Basket Bully

BULLY
BALLERS

Bully Ballers

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Overview

1. User’s Journey
2. Level 2 Diagram
3. Mechanical Subsystem
4. Sensor Subsystem
5. Gaming Subsystem
6. Power Subsystem
7. Future Work
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Problem Statement

Retrieving the Basketball

- Ball does not automatically return to player
- Ball can go into road and endanger children
- Retrieving the ball every time can get tiring
- No affordable returners available

Why Solve It?

- More efficient practicing
- To help out the common family
- No breaking the bank!

Demographic Info

- Sofia
- 35 years old
- Single mom
- Some disposable income

User Persona

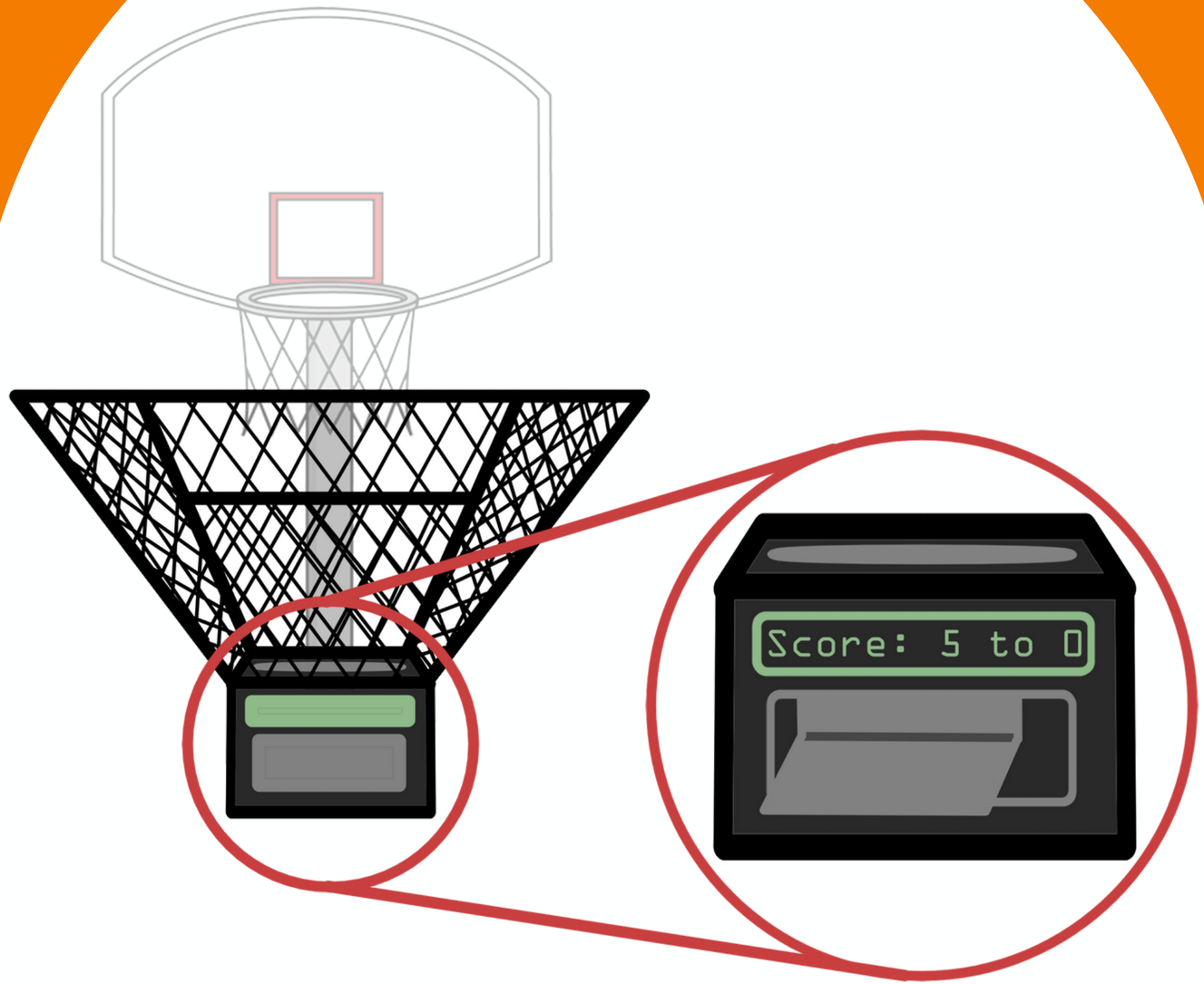
- Needs to encourage children to be active
- Needs something to keep them playing
- Not enough time
- Worried about kids
- Limited budget

Current Solutions

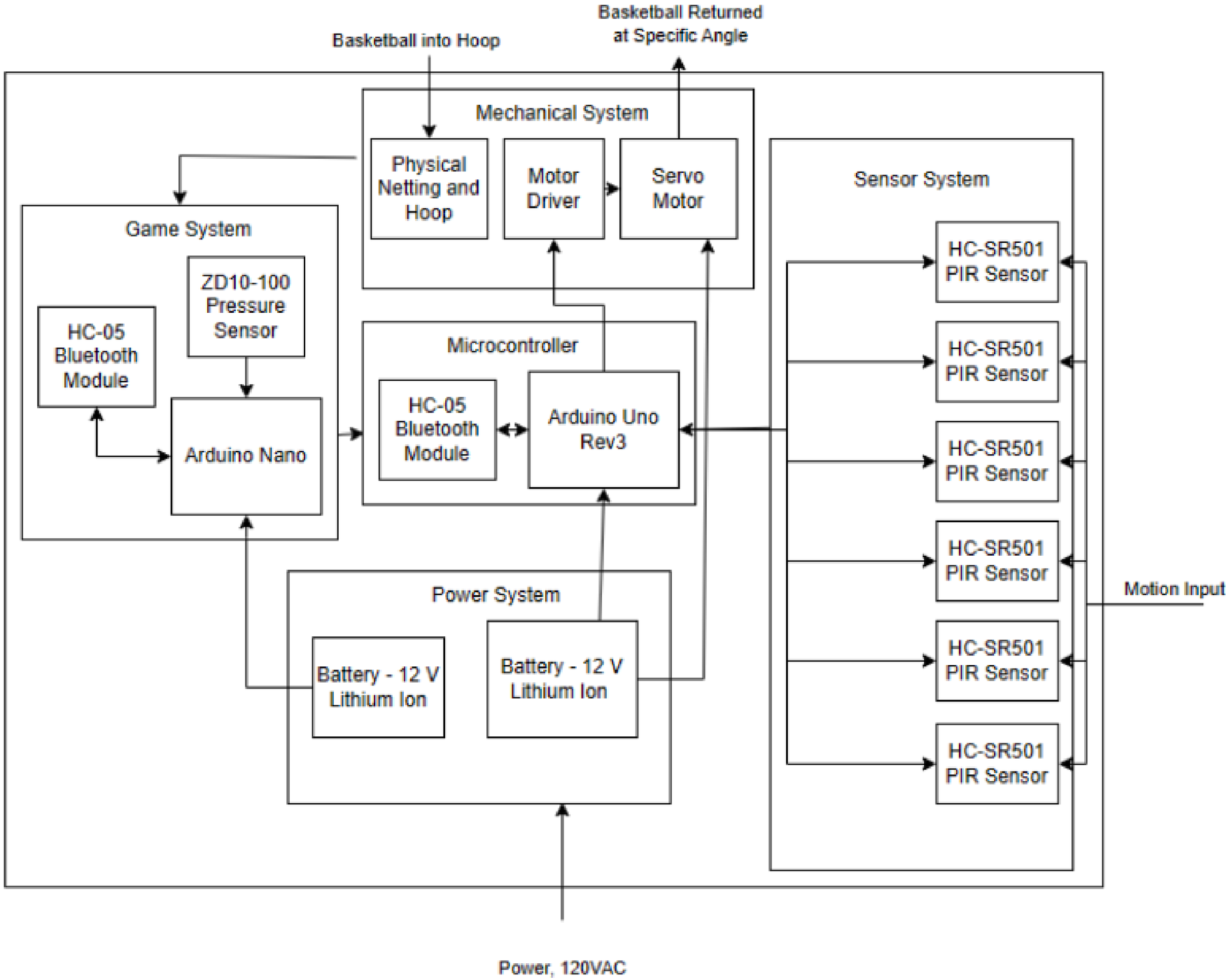
- Basketball is returned in direction set beforehand ($30 - $600)
- The closest solution is Dr. Dish ($3,000+) [1]

Our Solution

- Scoop-style return mechanism
- Automatic rotation via position
- Increase play
- Decrease injury
- Weather-proof
- Game system
- Affordable ($150 - $200)
- Optimized for the average person



Level 2 Diagram



Mechanical Subsystem

INJORA RC Digital Servo Motor [2]

Approach

- Rotation
- Operating voltage
- Size

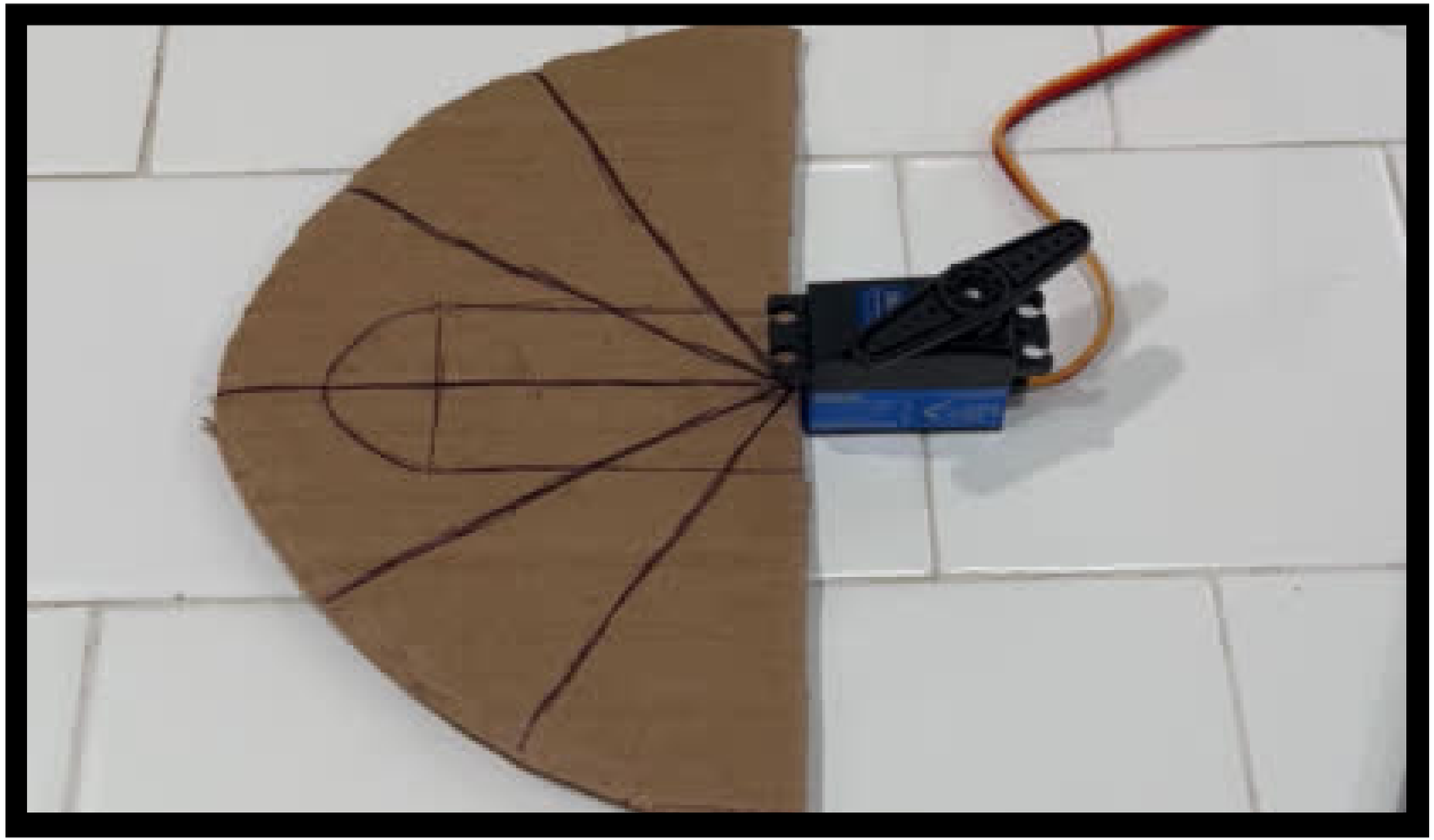
Hardware

- Voltage range: 4.8V - 7V [2]
- Torque range: 11.2 kg - 14 kg [2]

Requirements Satisfied

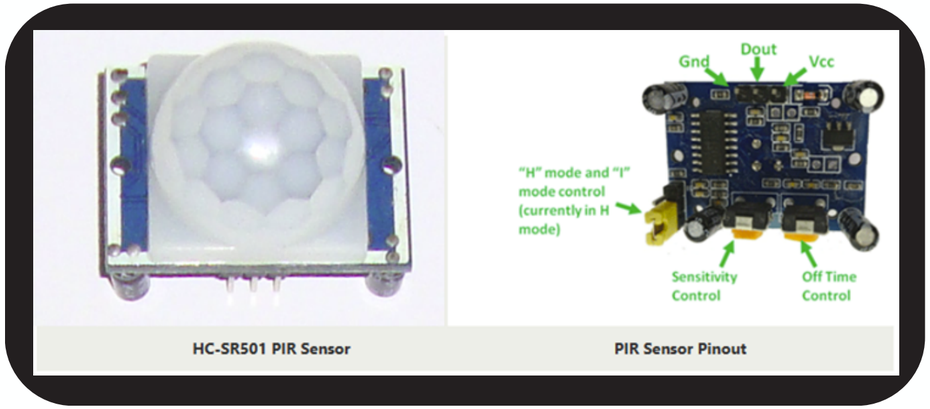
- Rotates 180 degrees [2]
- Size - 40x20x28.8 mm [2]

Motor Video

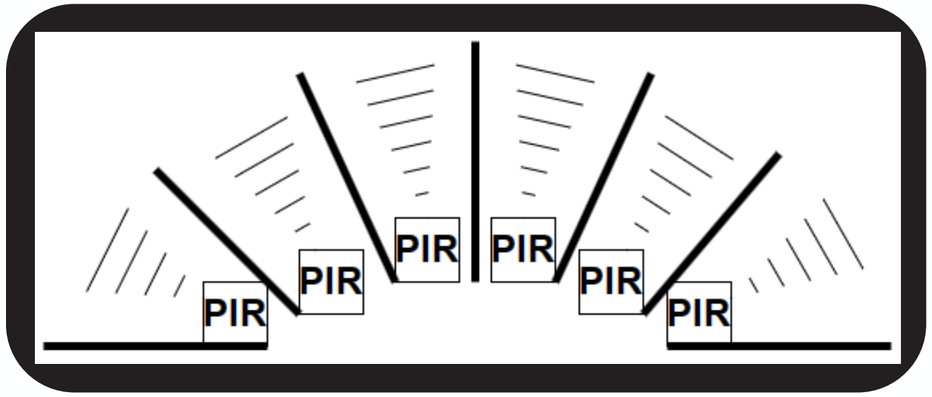


Sensor Subsystem

HC-SR501 [3]



Visual Design



Hardware Approach

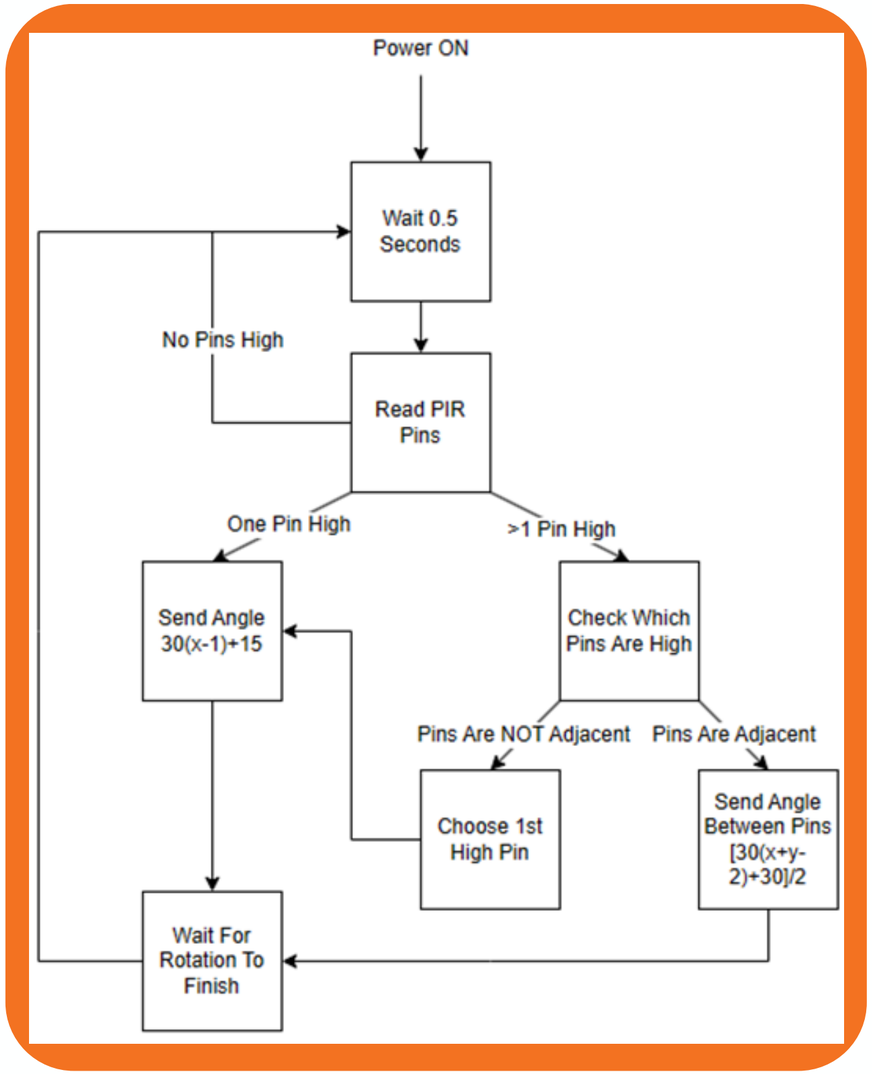
Subsystem Design Options

- Local Positioning System (LPS)
- Camera detection
- **Motion sensing (passive infrared sensors)**

Requirements Satisfied

- Low user setup time
- 180° return radius
- Level of accuracy ~5ft [3]
- Low cost ~$2.40 [3]

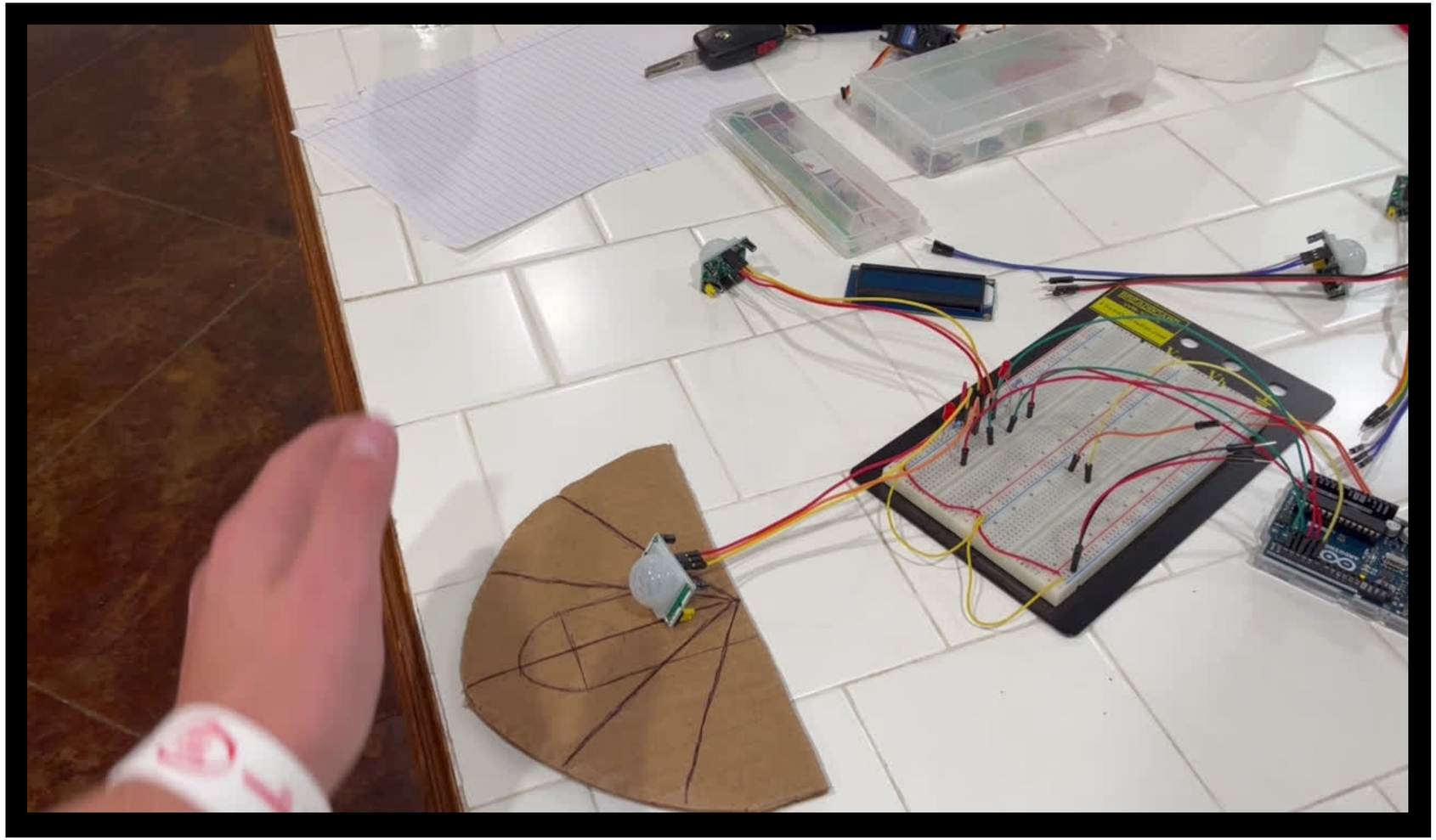
Sensor Subsystem



Software Approach

1. Wait for input
2. Match input to angle
3. Send return angle to mechanical subsystem
4. Loop back to step 1

Sensor Video



Game Subsystem

Hardware

Arduino Nano V3.0 [4]

- Analog pins
- Small size

Pressure Sensor SF15-130 [5]

- 10-kg resistance
- Long and narrow shape

DSD TECH HC-05 Bluetooth Module [6]

- Simple communication
- Able to be in slave or master mode

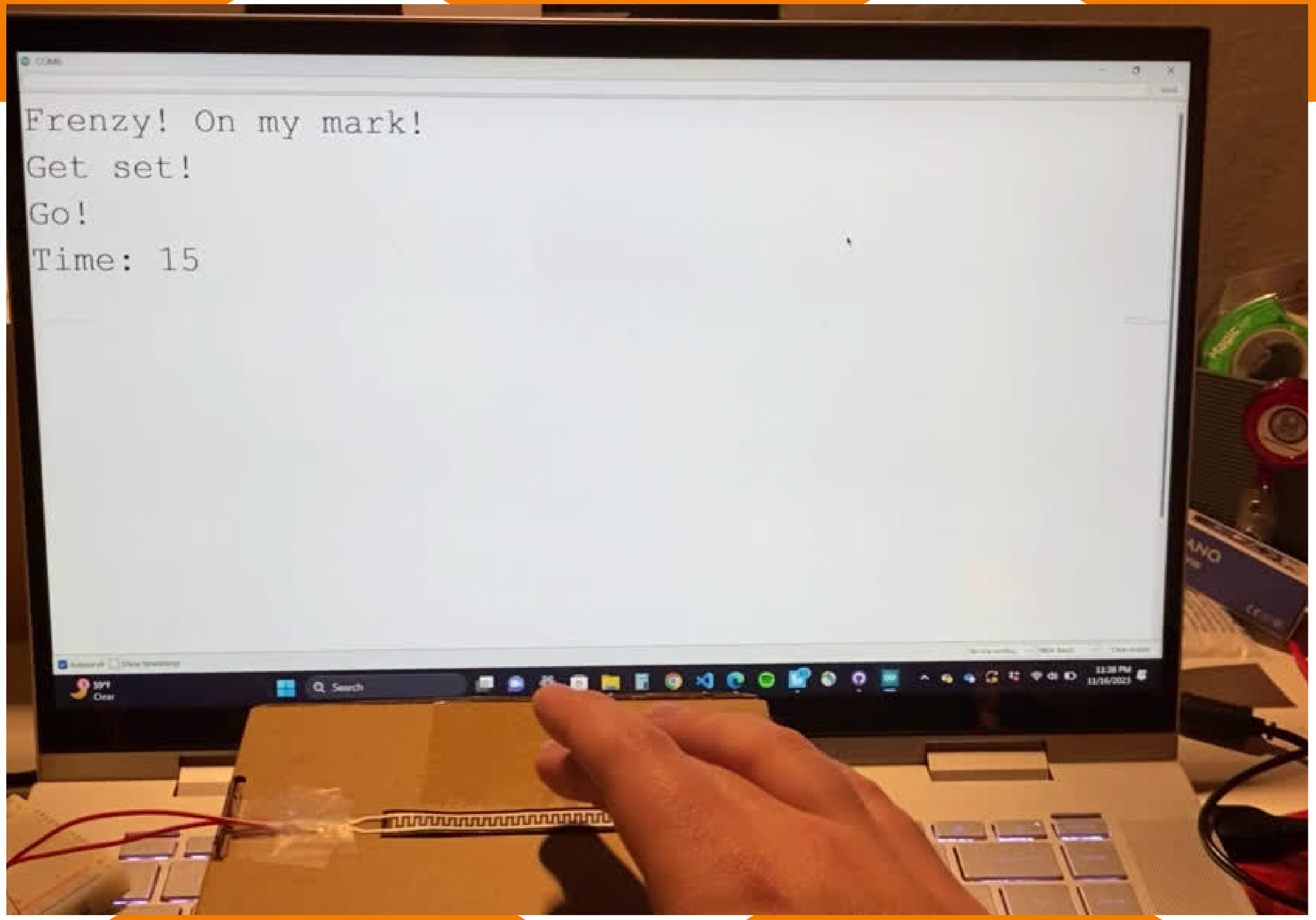
Game Subsystem

Software and Functionality

[7]

- Used for all Arduino boards

Frenzy	3 Point Shoot Out
Normal user tracking	Scoop rotates incrementally
User shoots from any court position	User shoots along 3 point line
Timer determines length of game	
User’s shots are tallied	


Frenzy! On my mark!
Get set!
Go!
Time: 15

Power Subsystem - Main

Approach

- Charging time
- Use time
- Operating voltage
- Supplied current

Requirements Satisfied

- Rechargeable
- Convenient
- Complies with OSHA 1910.334 [9] and IEEE 485-2020 [10]

Loads

- HC05: 30 mA [6]
- Servo: 100 mA [2]
- HC-SR501 PIR Sensors: 65 mA x 6 [3]
- Arduino Uno: 230 mA [11]
- Total = 750 mA
- 6.93 hour active use time

SPARKOLE Li-ion Battery [8]

Power Subsystem - Gaming

Design

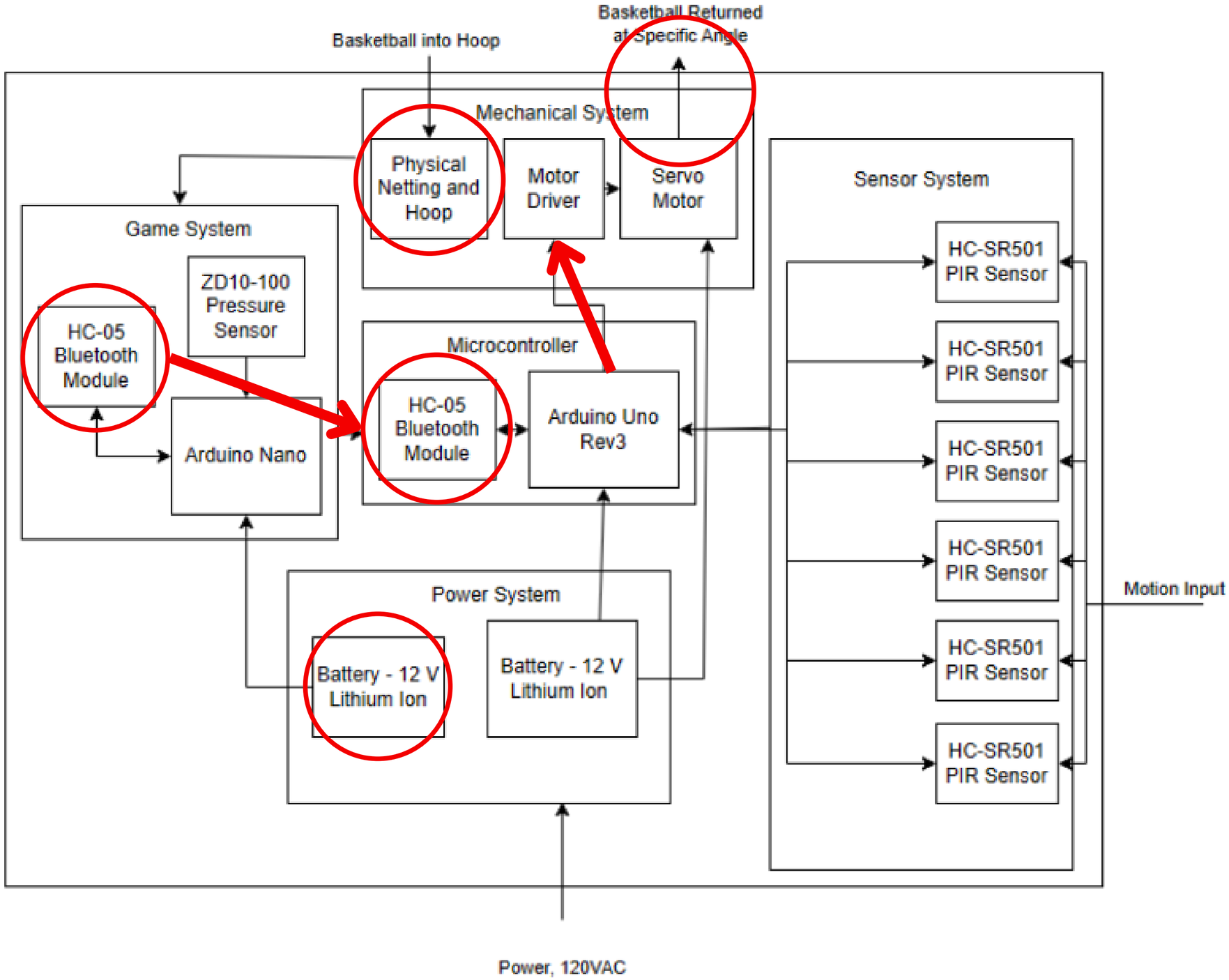
- Supply the playable game aspect
- Same battery as main design
- Satisfies the same requirements as the main design

Loads

- HC05: 30 mA [6]
- Pressure sensor: 35 mA [5]
- Arduino Nano: 50 mA [12]
- Total = 115 mA
- 45.22 hour active use time

SPARKOLE Li-ion Battery [8]

Future Work & Integration



What We Learned

Design Process

- Problem identification to solution implementation

Part Selection

- Researching suitability for parts across subsystems

Sensor Integration

- How sensors will work on determining location for project to function

Design Change

- Needed to come up with solution that any consumer could use

Time & Budget

- Limited budget for part ordering
- Strict deadline on project completion

Part Information

- Hard to find specific technical information when researching

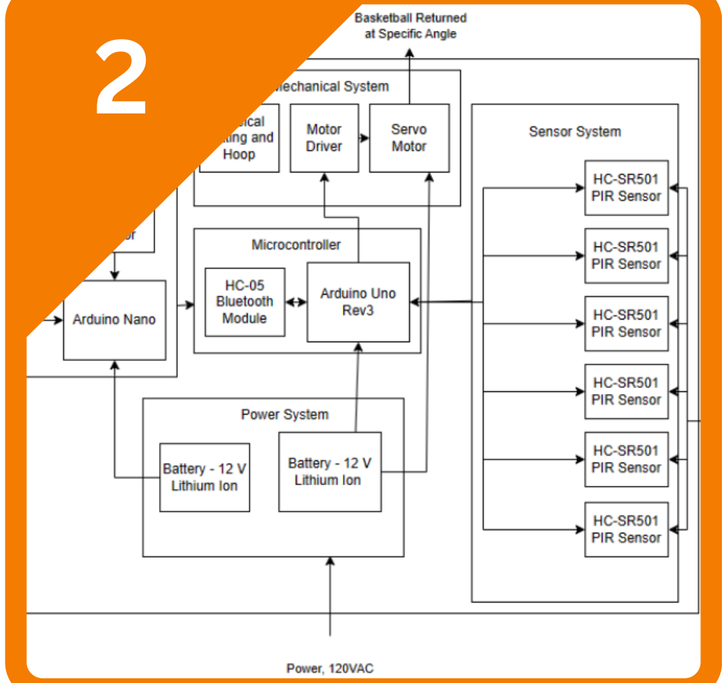
Conclusion

1

BASKET BULLY

The Basket Bully was designed to improve safety and encourage outdoor play time.

2



Each subsystem has undergone some testing and integration.

3

In Design II, we plan to finish testing, integration, and building the netting and enclosure.

RESOURCES

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QUESTIONS?

BULLY
BALLERS