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[Branch Program: Computer Science and Engineering (Internet of Things) – CSO]

SENSORS AND ACTUATORS FOR IoT

(Skill Oriented Course (Course Code: 20CO4C01))

COLOR SORTING MACHINE

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WHY?

- Sorting of object is an essential mechanical process in which difficult work is quite required.
- Chronic manual arranging makes consistency troubles.
- Machines can perform mainly dreary assignments superior to human beings.
- Laborer exhaustion on sequential manufacturing structures can result in decreased execution, and purpose troubles in retaining up object fine.

Components

1. Servomotor:-

- A servomotor (or servo motor) is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback.

- Servos are controlled by sending an electrical pulse of variable width, or pulse width modulation (PWM), through the control wire.
- There is a minimum pulse, a maximum pulse, and a repetition rate.
- A servo motor can usually only turn 90° in either direction for a total of 180° movement.
- Leading OEMs like Siemens and Allen Bradley typically list the lifespan of servo motor bearings for 20,000 to 30,000 hours.
- However, depending on your application and working conditions, your servo motor may last for decades or less than a year.

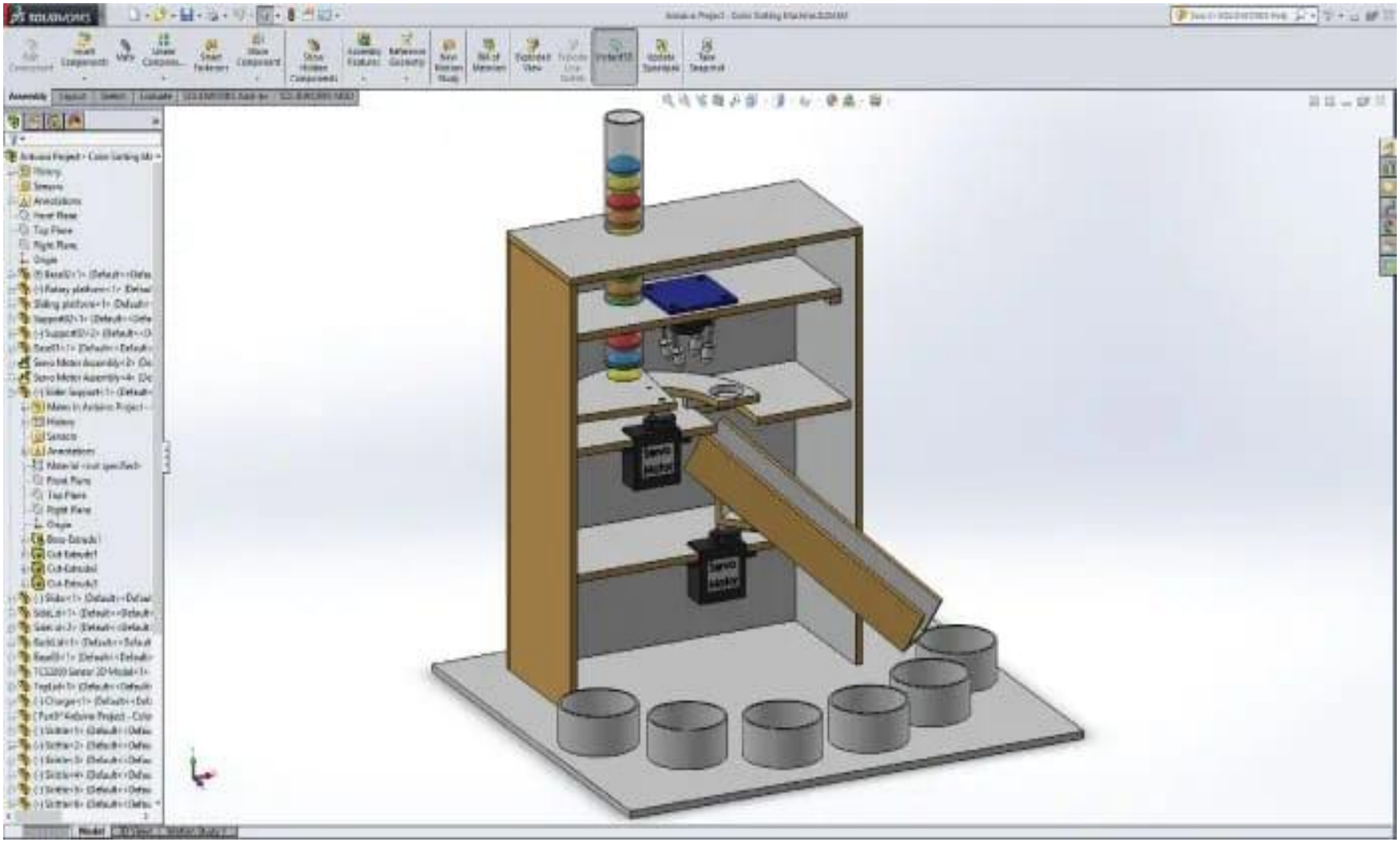
2. **Arduino Uno :-**

- The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc.
- The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits.

3.TCS3200(Color Sensor):-

- TCS3200 is a colour sensor that can detect a wide variety of colours based on their wavelength.
- It uses a TAOS TCS3200 RGB sensor chip to detect colour frequency. This sensor also contains four white LEDs that light up the object in front of it.

Design



- Initially, the colored skittles which are held in the charger drop into the platform attached on the top servo motor.
- Then the servo motor rotates and brings the skittle to the color sensor which detects its color.
- After that the bottom servo motor rotates to the particular position and then the top servo motor rotates again till the skittle drop into the guide rail.

APPROACH

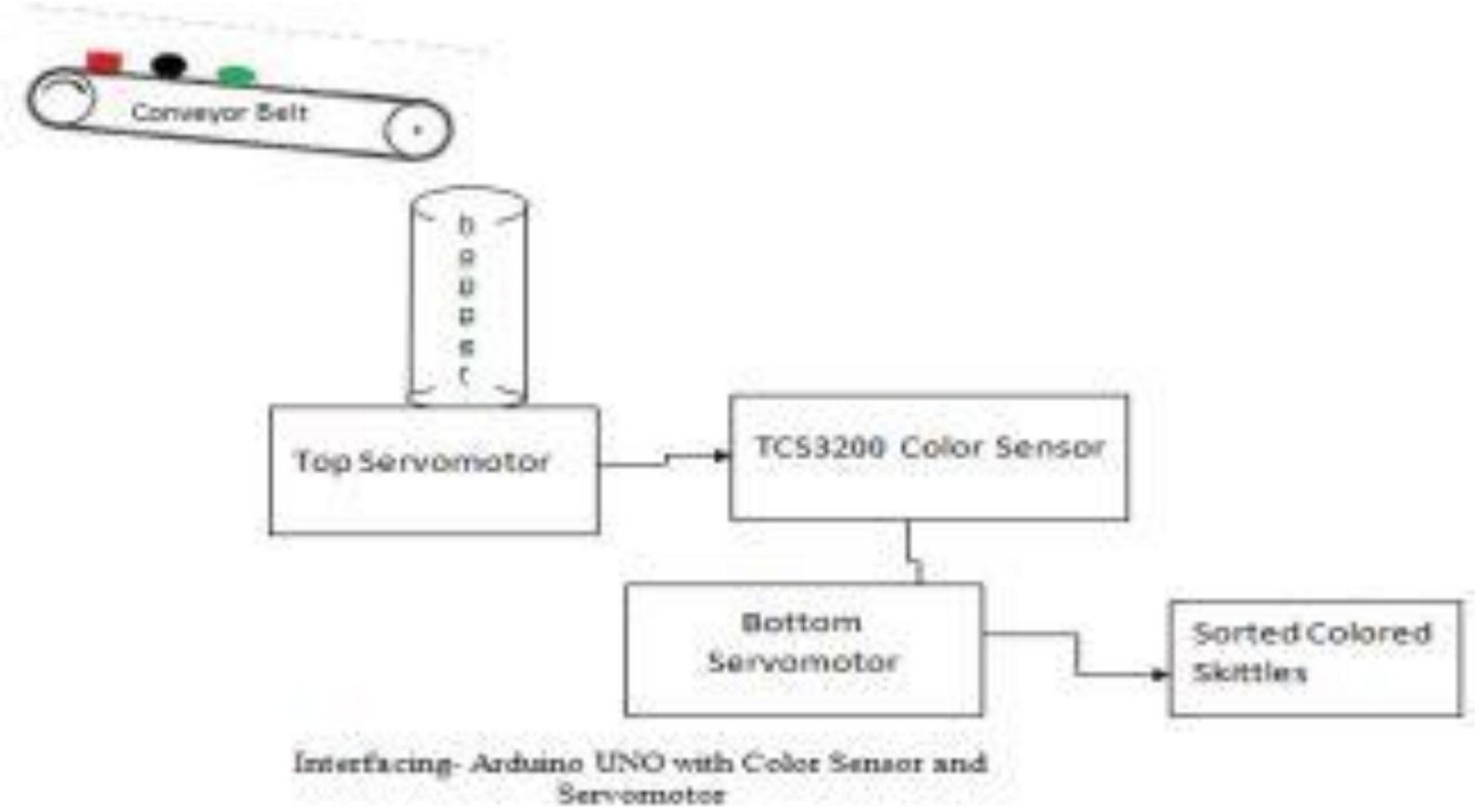


Figure 1: Block Diagram of the System

- This venture makes use of a simplified and not steeply priced technique for sorting the substances of a unique colored items, it's far sensing the color of the object and kind out the different colored devices.
- Servo automobiles are used to manipulate the motion of the skittles are amassed on the hopper.
- A servo motor is used to pressure the skittles to the sensor and the sensor that is interfaced with ARDUINO identifies the shade of the object and the bottom servo is operated as consistent with the deliver code.

- ***<u>This approach consists of three units:-</u>***

1. Input Unit
2. Processing Unit
3. Output Unit

Input Unit

- The precept goal of the work is to move the object from specific spot to sensor unit.
- On the factor at the same time as the object is introduced to the sensor a directing rail is made to prevent. Proper here field is the important statistics unit.
- Field is going to accumulate all the shaded items and drives personally toward the sensor unit with the help of pinnacle servo engine.
- We are able to make use of any of the shaded gadgets in step with the mechanical factors of the device. The essential hued objects we are going to use right here are colored skittles like gem stones, Marbles and so forth.
- The essential employment of this unit is to transport the object shape a gap to sensor unit, while the object goes to the sensor unit the manual rail desires to prevent.

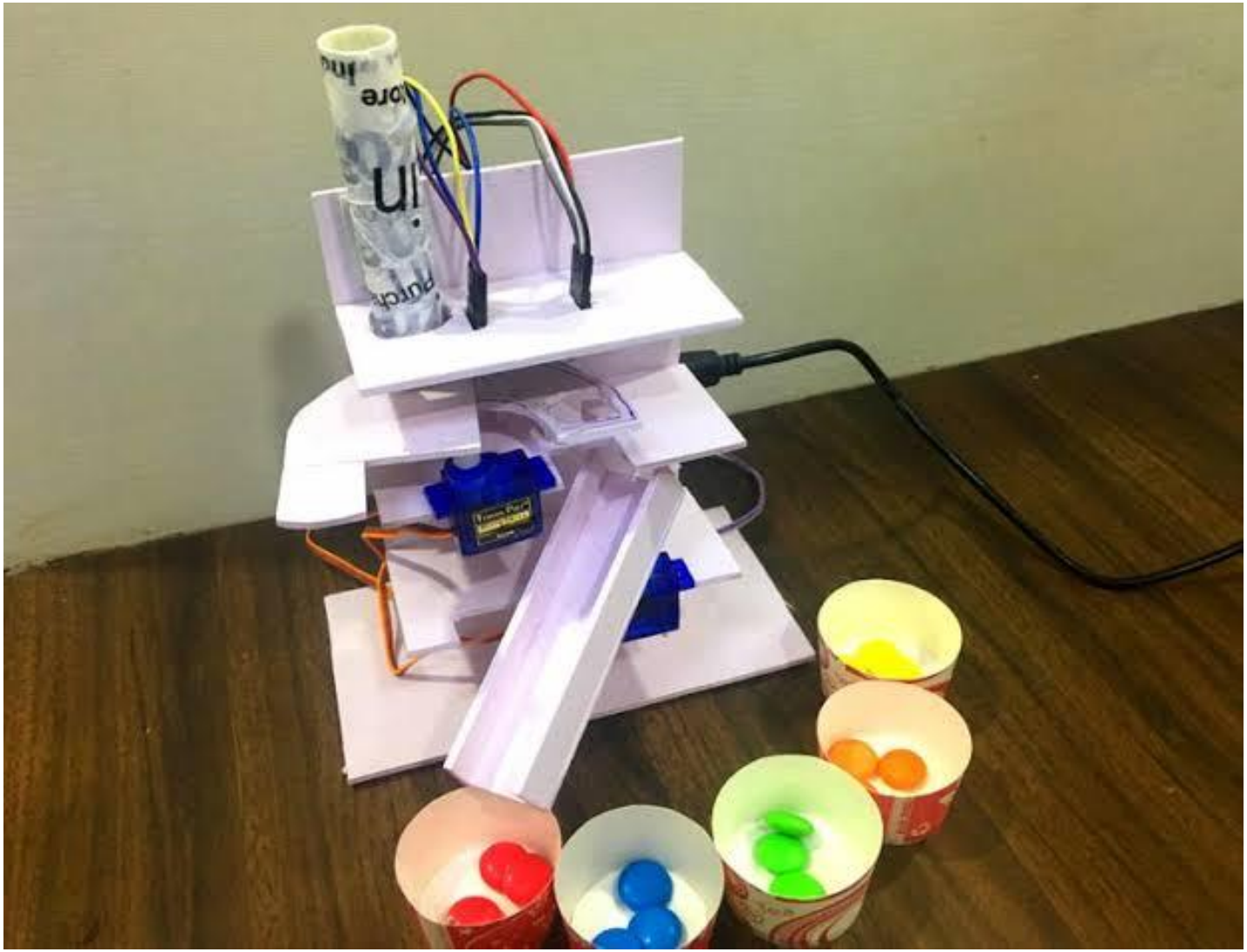
Processing Unit

- This unit gives pointers at the same time as the item emerges at the directing rail.
- With the help of servomotor and makes a decision the coloration of the item with the assist of the TCS3200 shading sensor and sends those sign to the control unit for subsequent operational advances.
- Right here the coping with is virtually relies upon in the deferral gave to the top servo engine. Thru giving a splendid degree of postpone lets in in best acknowledgment of R, G, B pressure estimations of each deal with.
- The making prepared is likewise based totally on the interfacing of shading sensor with Arduino UNO. Right here we're able to supplant Arduino UNO with Arduino Nano.

Output Unit

- The unit is directed with the aid of the manipulate unit for the deciding on and putting of the item from the shipping unit to explicit spot contingent upon the colour of the object.
- Every shading is accumulated at numerous devices. As an instance, any shading from red, green or blue is stored for discovery in advance than the shading sensor then an appropriate shading drove is grew to emerge as on and the yield of the detecting of shading is visible.
- Inside the first place, we keep the inexperienced shading paper over the shading sensor, it acknowledges and turns the drove on and further, approach is performed for the alternative two colorings.

Final Model



THANK YOU