

Dr. Shyama Prosad Chowdhury

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Professional Summary (16+ Years):

- Sr. Manager, **IBM India Private Limited.**
Duration: June 2016 - To date
- Deputy General Manager, **Samsung R&D Institute - Delhi.**
Duration: Sept 2013 - June 2016
- Director - R&D, **Videonetics Technology Private Limited.**
Duration: Feb 2012 - Sept 2013
- Senior Member of Technical Staff (Part time), **Videonetics Technology Private Limited.**
Duration: Feb 2009 - Jan 2012
- Technology Leader – Research Unit, **Avisere Technology Private Limited.**
Duration: June 2004 - Nov 2008
- Project Assistant, Surveillance System Development Lab, CST, **B.E. College (D.U.), Sibpur (IEST).**
Duration: Sept 2003 - May 2004
- Project Fellow, Content Based Image Retrieval Lab, CST, **B.E. College (D.U.), Sibpur (IEST).**
Duration: July 2002 - Aug 2003

Education:

- PhD from the School of Electronics, Electrical Engineering and Computer Science, **Queen's University Belfast, UK, 4th July 2012.**
- M. E. in Computer Science and Engineering from **Bengal Engineering and Science University (IEST - B. E. College (D.U.), Shibpur), India, 2004, First Class (69.1%).**
- B. E. (Honors) in Computer Science & Engineering from **College of Engineering & Management, Kolaghat, India, 2002, First Class (74.5%).**

Managerial Contributions:

- Winning new business, Building trust and Clients management.
- Leading multiple technical teams of 100+ engineers.
- Formulation, Leadership and Execution of successful technology startup.
- Building Product roadmap, Timeline projection and Resource planning.
- Coaching, Goal setting, Performance evaluation and Crisis management.

Technical Expertise and Research Domains:

Image Processing, Computer Vision, Video Surveillance Systems, Content Based Image Retrieval, Machine Learning, Data Analytics, Intelligent Transportation Systems, Computer Graphics and Simulation, Intelligent Security System, Civil Aviation Signaling, Document Image Analysis, Machine Vision etc.

Teaching Experiences:

- Computational Geometry (2014 - 2016) **Samsung R&D Institute – Delhi**
- Algorithm and Data Structure (2013 - 2016) **Samsung R&D Institute – Delhi**
- Image Processing (2013 - 2014) **Samsung R&D Institute – Delhi**
- Information and Coding Theory (2011 - 2012) **BESU (IEST, Shibpur)**
- C Programming Laboratory (2011 - 2012) **Queen’s University Belfast**
- Virtual Reality Laboratory (2009 - 2012) **Queen’s University Belfast**
- C++ using Visual Studio Laboratory (2009 - 2011) **Queen’s University Belfast**
- Engineering Undergraduate’s Final Year Project (2004 – 2006) **CEMK (WBUT)**
- Computer Graphics Laboratory (2002 – 2004) **BESU (IEST)**

Detailed Professional Experience:

I) Major Contributions at IBM:

- 1) **Analytics Solutions Leveraging Sensory Data in Reinsurance:**
Conceptualized and proposed direction towards providing an insight to analytical applications for four different reinsurance business processes. It includes “Understanding and assessment of risk” and “Validation on claim investigation” using sensory data. Before this research no proven direction is reported to date towards building a solution to meet the practical business requirements. Novelty lies on consolidated discussion to help reinsurance business processes with the advancement of analytical solutions.

II) Major Contributions at Samsung:

- 1) **Automatic Sports Video Highlight Generation at Viewer’s End:**
Conceptualized, proposed, designed and lead the team to develop an intelligent cricket video analytics system. Automatic and customized Cricket Highlight using broadcasted signal was generated. Processing was done using TV processor without any internet connection or content provider’s (CP’s) data. The developed system was highly appreciated and extrapolated to further business expansion.
- 2) **Automatic Planetarium Show on TV about the Day’s Night Sky:**
Conceptualized, proposed, designed and lead the team to develop the intelligent TV application to show an indigenous runtime variable show about actual night sky objects. This app simulates and demonstrates information of 88 constellations with precise and exact positional information of more than 10,000 deep sky objects and planets. Considering automatic content generation, this is a pioneering TV app. Recognized as one of the highest impact scientific app on TV, this app is all set to revolutionize the TV viewing experience.

- 3) **SmartTV Viewer's Engagement Analysis using Watched Content:** Conceptualized, proposed, designed and lead the team to develop an intelligent TV application that analyses watched video content. This app generates a preference list by identifying channel logo, analyzing content of broadcasting signal, CP's data and downloaded data. Advertisement and content recommendation are future planned expansions.
- 4) **Moving Picture Blurriness Measurement and Jitter Detection on TV:** Lead the team to develop the solution to measure blurriness in the moving picture. It used a computer controlled camera platform that pans around its own axis. Mounted camera measures the blurriness of the pictures in motion with an auto synchronized pan speed. Picture jitter detection on UHD (4K and 8K) TV uses 4 synchronized cameras that grab 4 images together which are then analyzed to generate a composite report.
- 5) **Recommendation Engine for Million Songs for Club Samsung:** Lead the team to develop the solution to generate a low cost highly accurate recommendation engine for millions of songs in Club Samsung. This is a three-tier recommendation engine where first tier solely focused on content tag. Second tier is dedicated to user's sequential choice of music and the final tier is dedicated to the individual users.

III) Major Contributions at Videonetics:

- 1) **Security Solution in Airports:** Lead the team to develop a complete intelligent analytics-based security solution for Airport environment using Surveillance Cameras. The developed product is installed in 59 airports in India. This is the only intelligent camera-based security surveillance product that can be found in each and every airport in India.
- 2) **Automatic Extraction, Modeling and Analysis of Retail Statistical Data using Video from Surveillance Cameras:** Conceptualized, designed and lead the team to develop an innovative system that uses surveillance cameras to analyze human traffic behavior and characterizes its statistical pattern inside a Retail store or inside the shopping Mall. This automated system intelligently analyzes the video contents, generates many statistical measurements and analyzes statistical data. The product aids in efficient store management, optimal allocation of human resources, effective and intelligent product placement, improving service excellence and increasing customer satisfaction.
- 3) **Successful Tie Up between Videonetics and NLSS:** Lead the team to develop real time analytics suite for analyzing video data. This suite is further integrated with NLSS gateways that use cloud service. NLSS, USA is the winner

of the 2012 SIA New Product Showcase award in the Network Support Solutions category at ISC West for Next Level NLSS Cloud Services. The complete package is designed to provide highest level of security solution to the USA customers.

- 4) **Advanced City Surveillance and Traffic Monitoring Software:** Lead the team to develop analytics based advanced city traffic monitoring system to control traffic and enforce traffic rules. It contains several components including a vehicle's license plate recognition and accurate position estimation system which is developed to aid Police to maintain rules and regulation in a city.

IV) Major Research Contributions at Avisere:

- 1) **Surveillance System for Vehicle:** Designed and Implemented algorithms for real-time machine-vision based software (in C++) for the purpose of detecting and counting cars in the busy city street and drive-through of "Quick-Service-Restaurant".
- 2) **Human Detection and Tracking System:** Lead the Research team to design and implement algorithms for real-time machine-vision based software (in C++) for the purpose of monitoring (detection and counting) human movements in i) indoor & ii) outdoor scenes.
- 3) **People Count and Queue Detection inside Crowd:** Lead the Research team to find out a top level algorithmic design for a robust Multi-Camera based real-time machine-vision software for the counting the number of peoples inside the crowd and detect number of queue formation inside that crowd and individual queue length.

V) Project: Identifying the Numbers and Types of Vehicles Passing through the Toll-Plaza of Vidyasagar Setu

Client: Hoogly River Bridge Commission, Govt. of West Bengal.

Duration: 9 months (Pilot research project)

Description: Implemented a real-time machine vision-based system (in C) for identifying the numbers and types of vehicles passing through the toll-plaza of Vidyasagar Bridge, Kolkata. The system also indicates the appropriate amount of toll depending on the type of the vehicle. This enables the operator in charge to issue the same without looking at the vehicle manually. It was deployed during March-May, 2004 as a part of the pilot project.

VI) Project: Content Based Image Retrieval

Client: Intel Corp, USA

Duration: 14 Months (Research project)

Description: Sponsored Research project to develop new techniques in image retrieval without using any text tag. We devised a set of algorithms for color and texture modeling of a single object for the purpose of image based search engine. Three separate new algorithms were designed and implemented (in C) for i) segmentation of the object of interest from the scene ii) color modeling & iii) texture modeling of that object.

PhD Details:

Title:

Performance Analysis of Airport Ground Lighting using Computer Vision Techniques

Abstract:

Airport Ground Lighting (AGL) is critical to airport operations. It is used at airports to guide pilots during the visual acquisition of an airport, landing and also the take-off phases of their flight. It provides at night and at low visibilities, the same cues that a pilot would normally see in clear day time conditions.

Standard AGL configurations consist of runway luminaires that are inset into the surface. Approach luminaires, however, extend beyond the runway and are installed above ground level. It is important that the AGL is operating according to standards set by aviation governing bodies. One such standard indicates that the AGL pattern should appear uniform to the pilot, that is, luminaires should exhibit similar performance. Other standards indicate luminaires should have a given color, projection and luminous intensity.

However, due to the operating environment for these lighting systems it is difficult to maintain the individual luminaires and check they are operating as intended. As yet no device exists which can monitor the performance of the complete AGL pattern. Presently, airports can only assess the quality of their light output from flight tests with subjective observers and by taking spot readings using the appropriate lighting meters.

In our research, we propose using a comparison-based approach in order to determine a performance metric for the complete pattern. As such, for luminaires of similar luminous intensity, which are of similar or comparable distances away from the camera at the instant an image was recorded, it is possible to use the pixel grey level information in order to compare their performance. Using this theory, it is also possible to determine a comparative performance metric per luminaire.

Awards & Publications:

I) International Awards:

- 1) 2nd prize in "*IET Present Around the World Competition*" Awarded by **IET** Northern Ireland Network 2008, Belfast, UK.
- 2) IET Travel Award as a part of "*The IET Ambition Awards*" Awarded by **IET** 2011, UK.
- 3) Emily Sarah Montgomery Scholarships from "*Queen's University Belfast*" Awarded by **QUB** 2010 Belfast, UK.
- 4) Postgraduate Research Studentship 2008-09 to cover "*Oversees Fees*" and "*Maintenance allowance*" at Queen's University Belfast for the period of 2008 October to 2011 September. This University Studentship is to pursue PhD in the **School of Electronics, Electrical Engineering and Computer Science, Queen's University Belfast, UK.**
- 5) 1st prize in "*Page Segmentation Competition*", Awarded by **ICDAR** 2007 Curitiba, Parana, Brazil.
- 6) 2nd prize in "*Page Segmentation Competition*", Awarded by **ICDAR** 2003 Edinburgh, Scotland.
- 7) Honorable mention prize in "*ACM International Collegiate Programming Contest*", Awarded by **ACM ICPC-2003**.

II) National Awards:

- 1) 2nd prize in "IEEE Best Student Paper Award", All India Post Graduate Student Section; Awarded by IEEE: IAISC, 2004, India.
- 2) 1st prize in "IEEE Best Student Paper Award", All India Post Graduate Student Section; Awarded by IEEE: SPCTS, 2003, India.
- 3) Special mention award in "CSI Best Student Paper Award"; Awarded by Computer Society of India, CSI YITPA(E), 2003, India.
- 4) 2nd prize in "CSI Best Student Paper Award"; Awarded by Computer Society of India, CSI twenty-sixth Conference, 2001, India.

III) Professional Awards:

- 1) Grade Promotion with the responsibility of "**Research Team Coordinator**", *May 2005. Avisere Technology Private Limited, India.*
- 2) "Truly outstanding performance that results in extraordinary and exceptional accomplishments with significant contributions to objectives of the department and company" in **Innovation**, *May 2005, May 2006 and May 2007.*

Avisere Technology Private Limited, India. (I have won this award for consecutive three years)

- 3) “Truly outstanding performance that results in extraordinary and exceptional accomplishments with significant contributions to objectives of the department and company” in **Team Performance**, *May 2005 and May 2007. Avisere Technology Pate Limited, India.*
- 4) Grade Promotion with the responsibility of “**Technology Leader - Research Unit**”, *May 2007. Avisere Technology Private Limited, India.*

IV) Journal papers:

- 1) A Simple and Effective Table Detection System from Document Images, *International Journal on Document Analysis and Recognition*, Volume 8, Number 2, June 2006, pp. 172-182.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 2) Robust Extraction of Text from Camera Images using Colour and Spatial Information Simultaneously, *Journal of Universal Computer Science*, Volume 15, Number 18, December 2009, pp. 3325-3342.
Co-author(s): S. Dhar. K. Rafferty, A. K. Das, B. Chanda
- 3) Multiple Luminaire Identification in Airborne Images of Airport’s Approach Lighting Using Mathematical Morphology With Variable Length Structuring Element, *IEEE Journal of Selected Topics in Signal Processing*, Volume 6, Number 7, November 2012, pp. 876-885.
Co-author(s): K. Rafferty, S. Ferguson

V) Conference papers:

- 1) A Complete System for Document Image Segmentation, *National Workshop on Computer Vision, Graphics and Image Processing, WVGIP 2002*, Madurai, India, February 15–16, pp. 9-16, 2002.
Co-author(s): A. K. Das, B. Chanda
- 2) Automated Detection and Segmentation of Table of Contents Page from Document Images, *7th International Conference on Document Analysis and Recognition, ICDAR 2003*, Edinburgh, UK, August 3-6, Vol. I, pp. 398-402, 2003.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 3) Automated Segmentation of Math-Zones from Document Images, *7th International Conference on Document Analysis and Recognition, ICDAR 2003*, Edinburgh, UK, August 3-6, Vol. II, pp. 755-759, 2003.
Co-author(s): A. K. Das, S. Mandal, B. Chanda

- 4) Automated Detection and Segmentation of Table of Contents and Index Pages from Document Images, *12th International Conference on Image Analysis and Processing, ICIAP 2003*, Mantova, Italy, September 17-19, pp. 213-218, 2003.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 5) Automated Detection and Segmentation of Form Document, *5th International Conference on Advances in Pattern Recognition, ICAPR 2003*, Calcutta, India, December 10-13, pp. 284-288, 2003.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 6) Detection and Identification of Tabular Structures from Document Images, *2nd National Workshop on Computer Vision, Graphics and Image Processing, WCVGIP 2004*, Gwalior, India, February 21-22, pp. 28-31, 2004.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 7) Fully Automated Identification and Segmentation of Form Document, *International Conference on Computer Vision and Graphics, ICCVG 2004*, Warsaw, Poland, (LNCS, Springer Verlag, pp 953-961) September 22-24, 2004.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 8) A Complete System for Detection and Identification of Tabular Structures from Document Images, *International Conference on Image Analysis and Recognition, ICIAR 2004*, Porto, Portugal, September 29-October 1, pp. 217-225, 2004.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 9) A Very Efficient Table Detection System for Document Images, *4th Indian Conference on Computer Vision, Graphics and Image Processing, ICVGIP 2004*, Kolkata, India, December 16-18, 2004.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 10) A Hierarchical Method for Automated Identification and Segmentation of Forms, *8th International Conference on Document Analysis and Recognition, ICDAR 2005*, Seoul, Korea, August 29 - September 1, pp. 705-709, 2005.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 11) Detection and Segmentation of Tables and Math-Zones from Document Image, *21st Annual ACM Symposium on Applied Computing (Document Engineering Track), ACM SAC 2006*, Dijon, France, April 23--27, pp. 841-846, 2006.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 12) Detection and Segmentation of Table of Contents and Index Pages from Document Images, *2nd IEEE International Conference on Document Analysis for Libraries, DIAL 2006*, Lyon, France, April 27--28, pp. 70-81, 2006.
Co-author(s): A. K. Das, S. Mandal, B. Chanda

- 13) An Efficient Method for Graphics Segmentation from Document Images, *6th International Conference on Advances in Pattern Recognition, ICAPR 2007*, Calcutta, India, January 2-4, pp. 107-111, 2007.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 14) Segmentation of Text and Graphics from Document Images, *9th International Conference on Document Analysis and Recognition, ICDAR 2007*, Curitiba, Brazil, September 23-26, pp. 619-623, 2007.
Co-author(s): A. K. Das, S. Mandal, B. Chanda
- 15) Saving Electrical Power in a Surveillance Environment, *7th International Conference on Advances in Pattern Recognition, ICAPR 2009*, Kolkata, India, February 4-6, pp. 274-277, 2009.
Co-author(s): S. Sen. A. K. Das
- 16) Robust Extraction of Text from Camera Images, *10th International Conference on Document Analysis and Recognition, ICDAR 2009*, Barcelona, Spain, July 26-29, pp. 1280-1284, 2009.
Co-author(s): S. Dhar, A. K. Das, B. Chanda, K. McMenemy
- 17) Performance Evaluation of Airport Lighting using Mobile Camera Techniques, *13th International Conference of Computer Analysis of Images and Patterns, CAIP 2009*, Munster, Germany, Sept 2-4, pp. 1171-1178, 2009.
Co-author(s): K. McMenemy, J-X Peng
- 18) Localisation and Tracking of an Airport's Approach Lighting System, *International Conference of Computer Vision and Graphics, ICCVG 2010*, Warsaw, Poland, Sept 20-22, pp.19-26, 2010.
Co-author(s): K. Rafferty, A. K. Das
- 19) Confidence Factor Determination for Performance Evaluation of Lighting Pattern, *13th International IEEE Conference on Intelligent Transportation Systems, ITSC 2010*, Madeira Island, Portugal, Sept 19-22, pp.1380-1387, 2010.
Co-author(s): K. Rafferty, S. Ferguson
- 20) Simulation and Performance Assessment of Airport Landing Lighting, *13th International IEEE Conference on Intelligent Transportation Systems, ITSC 2010*, Madeira Island, Portugal, Sept 19-22, pp.1600-1607, 2010.
Co-author(s): K. Rafferty, S. Ferguson
- 21) Modelling 3D camera movement for vibration characterisation and multiple object identification with application to lighting assessment, *IEEE International Symposium on Robotic and Sensors Environments, ROSE 2011*, Montreal, Canada, Sept 17-18, pp.178-183, 2011.
Co-author(s): K. Rafferty, S. Ferguson

Others:**Hobbies:**

Sky Watching, Reading Books, Travelling

Associations and Memberships:

- IEEE Member
- Member of the Sky Watchers' Association, Kolkata
- President, South Asian Students' Society, QUB, UK (2008–2009)

(Shyama Prosad Chowdhury)