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D. Hofmann / P.-G. Dittrich

Visual Quality Measurements with Innovative Universal Smart Vision Sensors

INTRODUCTION

Quality measurement is an organized examination or formal evaluation process. It involves measurements, tests, and gauges applied to certain characteristics in regard to a product or process. The results are usually compared to specified requirements and standards for determining whether the product or process is in line with the targets.

Optical visual quality measurements are fast, contact-free and non-destructive. To get these highly productive features most visual quality measurements still provided subjective by human inspectors. Visual quality measurements by human inspectors have three significant disadvantages:

- 1 The human inspector must be specialized
- 2 The human inspector is expensive
- 3 What human inspect in subjective visual perception is not simply a translation of the image on the retina. Thus people interested in perception have long struggled to explain what visual processing does to create what we actually see. This problem is unsolved till today.

Therefore an increasing interest is observable to use objective vision sensors and algorithmic image processing for visual quality measurements.

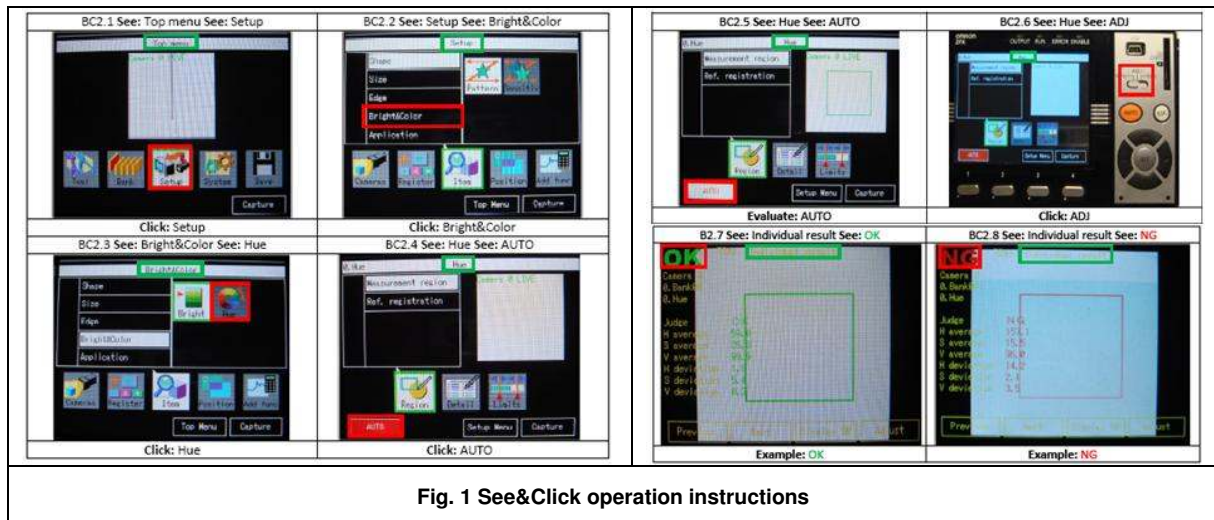
Digital cameras, embedded computers, affordable touch screens, LED-lighting inexpensive optics, standardized interfaces, robust image processing algorithms and colored icons are the fundamentals of a new class of image processing systems for visual quality measurements. The fast progress of micro and optical technologies belonging to applications for consumer goods are fundamental prepositions of convenient, reliable and affordable instrumentations in quality measurements.

It will be **practically demonstrated** that the new smart vision sensors and the new intuitive programming method are milestones in the digitalization of measurements and therefore a breakthrough in measurement theory and practice as well as in education and training for visual quality measurement and management.

SMART VISION SENSORS WITH SEE&CLICK INSTRUCTIONS

Smart vision sensors are a new kind of measuring instruments on the market [1]. The ZFX-C Smart Vision Sensor is a complete image processing system that includes everything from a camera with an integrated light source to an image-processing unit.

With Omron's newly developed proprietary measurement algorithms, the parameters can be set through only a few steps involving the operation of a touch-panel color monitor [1]. To accomplish the operation of the above mentioned smart vision sensors we developed the so called See&Click operation instructions (Fig. 1).



The smart user interface with the colored icons plus the See&Click operation instructions provide simplicity of usage giving anyone all they can need to perform a complete visual quality measurement. Thus the combination of smart vision sensors with See&Click operation instructions makes visual quality measurements convenient, reliable and affordable also for non-specialized users. To enable the application of the See&Click operation instructions for the users independent of space and time they have been included into the SpectroNet portal with Web 2.0 capabilities [2].

CONCLUSIONS

The main purpose of the paper was to present a new kind of universal smart vision sensors and a new method for intuitive programming with icons on touch screens to overcome the existing well-known problems of subjective visual quality measurements by human. Practical examples will be demonstrated during the presentation. The new technology and style of the ZFX-C as well as the new technology and style of See&Click operation instructions pave the way to a new era of visual quality measurements with smart vision sensors.

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