

# EE 356 – PROJECT PROPOSAL

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# **EE356: Electronic Product Design and Manufacture**

## **Project Proposal**

**TITLE: Color Sensing Device for Visually impaired person.**

### **INTRODUCTION:**

According to the World Health Organization (WHO), there are 285 million visually impaired persons globally. There are 39 million people who are completely blind among these people. Several methods have been developed to assist visually impaired persons and improve their quality of life. One of those methods is assistive devices that can make their life easy. Color perception is a crucial aspect of our lives nowadays. Therefore, color identification assistance techniques are especially required for those who are visually impaired.

Other senses, with the exception of color sensitivity, are highly developed in visually impaired people compared to normal people, according to research. Therefore, with our device, we make use of their improved senses to assist them in identifying the correct color. As a result of their increased haptic senses and sensitivity to sound, we designed our device so that it can accurately identify color and provide haptic feedback and sound pattern to the user. When the necessity arises, this device may be a valuable and handy equipment.

### **PRODUCT DESCRIPTION:**

#### **SPECIFICATIONS:**

Specification	Description
Body	Dimensions: 15(L)cm x 7(W)cm x 3(H)cm
	Weight : 1.2 kg
Display	IC2 0.96-inch OLED display
Battery	18650 3.7V 3200MAH Rechargeable Li-ion
Sound	Speaker / 3.5 mm Headphone jack
Microcontroller	ATmega328P
Haptic motors	3V DC 1027 Flat Vibration Motor
Color Sensors	TCS 3200
	TCS 230

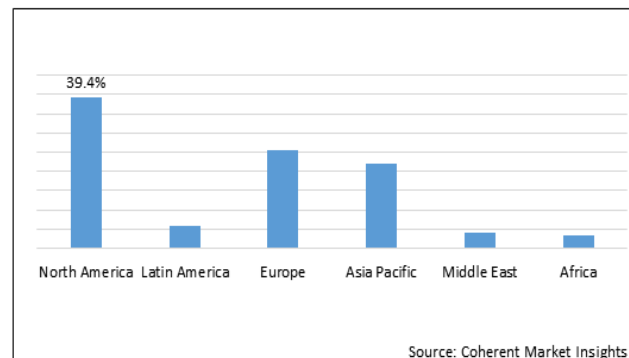
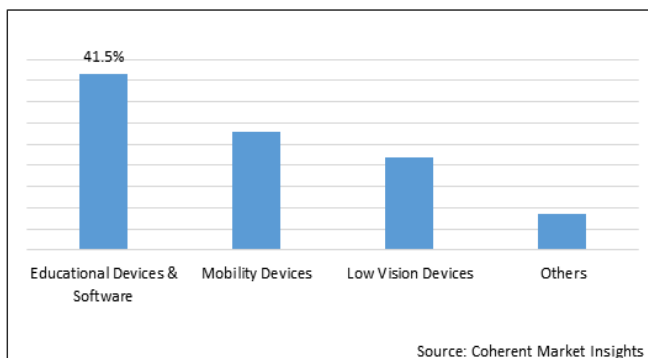
#### **FUNCTIONS:**

- Sense Color accurately via color sensors.
- Display the RGB value and exact color.
- Give Haptic Feedback pattern based on detected color.
- Give voice pattern according to the color detected.
- Store sensed color data.

## LIMITATIONS:

- Battery Life and charging speed
- Internet Connectivity / Wi-Fi connectivity
- Large range and slight output variation of color may cause inaccuracy.
- Color (RGB value) to voice mapping.

## MARKET ANALYSIS:



There are Various devices for visually impaired person market as shown by above graph. Large portion of the market is towards educational devices and software. Therefore, Our Product definitely has some industry appeal.

There are already some similar products in market but there are limited number of haptic feedback providing devices and our product, we feel will balance all the aspect and needs of a visually impaired person.

Visual Impairment Market Report Coverage			
Report Coverage		Details	
Base year	2019	Market Size in 2020	US \$4,362.8 Mn
Historical Data for:	2016 to 2019	Forecast Period	2020 to 2027
Forecast Period 2020 To 2027 CAGR:	8.1%	32027 value Projection	US \$4,362.8 Mn
Segments covered:	<div>▪ By Product Type:</div> <div>▪ Educational Devices &amp; Software: Braille Duplicators and Writers, Braille Computers, Mathematical &amp; Science Devices, Reading Machines, Others.</div> <div>▪ Mobility Devices: Canes, Others.</div> <div>▪ Low Vision Devices: Smart Glasses, VTS Link, Magnifying Lenses, Others.</div> <div>▪ Others</div> <div>By End Use: Blind Schools, Enterprises &amp; Social Organizations, Personal Use, Hospitals, Others.</div>		

According to the market survey, current product of Color sensing device for visually impaired person in market was done by our group. This device categorized as innovative product design, and this can be far more improved than the existing devices in the market. Also compared to the existing products of this category this device is cheaper and advance. Therefore, the target customers can use this device to sense the colors accurately. Here is summary of pros and cons of the product we have designed.

## PROS

- Low Cost
- Higher Accuracy of color detection
- Portable
- User friendly

## CONS

- Battery life and charging speed
- Color to voice and Haptic feedback pattern mapping complexity
- Comparably low output range of colors.

## METHODOLOGY:

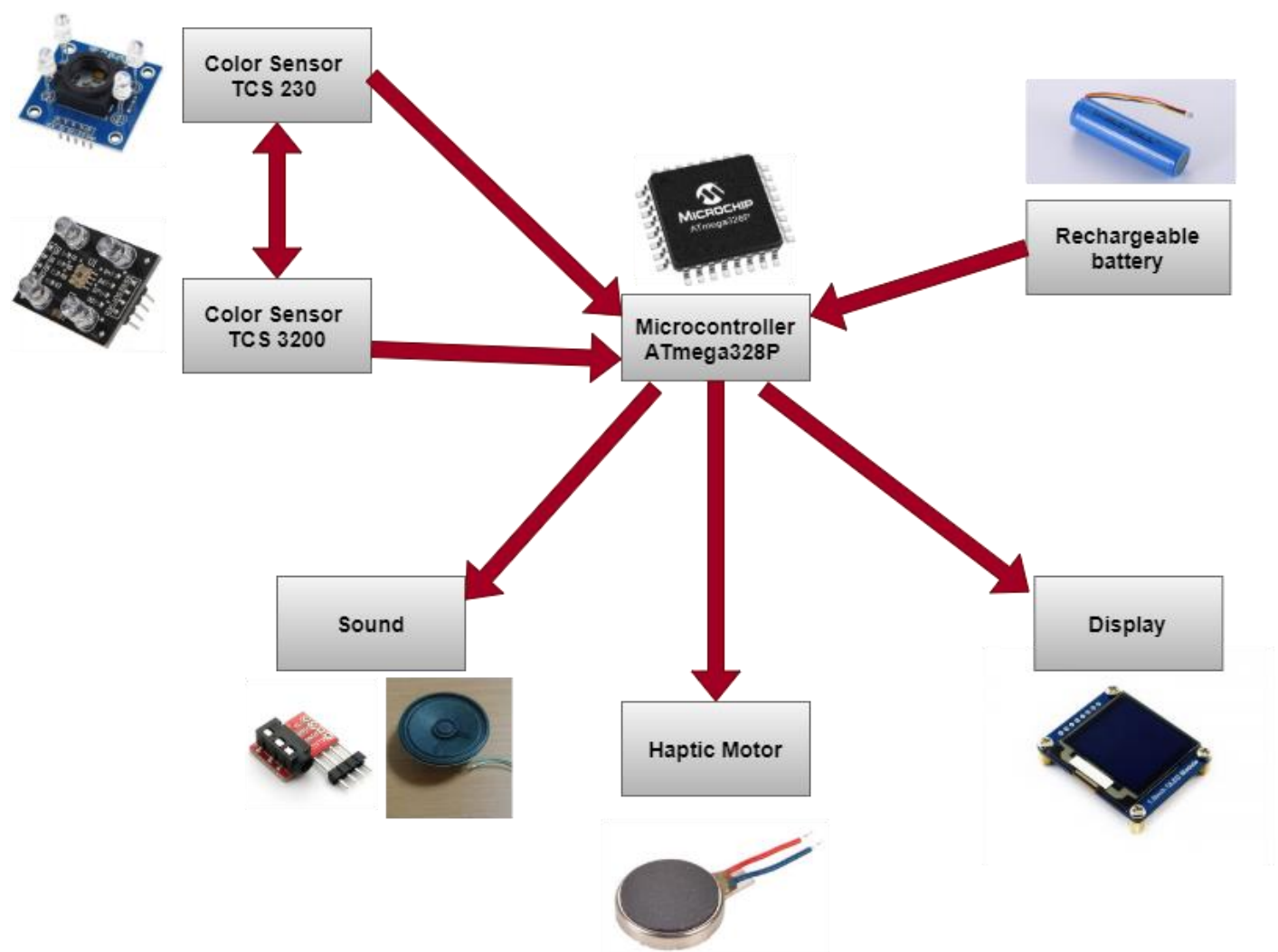


Figure 1 : Device Block Diagram

**PROPOSED BUDGET:**

Component	Unit Cost (Rs)	Number of Units	Total Cost (Rs)
ATmega 328P	1990.00	1	1990.00
TCS230 Colour Recognition Sensor	1,050.00	1	1050.00
TCS 3200 Colour Recognition Sensor	960.00	1	960.00
IC2 0.96-inch OLED display	1090.00	1	1090.00
18650 3.7V 3200 Mah Rechargeable Li-ion battery	990.00	4	3960.00
3V DC 1027 Flat Vibration Motor	150.00	3	450.00
4 ohm 3W speaker 2 inch	170.00	1	170.00
Jumper cable	5.00	50	250.00
		Sub total	9920.00

## TIMELINE:

