All Color Detector Sensor AR001

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Abstract— The objective of the present paper is to explore an approach of constructing a simple, low cost colour sensor using filter model which defines all colours as an additive combination of the primary colours Red, Green and Blue. The sensor consists of low pass filter surrounded by all color and light source. The low pass filter and the amplifier are mounted in such a way so that the color intensity from the source get absorbed by low pass filter and its passes through amplifier circuits. Therefore the voltage drop across the amplifier is varied whenever the light of different intensities from the low pass filter falls upon it. According to the voltage drop we decide the color identity because we know that every color has own intensity that why its produce specific voltage drop. The experimental results show that the variation of the color intensity gives the color identity.

Key words: Color Detector Sensor, Color sensing, AR001

I. INTRODUCTION

Color sensing is one of the important subjects of optical sensors. Color sensors have a variety of applications including detection of environmental, biological, and chemical parameters and in future its also use in robot as a eye. Color detection based chemical sensing is mostly implemented with particular emphasis on colorimetric sensors because many parameters, like pH, concentration, and chemical gases can cause direct or indirect color changes in biological and chemical species. Optical sensors usually have a non-linear relationship between the sensor's response and the effect to be sensed or the measured. Due to the fact that optical sensors have highly sensitive and non-linear nature, an unexpected change in the measured may cause considerably changes and measurement errors in the sensor's responses. Furthermore, it is expected that in modern sensor technology, a sensor has to adapt itself to the changing or unexpected conditions. In order to meet the expectations and to predict the sensor's response more accurately, filter techniques become a useful tool for the design of intelligent color sensors.

The study we present in this paper is a low-cost color sensor whose detection principle is similar to that of designs in but overcomes the drawbacks reported therein with the low pass filter. All parts of the sensor consist of cheap and easily available components. For example, the reflected signal from colored surface is produced by color source. The analog signal from the low pass filter is then amplified by an Op-Amp and applied to the microcontroller where it is converted to digital signals and processed. As it is well known, dark-colored surfaces degrade the performances of the reflective color sensors.

II. BRIEF DESCRIPTION OF THE LOW PASS FILTER

Low-pass filters are commonly used to implement antialias filters in data-acquisition systems. Design of second-order filters is the main topic of consideration. Filter tables are developed to simplify circuit design based on the idea of cascading lower order stages to realize higher-order filters. The tables contain scaling factors for the corner frequency and the required Q of each of the stages for the particular filter being designed. This enables the designer to go straight to the calculations of the circuit-component values required.

A. Filter Stages:

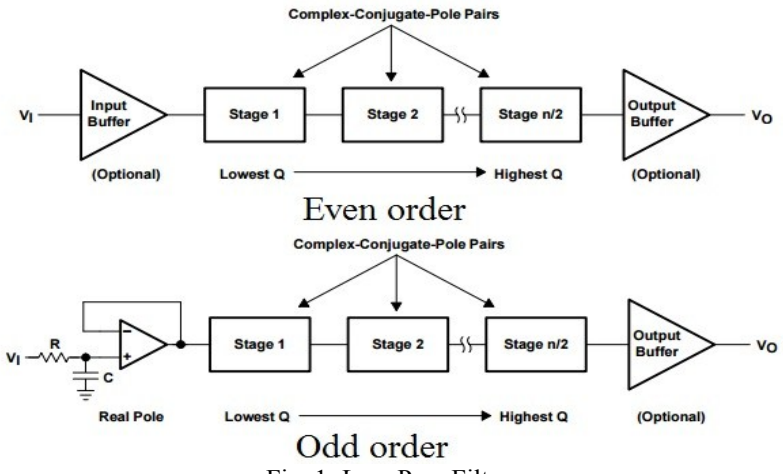

Fig. 1: Low Pass Filter

III. VOLTAGE AMPLIFIER (OPM)

A OPM Voltage Amplifier is a three terminal device which is use to amplify the input voltage at certain limit. Its work in two mode'

A. Inverting Mode:

In Inverting mode phase difference between input and output signal is 180 that means out of phase.

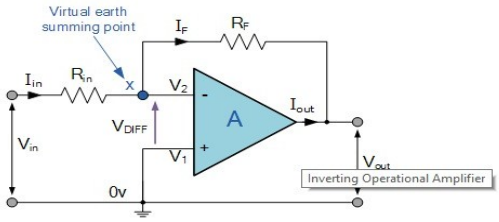

Fig. 2: Inverting Mode

B. Non-Inverting mode:

In Non Inverting Mode phase difference between input and output signal is zero degree that means in phase.

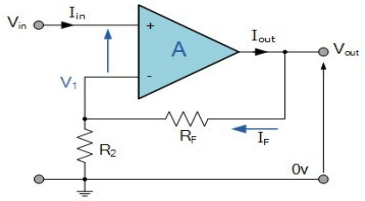

Fig. 3: Non Inverting Mode

IV. STEPS FOR EXECUTION

First of all we received upcoming reflecting color signal according to this we get some potential that potential is very low that why we can't measure them so further we pass through a voltage amplifier OPM circuits that amplify the give input up to certain limit after that we make a program for identify them.

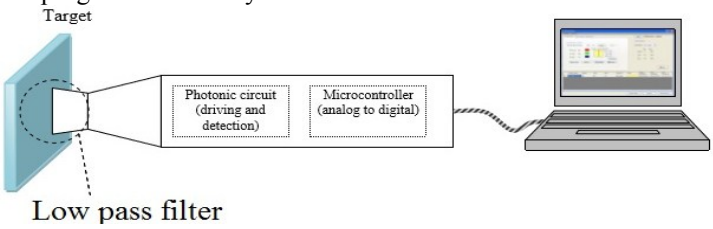

Fig. 4: Execution Steps

V. ALGORITHM FOR THE EXECUTION

For performing such type of work we make a Algo for that

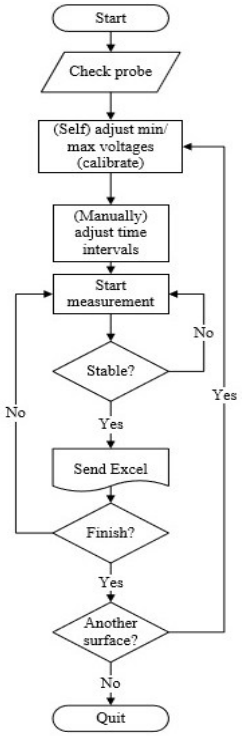

Fig. 5: Algorithm for Execution

VI. OBSERVATION

According to different wavelength of different color signal we get different output voltage.

color	Wavelength(nm)	Amplified Energy(mV)
Voilet	380-450	2.50-2.55
Blue	450-475	2.45-2.49
Cyan	475-495	2.40-2.43
Green	495-570	2.35-2.39
Yellow	570-590	2.30-2.34
Orange	590-620	2.26-2.29
Red	620-750	2.18-2.25

Table 1: Observation

After observation we make a model or kit and give code for microcontroller that give perfect identification of all color.

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