Kolorstone-Accurate colour detection tool

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Abstract— In a time where everything is going digital, right from an app to withdraw money or to purchase any household items it is a prime objective to increase the digitization of every activity so as to ease out the human work. The profession of people especially interior designers, architects, home decorators or artists involves a lot of heavy swatches which are to be carried from place to place. Furthermore, it is not feasible to record a colour at one place and reproduce the exact same colour with the exact properties at another place. "KolorStone" an app that will be linked with a hardware tool will eliminate such issues. The hardware tool is a sensor that, when pointed at any specific object, will eliminate every other sunlight that can possibly infiltrate and distort the actual colours on the object. The hardware tool will be programmed on an Arduino board and will be connected to the Android device using a Bluetooth module. The unadulterated colour that will be fetched by the hardware device will be given to the Android app which will first store the specifics of the colours the RGB code, CMYK code, HSL, HSI, HSV and HSB values in the database for any further use at any time needed. The app will further display the colour fetched by the device and will provide the corresponding shades that will begin from black (being the darkest shade of any colour) to white (being the lightest shade of any colour). The app will even provide a feature to compare any two colours and choose the one required by the end user. Thus, it will enable the designers to keep a track of the colours detected by them and eliminates the need of carrying different swatches and other heavy material since every piece of data will henceforth be collected by the app thereby making it more convenient for the end users and replace the old tradition with a digital one.

1 Introduction

The world around us is perceived through the senses, and of these, sight is the one which contributes more information to the human brain in its human-environment interface task. Sight gives us information through light, its intensity, and colour. Despite the complex processing that is carried out in human neurons from the moment the light reaches the rods and cones, this was the first human sense to be mathematical modelled through its own space of representation and measurement. In 1931, the International Commission on Illumination defined the standard colourimetric observer which sought to represent the average human being in terms of colour vision in order to determine and identify a colour based on mathematical coordinates.

Despite undergoing constant evolution linked to the constant advances in knowledge of human visual physiology and psychometrics, the origin of complex colourimetric transformations performed to represent a colour in an independent representation space is still based on this colourimetric standard observer.

These complex colourimetric transformations and concepts such as standard observer or CIE 1931 space contrast with the ease with which anyone used to work with digital devices that specify a colour by its RGB coordinates. However, this simplicity becomes difficult when these same people try to reproduce a particular colour in a different electronic device such as a monitor or printer. This is because the spaces representing the digital colour, RGB for monitors and digital cameras and CMYK for printers, are dependent colour spaces of the device, that is, the same RGB colour generates a simulation of a different colour on a monitor depending on the primary colours that the monitor uses and the specific configuration of brightness, contrast, gamma and colour temperature.

Although there are many colourimeters on the market, that measure the colour of an object in order to "digitize" it and begin these colourimetric transformations, they are usually quite costly. However, the development of modular low-cost electronics platforms, such as Arduino which can be equipped with all kinds of sensors, opens the door to the use of these devices for capturing colours.

2.3 Figures

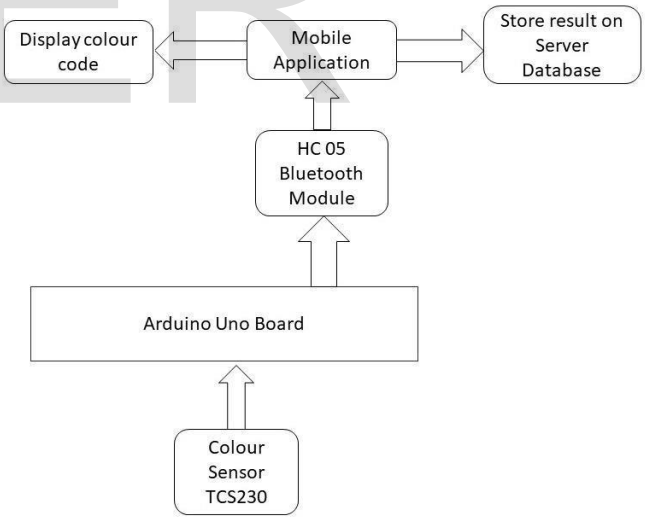

Fig.1.1System Architecture

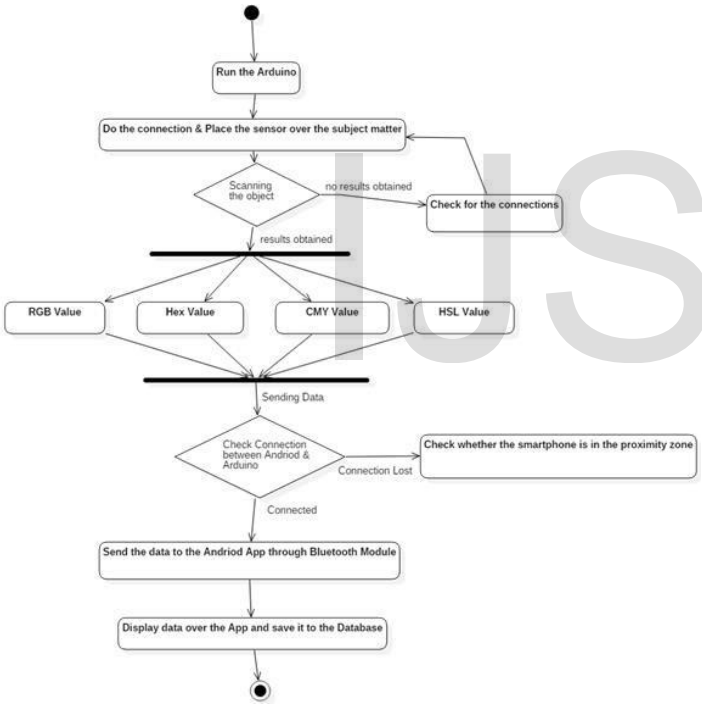

Fig.1.2Activity Diagram

6.1 Figures and Tables

TABLE 1

TESTING TABLE WITH DIFFERENT OUTPUT PARAMETERS

Sr.No.	Colour	Resulting Image (R, G, B)
1.	Red	180,8,9
2.	Green	19,220,60
3.	Yellow	255, 230,20
4.	Blue	46,61,157
5.	White	255,255,255
6.	Black	0,0,0

6.5 Algorithm

Conversion from RBG colour to hexadecimal colour code:-

Sr.No.	Colour to be detected	Actual Output	Expected Output	Interpretation (R,G,B)
1.	Red	Red	Red	255,0,0
2.	Green	Green	Green	0,255,0
3.	Yellow	Yellow	Yellow	255,255,0
4.	Blue	Blue	Blue	0,0,255
5.	White	White	White	255,255,255
6.	Black	Black	Black	0,0,0

TABLE 2

IMAGES OF THE CAPTURED RESULT

RGB colour

The RGB colour is a combination of Red, Green and Blue colours:

(*R*, *G*, *B*)

The red, green and blue use 8 bits each, which have integer values from 0 to 255.

So the number of colours that can be generated is:

$256 \times 256 \times 256 = 16777216 = 1000000_{16}$

Hex colour code

Hex colour code is a 6 digits hexadecimal (base 16) number:

$RRGGBB_{16}$

The 2 left digits represent the red colour.

The 2 middle digits represent the green colour.

The 2 right digits represent the blue colour.

7 End Sections

7.2 Acknowledgments

We would like to thank Fr.Francis D'mello(Director of XIE) for providing us with such an environment so as to achieve goals of our project and supporting us constantly.We express our sincere gratitude to our Honorable Principal Mr. Y.D.Venkatesh for encouragement and facilities provided to us.We would like to place on record our deep sense of gratitude to Prof. Chhaya Narvekar, Head of Dept Of Information Technology, Xavier Institute of Engineering, Mahim, Mumbai, for her generous guidance help and useful suggestions.With deep sense of gratitude we acknowledge the guidance of our project guide Prof. Fr Dr. John Rose S.J. The time-to-time assistance and encouragement by her has played an important role in the development of our project.We would also like to thank our entire Information Technology staff who have willingly co-operated with us in resolving our queries and providing us all the required facilities on time.

4 Conclusion

This project represents a solution for finding the accurate colour in hexadecimal, RGB, CMYK colour intended for use by the architect, interior designers, and creative enthusiast. A key feature of the tool will be is that the previous history will be saved in the cloud or on some local database server or additionally on free web hosting site so that it can be accessed from anywhere over the globe. Experimental results will be conducted when the colour sensor will be kept on that object. In future, we plan to extend the use of this tool to distribute it locally and not just confine it to our team.

References

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