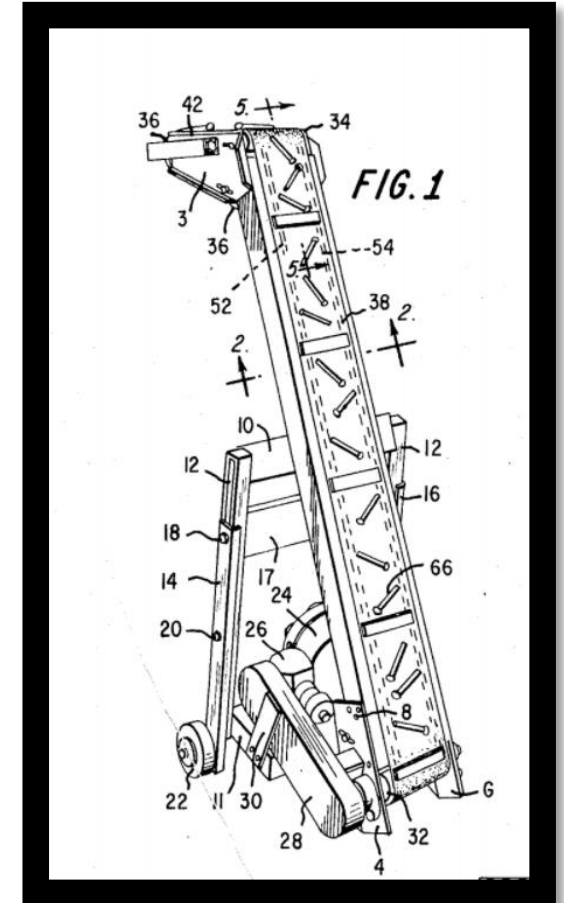
- Autonomous Tracking
- Color Identification
- Effective Circuit Development
- Robust Chassis Design
- Modern Techniques and Software

Our Design



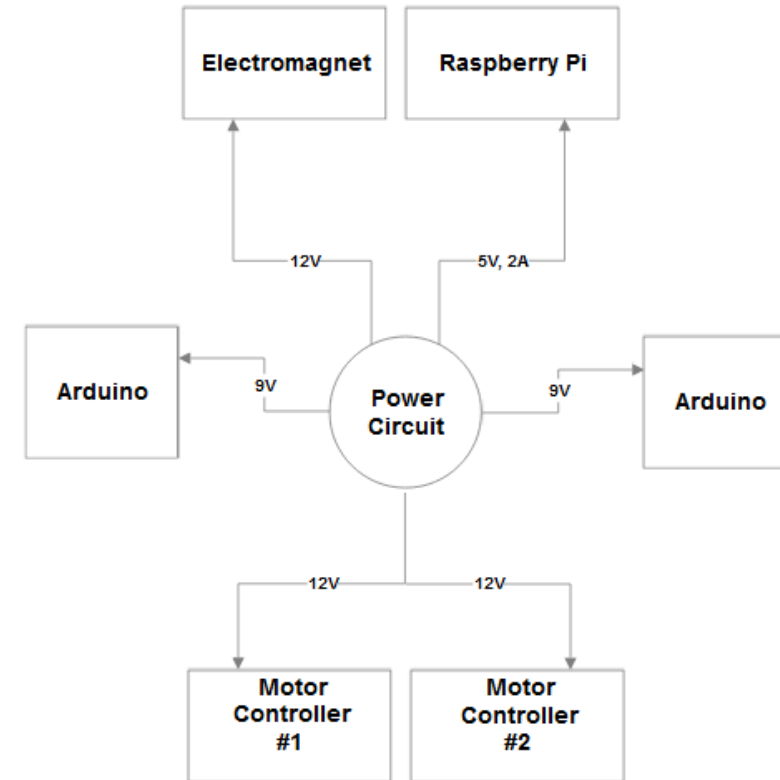
Mechanical Subsystem

- Chassis
 - 4-Wheel
 - Aluminum
 - Custom Brackets
- Token Retrieval
 - Magnetic Conveyor System
 - Revolver Storage Mechanism



Electrical Subsystem

- Power Circuit
 - Switching Voltage Regulators
 - 12V, 9V, 5V Outputs



Software Subsystem

- Autonomous Navigation
 - Spatial Localization
 - PID Controller
- Color Identification
 - Computer Vision

Schedule

December 1, 2017	Power Circuit
December 10, 2017	Drivable Chassis
January 10, 2018	Autonomous Movement
February 15, 2018	Pickup Mechanism
February 15, 2018	Sorting Mechanism
February 15, 2018	Color Detection
March 25, 2018	Documentation
March 25, 2018	System Tests Complete

Planned Budget

Item	Purpose	Amount
Raw Aluminum	Chassis Construction	\$140.00
80-20 with Hardware	Framing for Chassis	\$30.00
Collection Hardware	Used for building collection mechanism	\$200.00
Motor Controllers	Used for power distribution and control of motors	\$16.00
DC Motors with Encoders	Movement and Navigation	\$160
Wheels and Mounting Hardware	Attach to motors	\$40
Raspberry Pi	Main brain controller	\$45
Arduino	Main PWM controller	\$40
Various Circuit Components	Used to correctly step down battery voltage, connect sensors	\$80
Battery	Energy Storage	\$36
Cameras	Utilization of computer vision	\$26
Miscellaneous	Part Replacement/broken components	\$187
TOTAL CONSTRUCTION		\$1,000.00
Travel Expenses	Estimated gas usage	\$400
Hotel Expenses		\$750
TOTAL PRICE		\$2,150.00

Grant Request

Initial Request: \$1,000

- Materials
- Development

Secondary request following progress report: \$1,150

- Travel
- Lodging

Thank You/Questions

REFERENCES

A. Kornylak, "Magnetic Conveyor", 3642118, 1972.