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Abhijit Sarkar

Career Objective

Assume a leadership role in applied research, development and innovation in color imaging and display technologies

Areas of Interest

Color Science, color vision and perception, digital color imaging for still images and video, display technologies, novel imaging applications

Education

Doctorate in Applied Automation and Computer Science (Diplôme Doctorat Automation et Informatique Appliquée), Image and Video Communications Group, Institut de Recherche en Communications et Cybernétique de Nantes (IRCCyN), Polytech' Nantes, **Université de Nantes**, France, September 2008 – August 2011

- PhD Thesis: *Identification and Assignment of Colorimetric Observer Categories and Their Applications in Color and Vision Sciences*

- Funded by the prestigious ANRT-CIFRE program for industry-university collaboration, resulted in two patent applications, eight conference papers, one journal paper, two international awards and new overseas university collaborations

Master of Science in Color Science, Munsell Color Science Laboratory (MCSL), Center for Imaging Science, **Rochester Institute of Technology**, Rochester, NY, USA, May 2008

- MS Thesis: *Evaluation of the color image and video processing chain and visual quality management for consumer systems*

- Thesis initiated by a new collaboration between MCSL and Intel Corp, resulted in a patent and a conference paper

Master of Science in Architectural Engineering with specialization in Lighting/Electrical, **Pennsylvania State University**, USA, May 2005

- MS Thesis: *Proof-of-Concept: CMOS Sensor Based Lighting Control System Integrating High Dynamic Range Imaging and DALI*

- Resulted in multiple publications and a follow-up work at RIT supported by a student research grant, leading to a new collaboration with several lighting control companies and a state grant proposal (not pursued further)

Bachelor of Engineering in Electrical Engineering with elective in Illumination Engineering**, Jadavpur University**, Kolkata, India, 2000

Professional Experience

March 2013-Present   **Microsoft Corp, Redmond, WA**

Imaging Science Engineer (Color Scientist)

- Responsible for display color and image quality aspects of Surface products (Microsoft's tablet); conceived and helped implement factory color calibration to improve color accuracy on every Surface display; a key contributor in defining roadmaps and strategies for future color features in Surface

December 2011-September 2012   **ColorModules Inc., Stamford, CT**

Color Scientist and Director of R&D

- Developed and implemented a unique color imaging workflow for accurate color extraction from digital images, captured by smart phone cameras; co-developed ColorModules' flagship product Plum Perfect iPhone App, which incorporated advanced camera capture and color processing capabilities

September 2008-August 2011   **Technicolor Research & Innovation, Rennes, France**

PhD Student/Research Engineer

- Envisaged a new display application following a scientific work in color vision, developed a proof-of-concept prototype of a color matching instrument as an enabling factor for a new paradigm in color science and color imaging, initiated collaborative studies with two foreign universities

September 2005-March 2008   **Center for Imaging Science, RIT, Rochester, NY**

Graduate Assistant

- Conducted research on algorithmic and perceptual aspects of color processing in consumer video processing systems, which involved planning, setup, preparation and execution of subjective image quality experiments (thesis research sponsored by Intel Corp.)

June 2007-August 2007   **Intel Corporation, Chandler, AZ**

Summer Intern

- As part of the thesis research, developed a novel algorithm for perceptual enhancement of color and contrast, and conducted subjective experiments to evaluate its performance

June 2006-August 2006   **Hewlett-Packard Company, Vancouver, WA**

College Intern

- Developed a software application in Matlab for conducting psychophysical experiments on the image quality of various printing devices and demonstrated software capability by designing and conducting an image quality experiment for the product under development

Patents

- A. Sarkar, "Methods for color correcting digital images and devices thereof", US Patent Application 14/195,517 filed by ColorModules Inc. on March 3, 2014

- A. Sarkar, L. Blondé, P. Morvan, "Apparatus for the classification of observers according to their visual characteristics", WIPO Patent Application WO/2011/124698, Pub. Date: October 13, 2011; International Application No. PCT/EP2011/055539, filed by Thomson Licensing, US Patent # 8,565,521 granted on October 22, 2013

- A. Sarkar, J.E. Caviedes, and M. Subedar, "Joint enhancement of lightness, color and contrast of images and video", US Patent #8,477,247, filed by Intel Corp., granted on July 2, 2013

- A. Sarkar, L. Blondé, J. Stauder, "Method for controlling an image display device to allow the same perception of colours over a large variety of observers", WIPO Patent Application WO/2011/124699, Pub. Date: October 13, 2011; International Application No. PCT/EP2011/055542, filed by Thomson Licensing on April 8, 2010

Publications

1. A. Sarkar, "CIE Special Metamerism Index: Change in Observer", Encyclopedia of Color Science and Technology, Chapter 11, Springer (work in progress)
2. A. Sarkar, F. Autrusseau, F. Viénot, P. Le Callet, L. Blondé, "From CIE 2006 Physiological Model to Improved Age-Dependent and Average Colorimetric Observers", Journal of the Optical Society of America (JOSA A), 28(10): pp. 2033-48, 2011
3. M. Fetudina, A. Sarkar, P. Urban, P. Morvan, "(How) Do Observer Categories Based on Color Matching Functions Affect the Perception of Small Color Differences?", in Proceedings of the 19th Color and Imaging Conference, San Jose, CA, 2011
4. P. Morvan, A. Sarkar, J. Stauder, L. Blondé, J. Kervec, S.K. Hasan, "A handy calibrator for color vision of a human observer", IEEE International Conference on Multimedia and Expo (ICME), Barcelona, 2011
5. A. Sarkar, L. Blondé, P. Le Callet, F. Autrusseau, J. Stauder, P. Morvan, "Toward Reducing Observer Metamerism in Industrial Applications: Colorimetric Observer Categories and Observer Classification", in Proceedings of the 18th Color and Imaging Conference, San Antonio, TX, 2010
6. A. Sarkar, L. Blondé, P. Le Callet, F. Autrusseau, J. Stauder, P. Morvan, "Modern displays: why we see different colors, and what it means?", 2nd European Workshop on Visual Information Processing (EUVIP/IEEE), Paris, 2010
7. A. Sarkar, L. Blondé, P. Le Callet, F. Autrusseau, J. Stauder, P. Morvan, "A color matching experiment using two displays: design considerations and pilot test results", in Proceedings of the CGIV 2010 conference, Joensuu, Finland, 2010
8. A. Sarkar, L. Blondé, P. Le Callet, F. Autrusseau, J. Stauder, P. Morvan, "How Modern Displays Push Conventional Colorimetry to its Limit", Colour in art, science, design, conservation, research, printmaking, digital technologies, textiles (CREATE), Gjøvik, Norway, 2010
9. A. Sarkar, L. Blondé, P. Le Callet, F. Autrusseau, J. Stauder, P. Morvan, "Study of Observer Variability on Modern Display Colorimetry: An Analysis of CIE 2006 Model", in Proceedings of the 11th Congress of the International Colour Association (AIC) 2009, Sydney, Australia, 2009

10. A. Sarkar, L. Blondé, P. Le Callet, F. Autrusseau, J. Stauder, P. Morvan, "Study of Observer Variability on Modern Display Colorimetry: Comparison of CIE 2006 Model and 10° Standard Observer", in Proceedings of the 11th Congress of the International Colour Association (AIC) 2009, Sydney, Australia, 2009

11. A. Sarkar, M.D. Fairchild, J.E. Caviedes, M. Subedar, "A Comparative Study of Color and Contrast Enhancement for Still Images and Consumer Video Applications", in Proceedings of the 16th Color Imaging Conference, Portland, OR, November 2008

12. A. Sarkar, M.D. Fairchild and C. Salvaggio, "Integrated Daylight Harvesting and Occupancy Detection Using Digital Imaging", *Electronic Imaging Conference,* San Jose, CA, USA, 2008

13. A. Sarkar and R. Mistrick, "A Novel Lighting Control System Integrating High Dynamic Range Imaging and DALI", *Invited Paper, IES Annual Conference*, Phoenix, AZ, USA, 2007

14. A. Sarkar and R. Mistrick, "A Novel Lighting Control System Integrating High Dynamic Range Imaging and DALI", *Journal of the Illumination Engineering Society* 2(4): 307-322, 2006

15. R. Mistrick and A. Sarkar, "A Study of Daylight-Responsive Photosensor Control in Five Daylighted Classrooms", *Journal of the Illumination Engineering Society* 1(3): 51-74, 2005

Programming Experience

Intensively use Matlab, C/C++ (Visual Studio - Windows), Xcode for Mac iOS programming (iPhone) and OpenCV library for image processing/computer vision; significant experience in Visual Basic.

Awards and Recognitions

- Mitsubishi Electric Research Laboratory (MERL) Best Student Paper Award at the 18th Color and Imaging Conference (CIC), San Antonio, Texas, November 8-12, 2010

- Raymond Davis Scholarship 2010 awarded by the Society for Imaging Science and Technology (IS&T), USA

- Best student project award at the 18th Summer School on Image Processing, Cluj-Napoca, July 2010 for the project *Photographs restoration for scratch removal and date superposition removal*

- Granted by the French government a highly selective, merit-based 3-year (2008-11) residency permit *Carte de Séjour Competences et Talents*, awarded to select individuals from various disciplines

- Awarded CIS-Kodak research grant for Innovative Graduate Student Research Proposal by the Center for Imaging Science, RIT in 2006; Project title: *A Proof-Of-Concept Application of Digital Imaging in Lighting Control – Integrating Daylight and Occupancy Sensing*.

- Awarded scholarship and graduate assistantship for graduate studies by the Center for Imaging Science, Rochester Institute of Technology during 2005-07

- Awarded graduate assistantship by Dept of Arch. Engineering, Penn State University during 2003-05

Professional Affiliation & Activities

Member: IS&T (Society for Imaging Science and Technology), ISCC (Inter-Society Color Council), SID (Society for Information Display)

Held a topical Reportership position R1-54 ("Variability in Color-matching Functions") in 2011-12 at Division 1 of the **CIE** (Commission Internationale de l'Eclairage) based in Vienna, Austria

Served as a reviewer for the Journal of Electronic Imaging (JEI) in 2012

Contributed to European Broadcasting Union (**EBU**) Project Group on Display's physical meeting at BBC Television Center, London on November 22, 2012 as a topical expert on color-matching functions and their applications in displays

Contributed to the authoritative Color and Vision Research Laboratory (**CVRL:** www.cvrl.org) database hosted by Prof. Andrew Stockman at the Institute of Opthalmology, University College, London