



Object Sorting Industrial Robotic Arm Based on Color using Arduino & MATLAB Computer Vision

Problem Statement

- Manual sorting takes a long time when working with a large number of objects, and efficiency and precision will suffer as a result .
- This project is proposed to separate the objects from a set according to their color.
- Designing and implementation of synchronized robotic arm, which is used to perform all the basic activities like picking up objects and placing them.

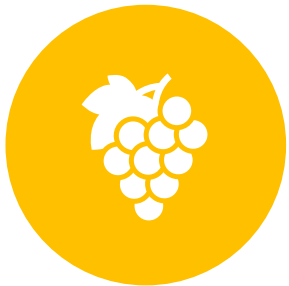
Objectives



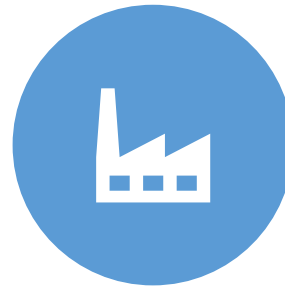
Object sorting based on color sensing.



Reduce human effort, labor and cost.



To implement this project in agricultural machineries like rice sorter, beans sorter, peanut sorter etc.



Increase efficiency in industrial product sorting.

Major Components



4micro servo motor



Arduino Uno



Camera

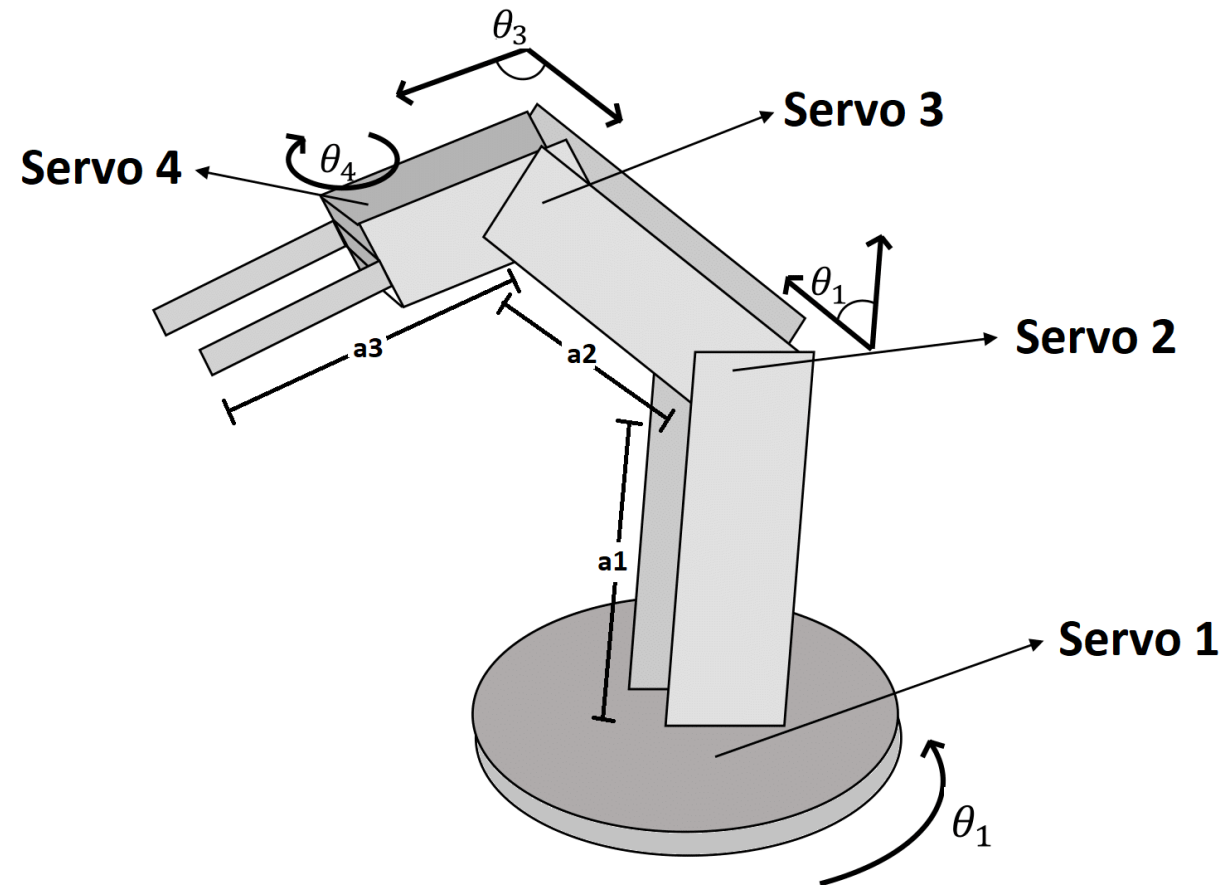


Jumper wires

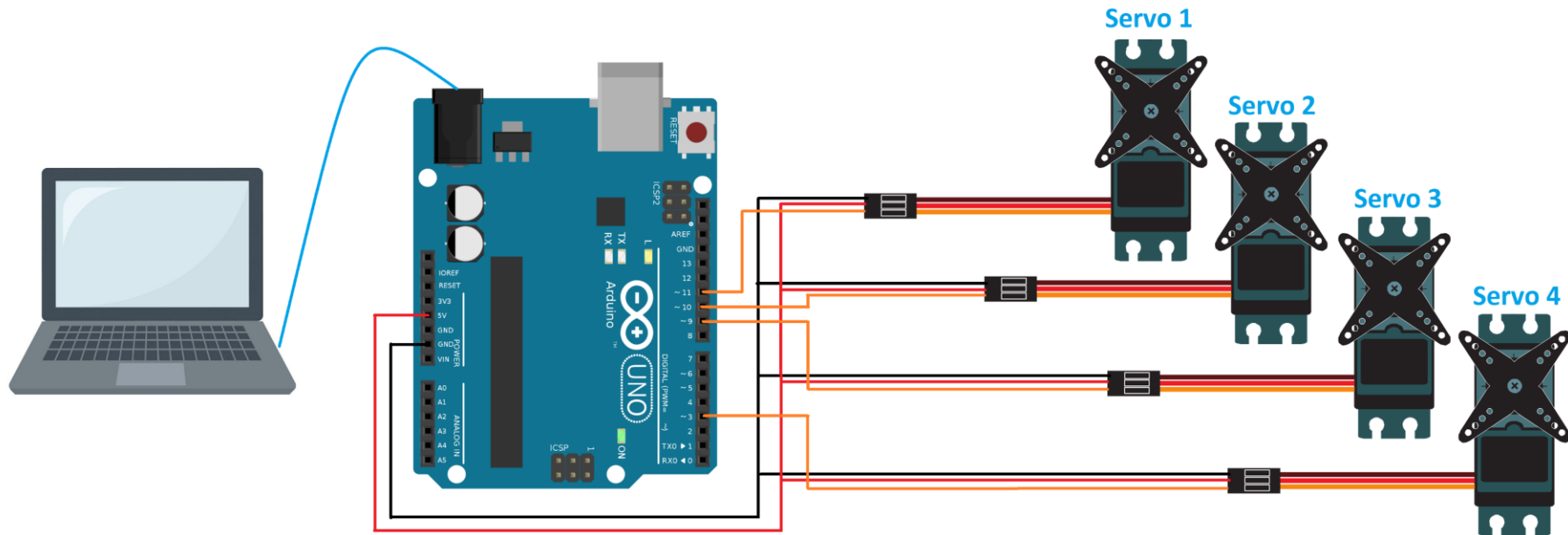


PVC foam sheet

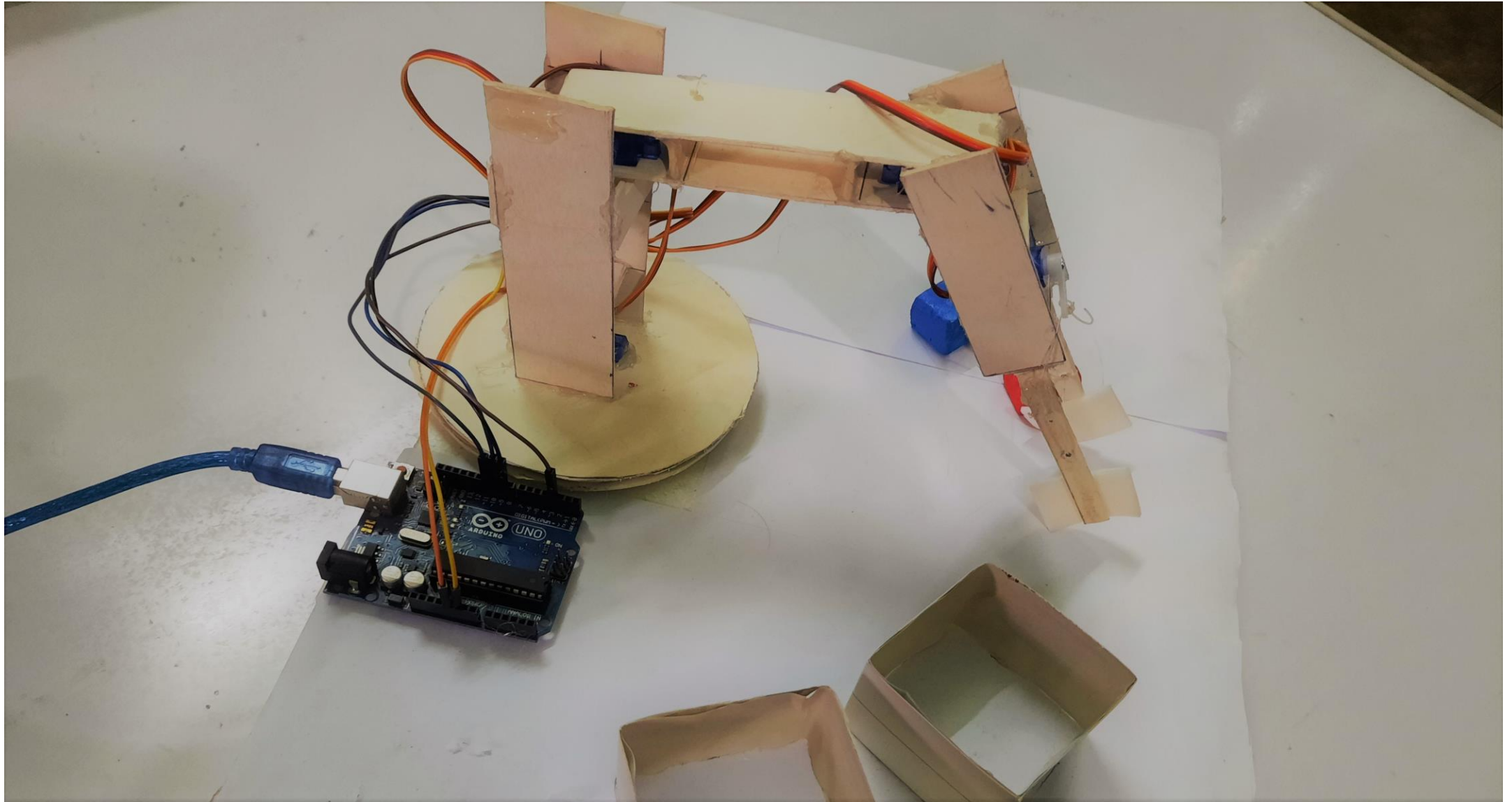
Measurements and Servo Positions



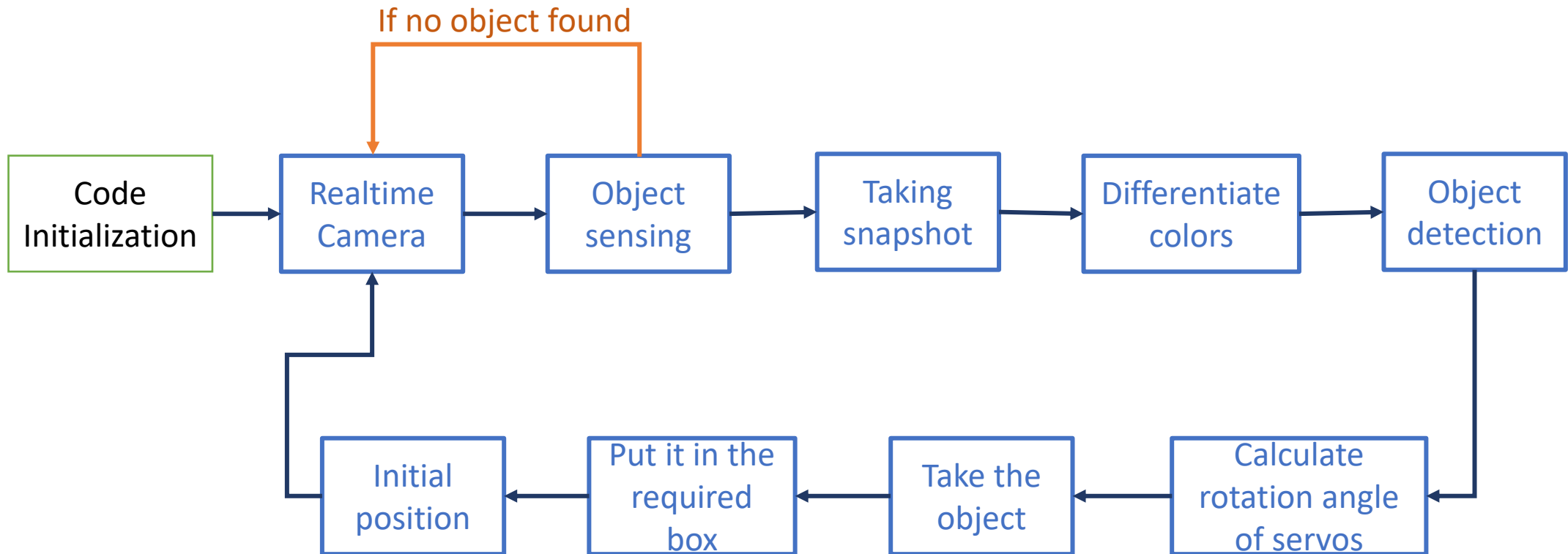
Wire Connections



Robotic Arm Overview



Flowchart




Limitations

- We built the body of the robotic arm from scratch using PVC foam board, and as we haven't used any 3D printer, our robotic arm is not 100% precise.
- We have used lower quality servo motors and still it costs a lot. And after testing our robotic arm for several times, the servos started to show unusual movements and gives 165/170 degree rotation instead of 180 degree rotation.
- We have used smartphone camera for the realtime video input, but if there is used a good quality wired camera in a fixed position, then the precision will improve much more.



Future Improvements

- Sorting based on complex colors
 - Sorting based on size of the objects
 - Using deep learning techniques to use this robotic hand in agriculture, industries and other fields
 - Using higher torque stepper motor to lift more weighted objects and moving the arm more precisely
 - Using a good camera for increasing the precision much more.
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Different Views of The Robotic Arm

