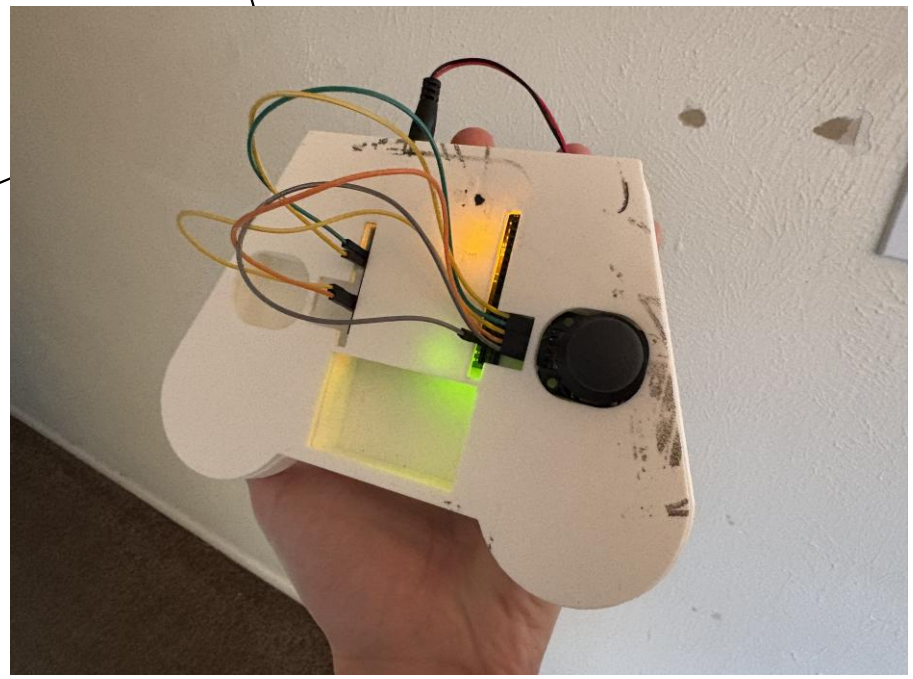
TEAM 95

FINAL DESIGN PRESENTATION

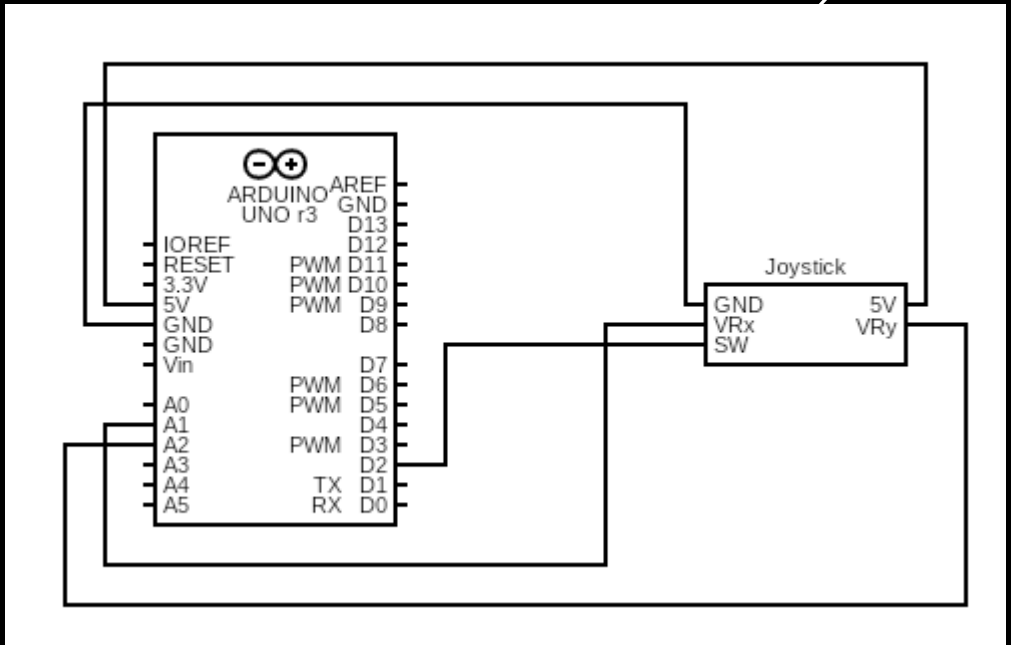
PROBLEM STATEMENT

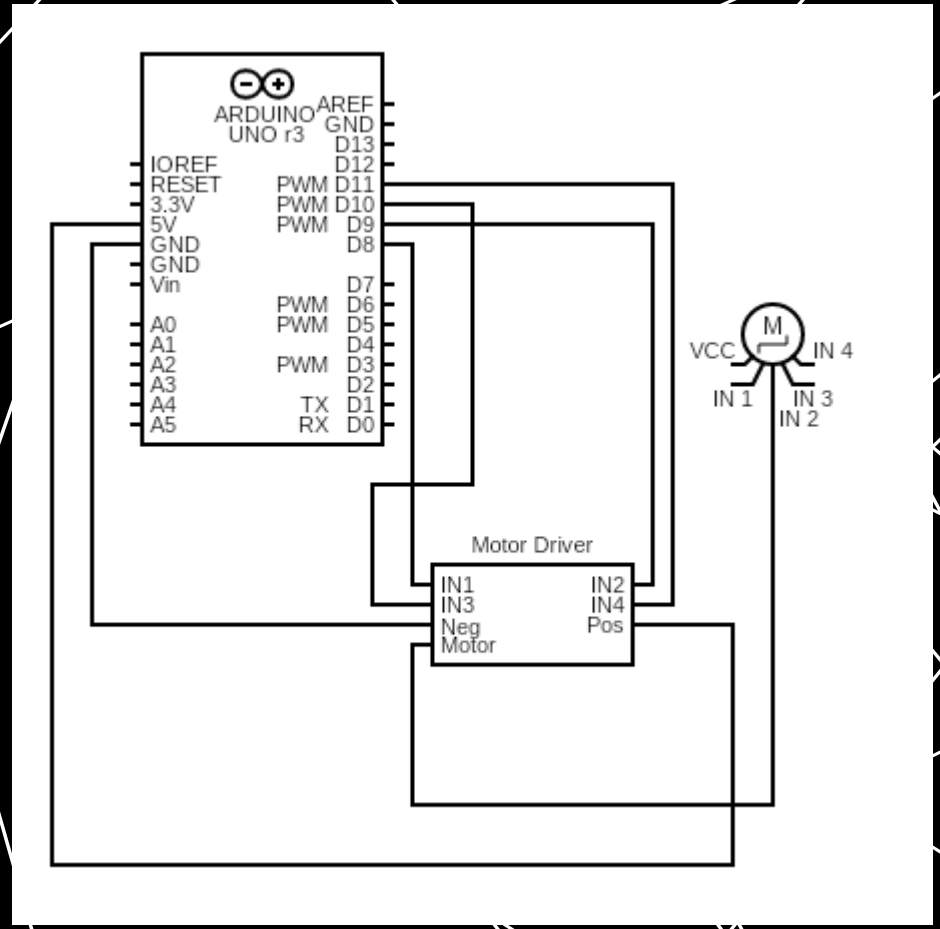
As drones are being considered more for package delivery systems, there is a challenge with being able to reliably pick up packages of varied sizes and shapes while the drone reaches its designation. Options on the market use fixed sized crates/claws or just drop the packages into designated zones. This lack of modularity makes it expensive to buy all the necessary sizes.

PHYSICAL PROTOTYPE



CIRCUIT DIAGRAMS





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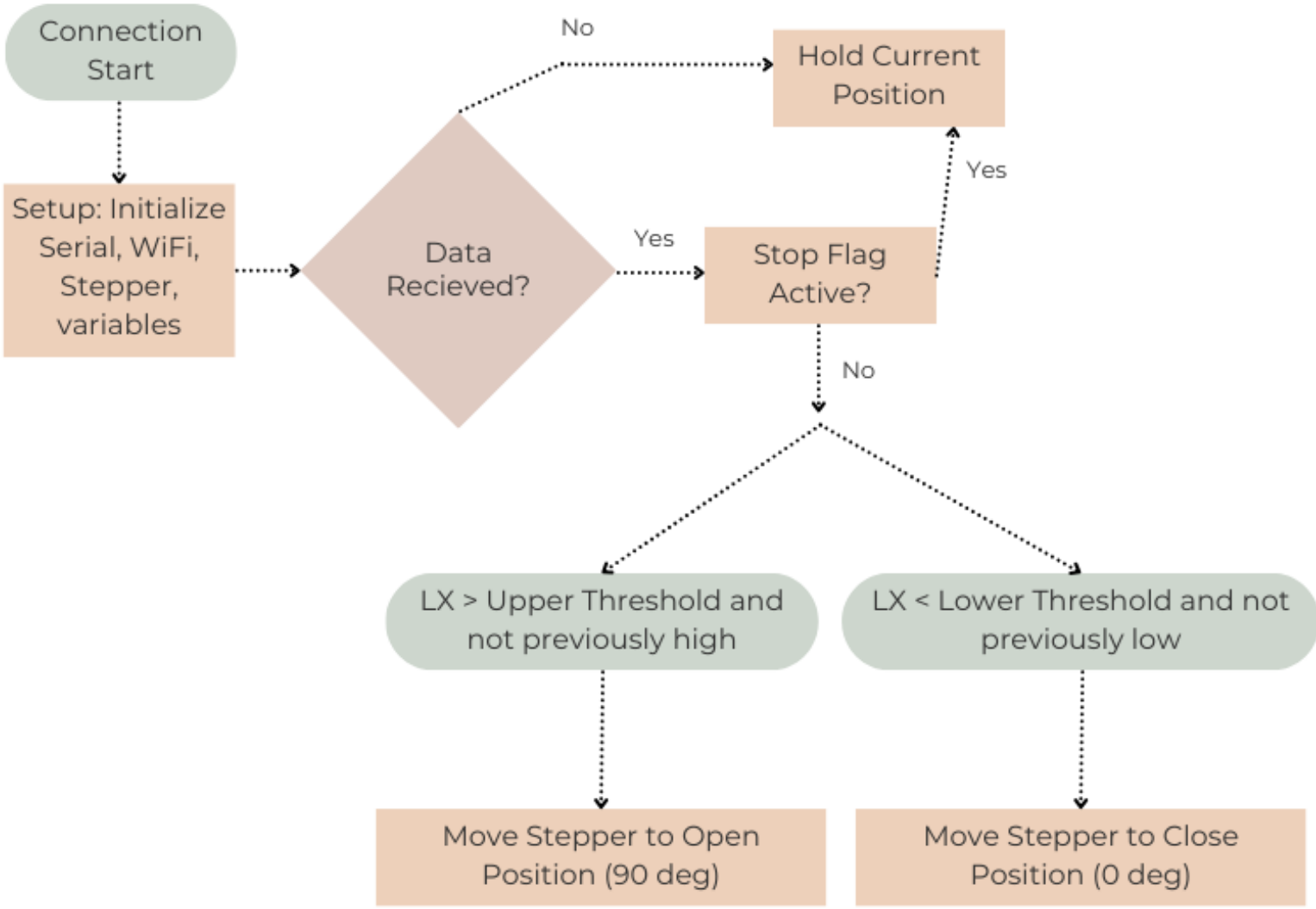
LOGIC FLOWCHART



CODE

Transmitter

```
#include "WifiPort2.h"
#include "Stepper.h"

// Data we send
struct DataPacket {
  int LX;   // Left joystick X
  int LY;   // Left joystick Y
  int RX;   // Right joystick X
  int RY;   // Right joystick Y
  int Stop; // Stop button
} data;

WifiPort<DataPacket> WifiSerial;

// Pin setup
int LXpin = A0;
int LYpin = A1;
int RXpin = A2;
int RYpin = A3;

void setup() {
  Serial.begin(115200);
  WifiSerial.begin("Group95", "Orediggas", WifiPortType::Transmitter);
}
```

```
// Read joysticks
data.LX = analogRead(LXpin);
data.LY = analogRead(LYpin);
data.RX = analogRead(RXpin);
data.RY = analogRead(RYpin);

// Send data
WifiSerial.sendData(data);
```

CODE

Receiver

```
#include "WifiPort2.h"
#include <Stepper.h>

// transmitter data
struct DataPacket {
  int LX;
  int LY;
  int RX;
  int RY;
  int Stop;
} data;

WifiPort<DataPacket> WifiSerial;

// Stepper setup
const int StepsPerRevolution = 2048; // number of steps for one full revolution
Stepper myStepper(StepsPerRevolution, 8, 10, 9, 11);

// Angular position tracking (in degrees)
int NewAngle     = 0;
int CurrentAngle = 0;

// Target positions (in degrees)
const int HOME_ANGLE = 0;    // closed home position
const int OPEN_ANGLE = 90;   // angle you want when joystick pushed open
```

```
// Joystick thresholds for one-axis control (LX)
const int CENTER_VALUE   = 512;
const int DEADZONE       = 50;              // +/- range around center
const int UPPER_THRESH   = CENTER_VALUE + DEADZONE; // > this = "open side"
const int LOWER_THRESH   = CENTER_VALUE - DEADZONE; // < this = "close side"

// Latest joystick reading
int joyX = CENTER_VALUE;

// Edge detection (we only move when crossing into a zone)
bool wasHighPrev = false;  // previously in "open" zone
bool wasLowPrev  = false;  // previously in "close" zone

// Safety timeout (if we want to use it later)
unsigned long lastDataTime = 0;
const unsigned long TIMEOUT = 500; // ms

bool hasReceivedData = false;

void setup() {
  Serial.begin(115200);
  delay(1000);
  Serial.println("=== Receiver Starting ===");

  WifiSerial.begin("Group95", "Orediggas", WifiPortType::Receiver);
```

CODE

Receiver Continued

```
  myStepper.setSpeed(10); // RPM, adjust as needed

  // Initialize data to safe center values
  data.LX = CENTER_VALUE;
  data.LY = CENTER_VALUE;
  data.RX = CENTER_VALUE;
  data.RY = CENTER_VALUE;
  data.Stop = 0;

  joyX = CENTER_VALUE;
}


void loop() {
  // transmitter reciever
  if (WifiSerial.checkForData()) {
    data = WifiSerial.getData();
    lastDataTime = millis();

    if (!hasReceivedData) {
      hasReceivedData = true;
      Serial.println("*** FIRST DATA RECEIVED ***");
    }
```

```
  // Debug print
  Serial.print("RX Data -> LX:"); Serial.print(data.LX);
  Serial.print(" LY:");  Serial.print(data.LY);
  Serial.print(" RX:");  Serial.print(data.RX);
  Serial.print(" RY:");  Serial.print(data.RY);
  Serial.print(" Stop:"); Serial.print(data.Stop);

  // Use only LX for open/close control
  joyX = data.LX;

  if (data.Stop == 1) {
    Serial.println(" -> STOP");
  } else if (joyX > UPPER_THRESH) {
    Serial.println(" -> JOYSTICK OPEN SIDE");
  } else if (joyX < LOWER_THRESH) {
    Serial.println(" -> JOYSTICK CLOSE SIDE");
  } else {
    Serial.println(" -> JOYSTICK CENTER");
  }
}

// If STOP is pressed, don't move the stepper this loop
if (data.Stop == 1) {
  return; // just listen for new data
}
```

```
  // Stepper Control

  // Current zone based on joystick X
  bool isHigh = (joyX > UPPER_THRESH); // joystick pushed to "open" side
  bool isLow  = (joyX < LOWER_THRESH); // joystick pushed to "close" side
  // if it's between LOWER and UPPER, it's in the deadzone/center

  // Rising edge into HIGH zone: go to OPEN_ANGLE
  if (isHigh && !wasHighPrev) {
    NewAngle = OPEN_ANGLE;                          // target angle
    CurrentAngle = stepperGoTo(NewAngle, CurrentAngle);
    Serial.println("Command: GO TO OPEN_ANGLE");
  }

  // Rising edge into LOW zone: go back to HOME_ANGLE (0)
  if (isLow && !wasLowPrev) {
    NewAngle = HOME_ANGLE;                          // back to home (0°)
    CurrentAngle = stepperGoTo(NewAngle, CurrentAngle);
    Serial.println("Command: GO TO HOME_ANGLE");
  }

  // Update previous zone states for next loop
  wasHighPrev = isHigh;
  wasLowPrev  = isLow;
}
```