**PROJECT SYNOPSIS**

**IOT BASED PROJECT**

**PROJECT TOPIC** **:** COLOURBASED OBJECT SORTING MACHINE

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**INTRODUCTION :** Color Based Object Sorting has a wide usage in fruit sorting as well as candy sorting industries. This system puts forward a mechanism to detect color and sort items through image processing. Once identified a mechanism is used to sort the candies into particular bins baskets. We here demonstrate this mechanism using a camera with electronic circuitry along with sorting mechanism using 3 bins. The controller circuit consists of a camera attached to it that detects color of a small object in front of it. A motor is used to feed is detected a signal is send to the sorter mechanism which uses a motor to position the sorting tube towards respective section. A feeder is then used to push the object towards the tubs so that it gets sorted and object is pulled in by the feeder. The action details are send to the IOT server using platform to keep track of the number of objects sorted in each section. Thus we achieve a completely automated IOT based sorting system. Cadbury gems color sorting machine by using Arduino nano and Color sensor.

**COMPONENT TO USE :**  1. MG90S servo .

2. SG90 servo .

3. Arduino Nano .

4. Color sensor .

5. Cardboard paper .

**FUNDAMENTAL OF COMPONET :**  1. MG90S servo : The MG90S Micro Servo is a 13g servo motor that is great for applications in low-cost robotics and automation. The MG90S can be powered directly from any 5.0V Arduino board, and can be controlled using the servo library included in most Arduino IDEs.

**Included with the MG90S Micro Servo Package:**

* 1x MG90S Micro Servo
* 1x Set of horns and screws (6 pcs)
* 3x Jumper Wires (Male-to-Male)

**Some Features of the MG90S:**

* Input Voltage: 4.8V - 6.0V
* Operating Current (5.0V): ~2.7mA (idle), ~70mA (no load), ~400mA (Stall)
* Rotation Angle: 0° - 180° (Resolution: 1°)
* Max Speed (5.0V): 0.6 deg/ms (full 180 degrees in 300 ms)
* Largest Dimensions: 12mm x 32.5mm x 32.5mm
* MG90S [Datasheet](https://www.electronicoscaldas.com/datasheet/MG90S_Tower-Pro.pdf)
* NOTE: These are not genuine Tower Pro motors

2. SG90 servo : A Servo motor is a type of motor that is powered by a DC source, either from an external supply or by a controller. A small and lightweight servo motor with high output power is called a micro servo motor sg9. This means that the sg90 micro servo motor will only work as hard as is required to complete the task at hand. A wide range of applications for servo motor exists, including cameras, telescopes, antennas, industrial automation, and robots.

A motor rotates from 0 to 180 degrees at each position of 90 degrees so that names it SG90. Servo motor have a gear that reduces the rotational speed of the motor by reducing its RPM and increasing the torque.

SG-90 Features :

* Operating Voltage is +5V typically
* Torque: 2.5kg/cm
* Operating speed is 0.1s/60°
* Gear Type: Plastic
* Rotation : 0°-180°
* Weight of motor : 9gm
* Package includes gear horns and screws

3. Arduino Nano : The Arduino Nano is Arduino's classic breadboard friendly designed board with the smallest dimensions. The Arduino Nano comes with pin headers that allow for an easy attachment onto a breadboard and features a Mini-B USB connector.

The classic Nano is the oldest member of the Arduino Nano family boards. It is similar to the Arduino Duemilanove but made for the use of a breadboard and has no dedicated power jack. Successors of the classic Nano are for example the Nano 33 IoT featuring a WiFi module or the Nano 33 BLE Sense featuring Bluetooth Low Energy and several environment sensors.

Arduino Nano Features : ATmega328P Microcontroller is from 8-bit AVR family

* Operating voltage is 5V
* Input voltage (Vin) is 7V to 12V
* Input/Output Pins are 22
* Analog i/p pins are 6 from A0 to A5
* Digital pins are 14
* Power consumption is 19 mA
* I/O pins DC Current is 40 mA
* Flash memory is 32 KB
* SRAM is 2 KB
* EEPROM is 1 KB
* CLK speed is 16 MHz
* Weight-7g
* Size of the printed circuit board is 18 X 45mm
* Supports three communications like SPI, IIC, & USART

4. Colour sensor : These sensors are the photoelectric devices that can [emit light](https://www.watelectronics.com/light-dependent-resistor-ldr-with-applications/) and detect the colour of reflected light from an object. These sensors can detect the intensity of light reflected from an object and differentiates the primary colours like red, blue, and green. These are also called as colour detectors.

Colour sensors can illuminate the object with broad wavelength, light ratio, and determine the light intensity of primary colours (red, blue, green, and white). The ratio of intensity light determines the amount of light reflected and absorbed by the object.

Colour sensor Features : Accuracy

* Environmental condition
* Wavelength range
* Calibration
* Resolution
* Cost
* Repeatability
* Frequency

**Reference** :