



HAL
open science

Embedded Image Capture System for Liquid Monitoring in the Smart Chemical Industry

Nesrine Boussaada, Guillaume Terrasson, Alvaro Llaría, Octavian Curea

► **To cite this version:**

Nesrine Boussaada, Guillaume Terrasson, Alvaro Llaría, Octavian Curea. Embedded Image Capture System for Liquid Monitoring in the Smart Chemical Industry. Journée de l'Ecole Doctorale SPI Université de Bordeaux 2022, Mar 2022, Bordeaux, France. hal-03898594

HAL Id: hal-03898594

<https://hal.science/hal-03898594>

Submitted on 14 Dec 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Embedded Image Capture System for Liquid Monitoring in the Smart Chemical Industry

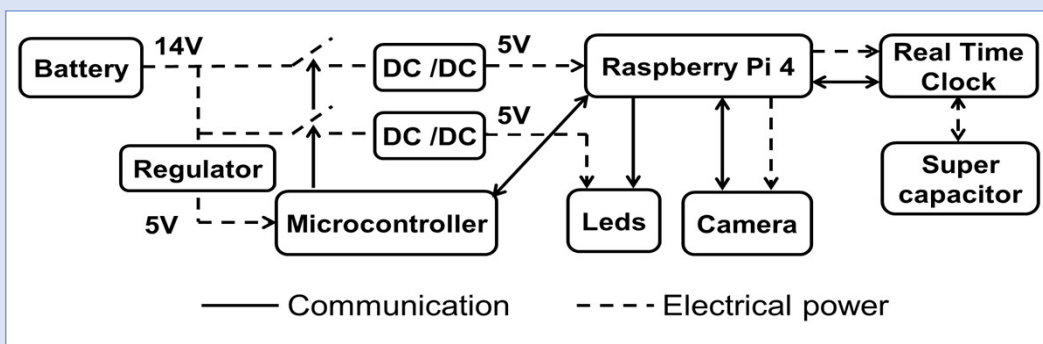
N. Boussaada, G. Terrasson, A. Llaría, O. Curea

Univ. Bordeaux, ESTIA Institute of Technology
F-64210 Bidart, France

n.boussaada@estia.fr; g.terrasson@estia.fr; a.llaria@estia.fr; o.curea@estia.fr



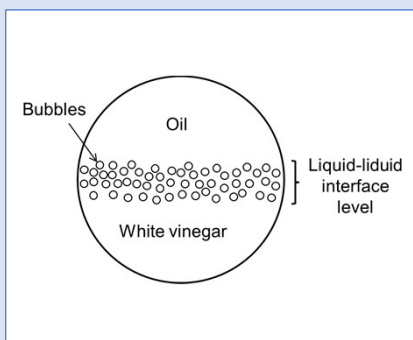
This paper proposes a contribution aiming to improve the captured image exploitability in a visual supervision system dedicated to the Smart Chemical Industry. For that we perform a study of the color light effects on captured images. One visual sensor node, based on Raspberry Pi and a camera, is designed to conduct experiments. In addition, a laboratory glass container including liquids is developed and used as an emulator of the real system.



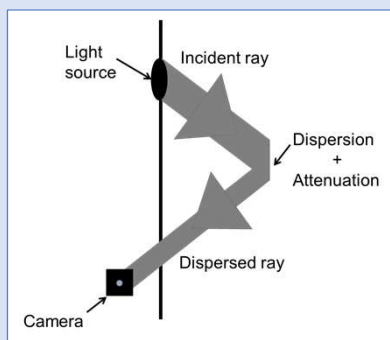
Architecture of the proposed sensor node prototype



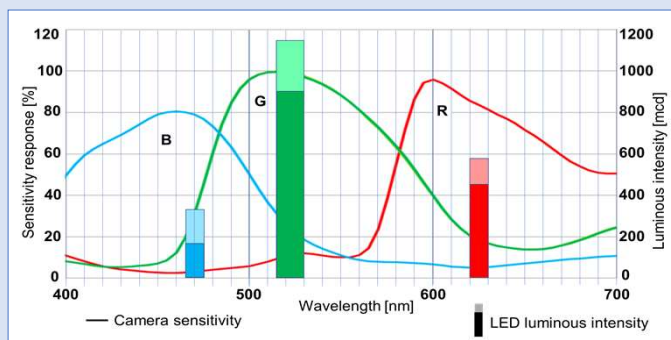
Experimental platform



The phenomena to be monitored



The Beer-Lambert-Bouguer law



RGB layers camera sensitivity and LED luminous intensity

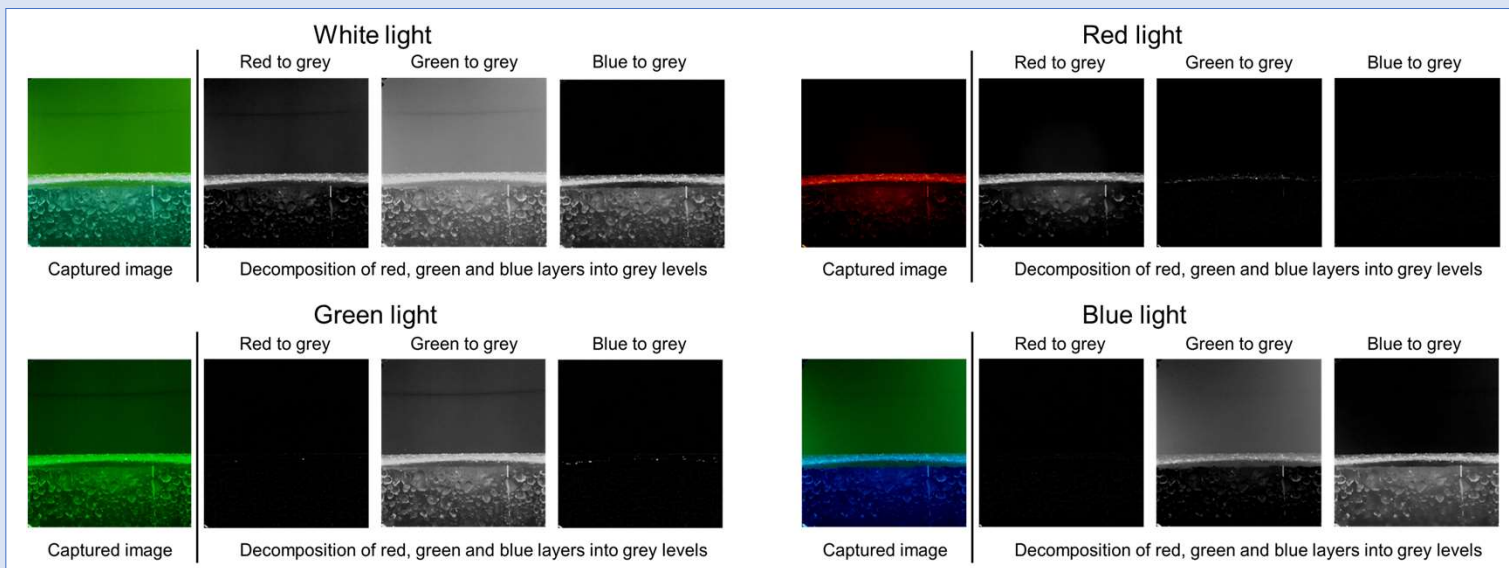


Image capture applying white – red – green - blue light

CONCLUSIONS

This work studied the color light effects on captured images in chemical industrial context. Based on the Beer-Lambert-Bouguer law, it has been demonstrated that an attenuation due to the crossed liquid materials properties could undergo when applying light in the instant of image capture.

The obtained results showed that the green layer of the green light source gives the best details of the image. This confirms the impact of the light source and camera settings on the proposed VWSN performances.

The designed sensor node will be installed on the real site and will capture images during 2 or 3 weeks, to collect a representative set of images to process.