

Co-Existence and Competition of Agx and Digital Imaging

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Abstract

In the AgX 2000 Symposium, Rogers of Kodak predicted that in a near future conventional silver halide photography would co-exist with digital photography, but that there would be a conflicting region such as DSC and a region where the two technologies would grow together. Takada of Fuji stated from the technical viewpoint that the direction of utilizing the feature of silver halide photography would be sensitivity enhancement, and that the technology would have a potential of more than 4 times increase in the next 10 years. Four years after these predictions, our photographic industry is facing a severer reality than predicted.

In this keynote, as the examples of image-capturing materials directly conflicting with digital alternatives, color negative films for consumer use, color reversal films for high-end amateur users and motion picture films for entertainment are dealt with. On the other hand, as the examples of photographic printing materials aiming for the co-existence with digital systems, color photographic paper for digital sources, dry imager films for medical diagnosis and the instant photographic system for cell-phone camera print are dealt with. Trend analyses have been made mainly for the Japanese market where the digitalizing waves are already arriving to speculate the basic direction of future technology development.

Introduction

In the present discussion, imaging systems are divided into three groups; firstly, all-analog imaging systems exemplified by the conventional photography, secondly hybrid imaging systems which make prints from an analog medium after analog-to-digital conversion or from the information recorded in a digital medium, and thirdly, all-digital imaging systems wherein digital image information is observed only on a display. Already there is no room for argument as regards to the movement from the all-analog to hybrid imaging system. Actually, most of the systems in the current mainstream belong to the hybrid imaging system.

Image Capturing

In image capture, DSCs overwhelm film cameras in terms of sales volume by virtue of functional merits such as use convenience, and further will soon catch up with film cameras also in terms of operating volume. Recent introduction of the Venus series into the color negative film market gave a less impact than expected of appealing features discriminating DSCs. As a result, the sales volume of color negative film is decreasing under the direct influence of DSC. On the other hand, single use cameras, which have expanded the lineup by adding distinctive products represented by 'Night & Day' equipped with a super high-speed film, seem to have secured a fairly solid position among the consumers.

In the segment of color reversal film devoted to favorite pursuit by high-end amateur photographers, a new product 'VELVIA 100F' has been injected into the market featuring high image permanence and color fidelity. Color reversal films, those are typical all-analog imaging system, are consistently and enthusiastically supported by those who value original slides as their artistic works. In the future, in addition to functional merits, emotional values such as user satisfaction will be more and more important.

Natural Photo System named 'Natura', which is a combination of the super high-speed film and the compact camera with bright lens, has been proposed to appeal the significance of emotional value of non-flash photography. Success or failure of this proposal will indicate our direction in the future. What supports those characteristics of new products is technology. In particular, technologies for sensitivity enhancement are important, as is manifested in the fact that the film adopted for Natura photography is with a speed of ISO 1600. To complete this concept for the commodity film, more advanced technologies would be required.

Meanwhile, to discuss the future of motion picture films, the balance between the convenience for film making, distribution and screen projection, etc. and the economical load for the infrastructure development is a key factor in the shift from hybrid imaging systems to all-digital imaging systems, and the route to all-digital imaging systems is not always flat.

Image Printing

In image printing, digital mini-lab evolved tremendously as a result of equipment miniaturization and processing capability enhancement by virtue of the advances of color paper technology including digital exposure adaptability as well as process speed acceleration. An explosive increase of color paper consumption for digital printing in these several years well compensates the consumption drop due to the recent analog print shrinkage. With such a background, digital mini-labs are now calling for 'shop printing' not only from films but also from DSCs. In the printing market for DSCs, the competition with home printing typically using inkjet printers will continue toward the future, but the growth of mini-lab printing will probably be faster than that of home printing. Anyway, further technology development and improvement of consumer service such as Internet utilization are indispensable for the emphasis of the merits of silver halide technology.

In the segment of medical diagnosis where X-ray film and screen system were the traditional mainstream and versatile digital diagnosis apparatuses such as CR, DR, CT and MRI have come on the stage. Since the market accepted the convenience of dry processing, dry imager materials are now rapidly replacing wet-process photographic materials. A net result in the medical diagnosis segment is a growth of dry imager materials by overcompensating the gradual decrease of the wet process X-ray films. The next stream expected would be the all-digital diagnosis wherein digital images are displayed on a flat panel. In this market segment, a discussion similar to that for motion picture film is needed whereby further simplification at least comparable to the completely dry print output will be necessary as a medical diagnosis material.

The biggest change in these four years was the appearance of image-capturing cell-phones with perfect portability and Internet connectivity. Almost instantaneously, image-capturing cell-phones have evolved so as to be installed with a Mega pixel imager, however the

captured images are usually reproduced only on a display with very few frequencies of print output.

A small-sized portable printer equipped with an IR communication capability and utilizing the instant film is a very interesting proposal as a characteristic system. The high sensitivity characterizing of the instant photography has achieved miniaturization of the printer with low energy consumption.

Conclusion

In a drastically changing era, prediction of the industry after four years from now is extremely difficult. Nevertheless I try to surmise that the hybrid system will then be playing a main role. Under such a situation, the question "Which will be playing the leading role, analog or digital?" is not so important. The key issue will be what type of merit each system can provide from the viewpoint of functional capability and/or emotional value. Meanwhile, technology is expected to steadily keep evolving as a behind-the-scenes weapon.

Biography

Shunji Takada is a Fellow in Research and Development Management Headquarters of Fuji Photo Film Co. Ltd. He received his B.S. from University of Electro-Communication in 1969 and his M.S. in physics from Tohoku University in 1971. Then he joined Fuji Photo Film Co. Ltd. in 1971 and started his fundamental research in AgX physics and development of photographic materials and systems in Ashigara Research Laboratories. He received his doctoral degree from Tokyo Institute of Technology in 2000. A subject of the doctoral dissertation was the fundamental research in a physical property and photosensitivity of silver halide micro-crystals and their application to the photographic materials. Since then, he is a visiting associate professor in Department of Information Processing of Tokyo Institute of Technology.