

A portable gas sensing Device Based on Imageprocessing

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There are various kind of gases that evolving from common applications in the industrial, automotive, medical, laboratory and environmental areas. Most of the gases are hard to identify due to the location they release and difficult to capture them. Any gas released is inconvenient to carry them to a laboratory for identification. Currently available laboratory devices that used for gas sensing are expensive due to their advanced technology. Therefore, a cost effective special instrument consists with simple technology is require as a solution. This research will be helpful to fulfil above requirements. The device is especially designed for the industrial and laboratory purposes. At the beginning, system was developed to detect Ammonia gas. Concentration series of 25 ml sample solution were made by adding 1 ml of Nessler (mercury II Chloride 2.5%) with different Ammonia volume. Colour changes of Ammonia gas with Nessler solution were monitored by an image. Images were captured using Y3-Huawei phone camera, which have 480x854 screen resolution with 5 mega pixels. ROB measurement of images were obtained using the MATLAB 2014a Software. UV spectrometer data of the same samples were obtained at same time. RGB Values and UV spectrometer data were analyzed statistically. Minimum detection level of Ammonia gas was found as 0.091 ppm. The average Absorbance with Concentration (mol dm^{-3} , Ammonia) are statistically significant with absorbance at 0.03 level of significance and percentage of variance is 96.5%. The average Red colour with concentration (mol dm^{-3} , Ammonia) are statistically significant with average red colour 0.012 level of significance and percentage of variance is 91.1%. Green and blue Variance are lower than red. Compared to three colours, red colour was best for the Ammonia gas Analysis. This research can be extended later for other gases, which give colour changes with chemicals such as CO₂, SO₂ with potassium dichromate (VI), and H₂S gas with lead acetate etc. Also, as an extra application this research can be extended for any colour measurement application like tea, paint, and dye colour analysis.

Keywords: Image processing, automotive, RGB, pixels, Absorbance