Munsell Color Science Laboratory Fall 1997

New Visiting Scientists Working with Dr. Roy Berns

Akihiro Ito, CIS Visiting Scientist — Fuji-Xerox Co., Ltd.

My research theme is the standard image file format for Xerographic color printers in a network environment: to invent the next generation image file format for color Xerographic printers in network environment which enables ordinary PC users in general network environment to handle high quality image. This format consists of two parts, such as image structure format and color space format. Image structure format guarantees 600dpi X 600dpi X 8bit pictorial image quality and 2400dpi X 2400dpi X 1bit line image quality. It also enables printer manufacturer to easily implement color gamut distortion adjustment, defect adjustment and dot/line edge enhancement function. Color space format guarantees color and spatial appearance matching in different observation conditions among printer outputs, CRTs, digital cameras and flat bed scanners. The research in the above two areas very active and world wide organization such as ISO, CIE, ICC are working on standards. Also, many image related companies are actively researching those areas and once a good proposal is developed it will soon become a de facto standard. It is very important for Fuji Xerox to completely grasp the trend of activities in those areas and establish its own technology.

Hideto Motomura, CIS Visiting Scientist — Matsushita Research Institute Tokyo, Inc. (Panasonic)

I would like to design a practical color management system which is useful for the general public. Current color management systems are available for limited conditions. For example, the existing CRT characterization methods are useful only in a dark room. A CRT, however, is viewed under some lightings. Moreover, a printer driver, a scanner driver, color rendering software and so on have a lot of parameters to control color quality. Color optimization of device driver or rendering software, however, is so complicated for amateur users.

To solve the above problems, I would like to develop new device characterization methods and new device connection methods which are useful for the general public under typical office/home lighting conditions according to the following procedure: estimation of existing models for device characterization, development of new device characterization models, estimation of existing models for device connection, and development of new device connection methods. On my research into device connection, I would like to focus on gamut mapping techniques and chromatic adaptation.

There are a lot of research terms as mentioned above. So, it would be very hard to carry out every thing. But, the MCSL has already some excellent technologies in terms of color management system. I believe I can reach my goal by being piled up an effort step by step and collaborating with MCSL.

Summer Co-Op at Xerox Corporation

An opportunity to work at one of the premier Research & Development groups was exciting. As a summer intern, I was able to participate in research work in Xerox Corporation, at the Color and Digital Imaging Systems (CADISYS) group; the center for digital color research, at Webster, NY.

During the three months of my internship at Xerox, I was involved with research in the area of scanner calibration and characterization. This stint gave me a chance to establish my research ability. My job was to design an experiment, run the experiment and analyze the results of the experiment. It was challenging, but I was able to successfully accomplish the task.

The knowledge and understanding of the concepts of 'color' gained in the one year curriculum, here at RIT, enabled me to enjoy the work that I was doing at Xerox. The training of 'research quality work' obtained throughout the courses was perhaps very beneficial because I felt I had some experience in analyzing results and separating good data from a whole load of noisy data.

How has the three months internship helped me? It, gave me an opportunity at testing my ability as a researcher, helped me understand how research is a balance between 'being ahead in the game' and 'increasing revenues of the company' in a corporate world, helped me keep abreast of the latest trends and technologies in the field of color in corporations, gave me an opportunity to interact and learn from my peers in the field of color and image processing.

I enjoyed working in a team of researchers and would like to pursue my career as a researcher in a corporation. My interests include color management, color image capture systems, color appearance and color rendering technologies.

Deepthi Sidavanahalli
M.S. Candidate, Color Science

MCSL's New Post Doctoral Fellow

Introducing Dr. Francisco Imai. He was recently hired as a Post-Doctoral Fellow by the Munsell lab. He has a doctoral degree in Imaging Science from Chiba University. His research was concerned with applying linear modeling techniques to improved color reproduction of facial patterns. His research was under the direction of Professor Yoichi Mikaye, an international expert in color imaging. The research to be carried out at RIT is a natural extension of Dr. Imai's doctoral dissertation. As such he comes to RIT with the skills necessary to solve this research problem efficiently and with intellectual integrity.

Dr. Imai will perform research in multispectral image capture. Typically three channels are used to record color information. As a wide-band system, it is impossible to distinguish between metameric stimuli. A multispectral image acquisition system will alleviate this difficiency. This is readily accomplished with a CCD digital camera imaging through a set of six to nine narrow-band interference filters. Through principles of linear systems analysis, spectral scene information can be estimated. This enables the differentiation of metameric stimuli. This information can be used for high-accuracy image archiving and color printing. However, current digital systems tend to have low spatial resolution. Dr. Imai's research will be concerned with overcoming the limitations of low resolution. This will be accomplished by combining low-resolution multi-spectral digital images with high-resolution conventional photographic images. This will require inverse modeling of the photographic process, linear systems scene estimation, and image merging between low and high resolution by optimization methodologies developed for multi-spectral remote sensing applications.

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