



ACCURATE COLOR FILTER ARRAY OBJECTS WITH NOISELESS AND NOISY COLOR IMAGE ACQUISITION

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ABSTRACT

In industrial environments, the determination of the positions and orientations of tools in complex manual assembly processes allows an automated monitoring about the fulfillment of the process and a quality control. This contribution presents an optoacoustic indoor localization system based on combined distance and inertial measurements that is able to undertake this positioning task. In doing so, an accurate distance measurement is achieved with ultrasound and infrared. An image histogram is a type of histogram that acts as a graphical representation of the tonal distribution in a digital image.

Keywords: Distance Measurement, Indoor Navigation, Particle Filters (PFs), Pose Estimation, Ultrasonic Transducers.

1. INTRODUCTION

"Color Filter Array" redirects here. Digital image sensors used in scanners and digital cameras do not respond in a manner that differentiates color. The sensors respond to the intensity of light : the pixel that receives greater intensity produces a stronger signal. A color filter array (CFA) is a mosaic of color filters (generally red, green and blue) that overlays the pixels comprising the sensors. IMAGE PROCESSING

Image processing is a way to convert an image to a digital aspect and perform certain functions on it, in order to get an enhanced image or extract other useful information from it. It is a type of signal time when the input is an image, such as a video frame or image and output can be an image or features associated with that image. Usually, the Image Processing system includes treating images as two equal symbols while using the set methods used. It is one of the fastest growing technologies today, with its use in various business sectors. Graphic Design forms the core of the research space within the engineering and computer science industry as well. Image processing basically involves the following three steps. Importing an image with an optical scanner or digital photography. Analysis and image management including data compression and image enhancement and visual detection patterns such as satellite imagery. It produces the final stage where the result can be changed to an image or report based on image analysis. Image processing is a way by which an individual can enhance the quality of an image or gather alerting insights from an image and feed it to an algorithm to predict the later things. The growing popularity of digital photography demands every attempt of improvement in terms of quality and speed of the features provided in digital cameras. Image Processing is a technique to enhance raw images received from cameras/sensors placed on satellites, space probes and aircrafts or pictures taken in normal daytoday life for various applications.

2. LITERATURE REVIEW

According to research journal "Accurate color filter array objects with noiseless and noisy color image acquisition" (Dominik Esslinger, Philipp Rapp, Samuel Wiertz, 2020). In conducting indoor positioning by code division multiple access using spread spectrum ultrasonic waves, it is required to detect signals under the influence of near-far problem occurred by difference on signal power, caused by distance between transmitter and receiver. For discussing robustness to the problem, we verified measuring accuracy on distance from an experiment on a real space with a hardware device where our proposed method is mounted. The proposed method performs automatic signal detection by setting threshold level dynamically. As an experimental result, measurable distance were improved by the proposed method, and measurement errors were up to 50mm in distances from 1000mm to 6000mm; therefore, enough accuracy to realize selflocalization or navigation for autonomous mobile robot or human was obtained.

3. PROPOSED SYSTEM

A new 2 x 3-periodic CFA which provides, by construction, the optimal trade off between robustness to aliasing, chrominance noise and luminance noise. Moreover, a simple and efficient linear demosaicking algorithm is described, which fully exploits the spectral properties of the CFA. Practical experiments confirm the superiority of our design, both in noiseless and noisy scenarios. An image histogram is a type of histogram that acts

as a graphical representation of the tonal distribution in a digital image. The horizontal axis of the graph represents the tonal variations, while the vertical axis represents the number of pixels in that particular tone. Robustness to noise is more important than robustness to aliasing.

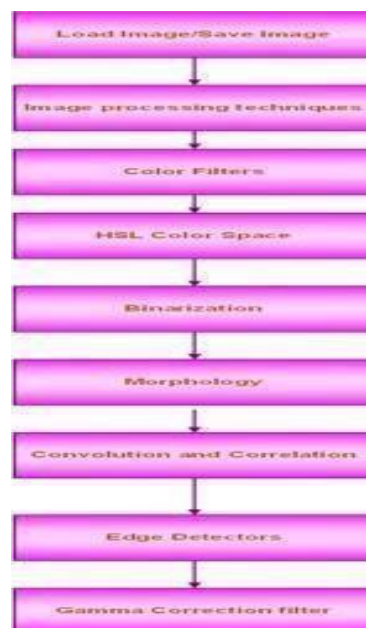
4. ALGORITHM

- 2 x 3-periodic CFA which provides, by construction, the optimal trade off between robustness to aliasing, chrominance noise and luminance noise.

5. ADVANTAGES

- It provide a quality of images
- CFA reduce the exposure time
- It utilize less destructive denoising process

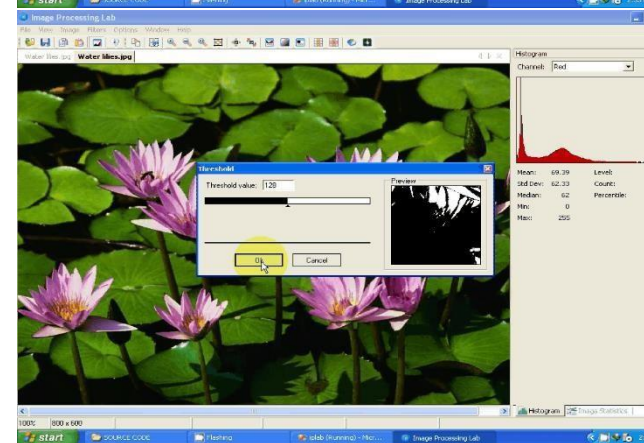
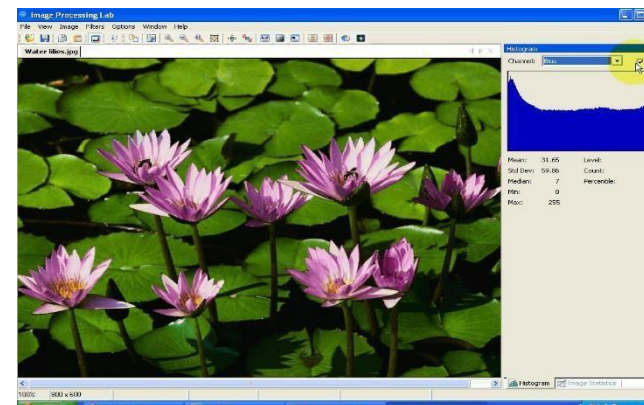
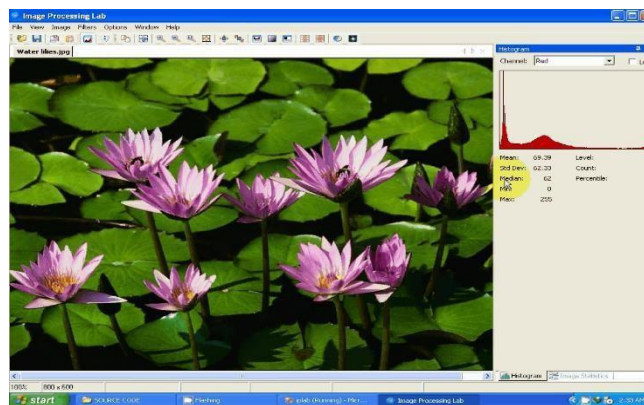
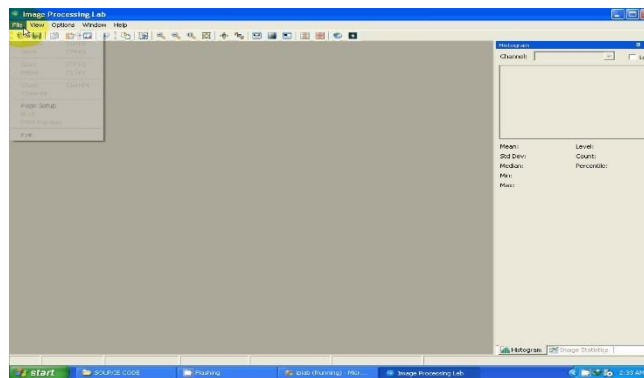
6. SYSTEM ARCHITECTURE

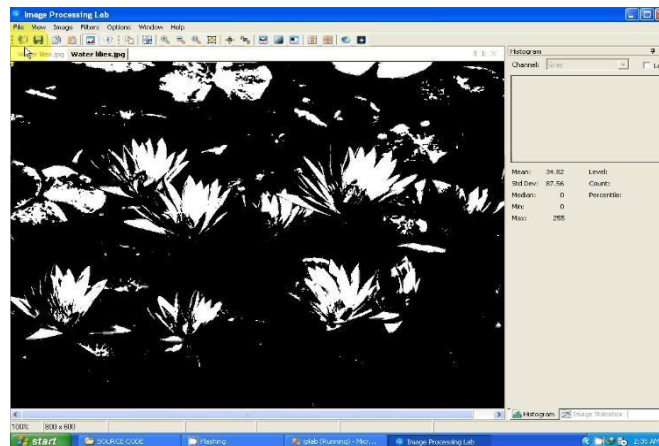


7. HARDWARE REQUIREMENTS

- Processor : Intel Dual Core
- Hard Disk : 60 GB
- Floppy Drive : 1.44 Mb
- Monitor : LCD Color
- Mouse : Optical Mouse
- RAM : 6 GB

8. RESULT





9. IMPLEMENTATION

Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus it can be considered to be the most critical stage in achieving a successful new system and in giving the user, confidence that the new system will work and be effective. The implementation stage involves careful planning, investigation of the existing system and its constraints on implementation, designing of methods to achieve changeover and evaluation of changeover methods.

10. CONCLUSION

We redefined the problem of CFA design as the maximization of the energy of the color scene encoded in the mosaicked image, through the choice of the gains of the CFA in an orthonormal luminance and chrominance basis. In fact, these gains are the inverse of the noise amplification factors in the luminance and chrominance channels of the demosaicked image. We derived the analytical solution to the optimization of these gains, under the constraint that the chrominance is modulated far away from the luminance in the Fourier domain, for robustness to aliasing. The proposed CFA has six colors and a periodic pattern of size.

11. BIBLIOGRAPHY

- [1] [1] Dominik Esslinger, Philipp Rapp, Samuel Wiertz, Helen Randich, Robert Marsden, Oliver Sawodny, and Cristina Tain, "Accurate Optoacoustic and Inertial 3-D pose tracking of Moving Objects With Particle Filtering," presented at the IEEE Int. Conf. Image processing, Apr. 2020.
- [2] [2] K. Hirakawa and P. J. Wolfe, "Spatio-spectral color filter array design for optimal image recovery," IEEE Trans. Image Process., vol. 17, no.10, pp. 1876–1890, Oct. 2008.
- [3] [3] M. Kumar, E. Morales, J. Adams, and W. Hao, "New digital camera sensor architecture for low light imaging," presented at the IEEE Int. Conf. Image Processing, Cairo, Egypt, Nov. 2009.
- [4] Y. M. Lu and M. Vetterli, "Optimal color filter array design: Quantitative conditions and an efficient search procedure," presented at the SPIE Conf. Digital Photography V, San Jose, CA, Jan. 2009.
- [5] L. Condat, "A new random color filter array with good spectral properties," presented at the IEEE Int. Conf. Image Processing, Cairo, Egypt, Nov. 2009.