TEXAS STATE
INGRAM SCHOOL OF ENGINEERING

E2.07 - Robo-Fetch II

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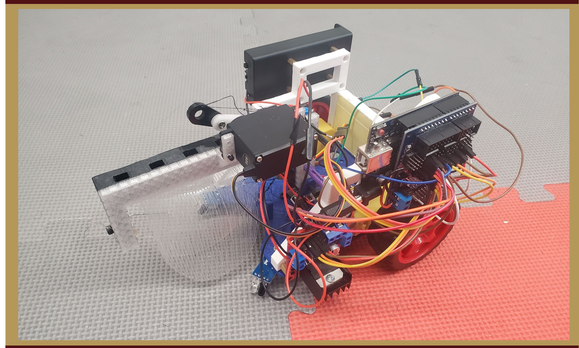
Robo-Fetch II an autonomous robot that retrieves eggs.

Project Overview

Our product is an autonomous robot that retrieves eggs in a predetermined field. The robot is able to distinguish eggs by color, and may selectively return eggs of a specific color to the robot's starting location.

The Robo-Fetch Bot

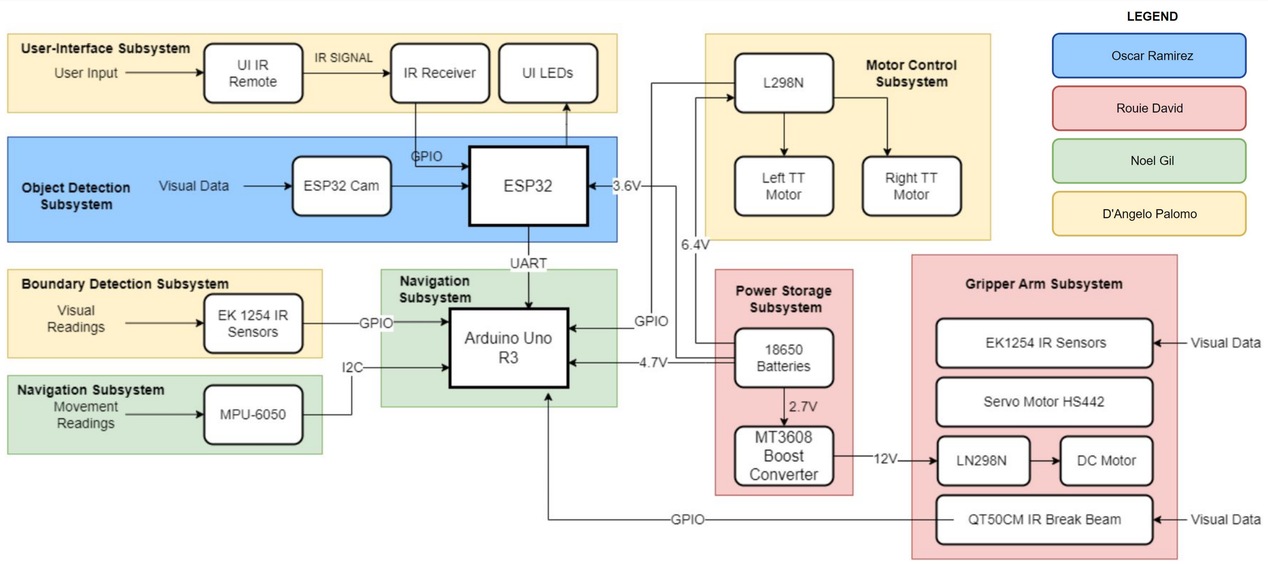


Project Requirements

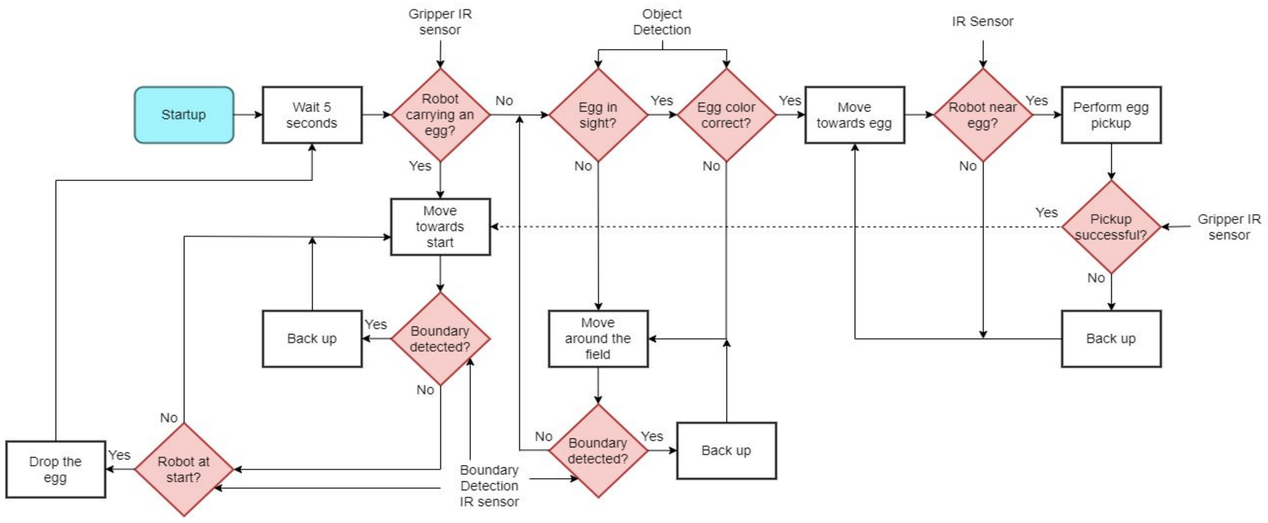
- Must be autonomous, i.e. able to operate without the need of user input
- Robot must be able to differentiate between different colored eggs and prioritize user selected colors
- Robot must be able to grasp and hold an egg using a gripper without breaking the egg
- Robot must drop off retrieved eggs at the starting location, denoted by a red square
- Robot must stay within the field without ever crossing the boundary
- Design must not exceed 20cm x 20cm x 20cm predeployment
- Must not exceed a $30 budget, excluding sponsor provided parts such as the hosyond 2wd smart kit and HS442 servo motor

Egg	Criteria
White Chicken Egg	A store bought chicken egg that is 50-70 mm in length and 30-50 mm in width.
Plastic Egg (Various Colors)	A store bought hollow egg that is monochrome, 50-70 mm in length and 30-50 mm in width.

System Block Diagram



Navigation Flowchart



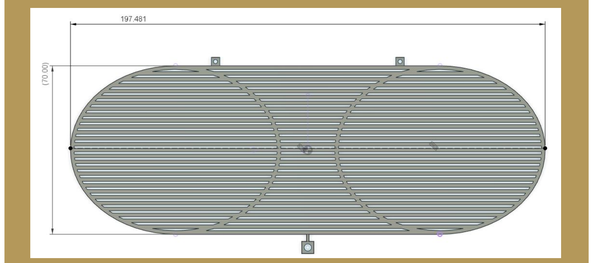
Components List

Component Name	Description	Component Name	Description
Arduino Uno	Main microcontroller which drives the robot	TT Motors	DC motors used for locomotion
ESP 32	Microcontroller used to drive the camera	EK 1254	IR sensors used to detect the field boundary
ESP32 Cam	Camera used for object and color detection	HS442	Servo motor in charge of picking up eggs
18650 Batteries	Power supply utilized to power the robot	SG90	Servo motor used to correct gripper position
Voltage Regulator	Regulator used to limit voltage	Alpha MF02A	Pressure sensor used to signal egg retrieval
L298N	Motor driver board used for TT motors	MPU-6050	Gyro/accelerometer used to track position

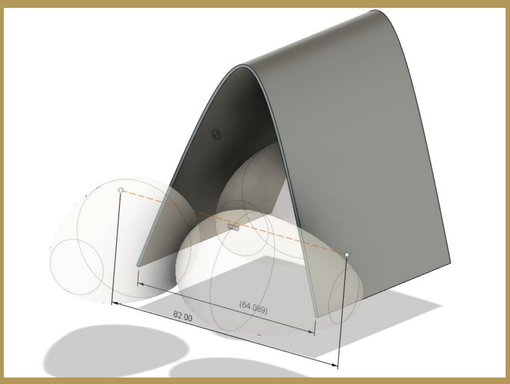
Meet The Team

D'Angelo Palomo | Rouie C. David | Oscar Ramirez | Noel G. Alvarez

The Gripper



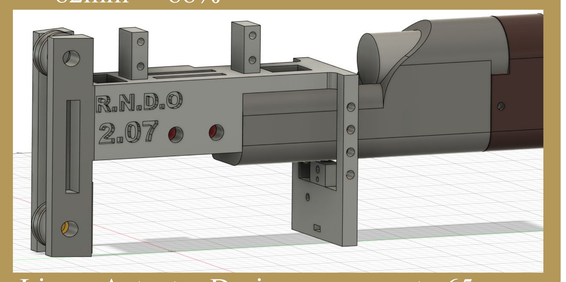
Kirigami gripper used in robot design



Pick up success rate in relation to egg's rotational axis:

64mm - 100%

82mm - 88%



Linear Actuator Design, range up to 65mm

Acknowledgements

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