Dr. Debmalya Sinha

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INTERESTS High-Fidelity Rendering, Ray Tracing, Light Fields, Augmented Reality, non-polygonal geometry rendering, Global Illumination, Game Engine development, HDR, Highly Parallel SIMD computing, Machine Learning, and Computer Vision.

EDUCATION

Doctor of Philosophy (Ph.D.)), Computer Science and Engineering
University of Warwick, UK. Grad: 2018
Concentration: Computer Graphics, Light Fields, Augmented Reality
Thesis: Temporal Incident Light Fields.
Extensive Experience: High-fidelity Rendering, Light Fields, Ray Tracing, Global Illumination, Light Transport, Monte-carlo methods, Voxel Rendering, Augmented Reality, Rendering Engines, Unity, C++11, OpenGL, OpenCV, Adobe Actionscript, HDR, Image Processing, Design and Execution of Qualitative and Quantitative experiments.

Master of Science (MS), Computer Science and Engineering
Indian Institute of Technology Kharagpur, India. Grad: 2013
Concentration: Human Computer Interaction, Usability
Thesis: Development of a Bangla Linux for Rural Indian Users.

Bachelor of Technology (B.Tech), Computer Science and Engineering
West Bengal University of Technology, India. Grad: 2009

EXPERIENCE

Rendering Engineer Oct 2018 - present
Automaton Games Ltd., Cambridge, UK.

- Research and Development of a novel high-fidelity high performance rendering technique for massive game worlds.
- Developed a standalone non-polygonal rendering technique where any scene with infinite detail can be stored into a suitable hierarchical acceleration structures in a modified Sparse Voxel OctTree (SVO).
- Extensively optimised SIMD processing for data retrieval with GPU based screen-space ray tracing engine.
- A modified Russian Roulette (RR) technique to achieve 60FPS in 1080p with mid range GPUs(GTX 1060) carefully optimised to make interleaved frames look indistinguishable for the Human Visual System (HVS).
- Extensive experience in: Ray-tracing, Light transport, Light field caching, Global Illumination, Signed-distance functions, 3D mathematics, Monte-Carlo techniques, Sparse Voxel OctTrees, Modern graphics APIs (DX11-DX12, Vulcan), C++11, CryFX/CryCFI, Shader Programming, Deferred shading, CryEngine, Unreal Engine, GPGPU, Graphics hardware and SIMD processing, Human Cognitive Theory (HCT), Colour Theory, High Dynamic Range Image (HDRi) processing, High-performance High-fidelity Rendering.

Senior Engineer Nov 2017 - Oct 2018
TrueDR Ltd, Leamington-spa, UK.

- Research and Development of a real-time depth perception technique using floating point Extended Dynamic Range and HDR stereo video stream for safety

critical automotive application.

- Testing of a number of different camera sensors including unreleased, experimental sensors from Sony, Omnivision, Optina, and Canon.
- Development of camera data retrieval softwares for niche sensors operated by unreleased experimental APIs.
- Design of over 150 quality testing methods using real scenes. Development of a standalone ray tracer to render virtual scenes with accurate light transport. These virtual stereo videos were used as test cases as the depth of the scene was accurately known.
- Implemented various industry standard image processing and computer vision algorithms for the lack of off-the-shelf APIs (i.e OpenCV) with floating point operations.
- Extensive Experience in: Image Processing, HDR, stereo video processing, HDR video codecs, depth perception, computer vision, physically based rendering, GPGPU processing, OpenCL, MatLab, C++11, Panther API, Canon DX API, OpenGL, GLSL, HDR scene mapping, and designing real world experiments.

Research Scientist Feb 2013 - Feb 2014
National University of Singapore, Felicitous Computing Group, Singapore.

- Development of a emotion recognition system from Gait analysis.
- Unique approach to detect emotion in 2D space of Valence and Arousal.
- Implementation of an Artificial Neural Network to train and later detect the Valence/Arousal with the gait pattern captured with a Microsoft Kinect.
- Implementation predates GPU Machine Learning and Deep Learning thus back-propagation ANN was implemented in CPU with 78.2% detection accuracy.
- Experience in : Machine Learning, Neural Network, Emotion Theory, Affective Computing, Kinect API, C#, C++, GTK+2,

Fedora Ambassador March 2008 - Feb 2013
Fedora Project, Red Hat Software

- Raising awareness for contributing and using Free Libre Open Source Software (FLOSS) and Linux
- Holding "install fests" around the college campuses.
- Actively taking part in the fedora Linux community and contributing to many OSS projects including the Live USB module in Fedora 9.

PUBLICATIONS

- High-fidelity Rendering of Virtual Objects in Real Scenes with Temporal Incident Light Fields. Sinha, D, Debattista, K, Chalmers, C. (in communication)
- Natural arrangement: A novel and intuitive perspective on filesystem re- organization. Sinha, D, Basu, A, IHCI 2012
- Gardener: A file browser assistant to help users maintaining semantic folder hierarchy. Sinha, D, Basu, A, IHCI 2012
- Design and Evaluation of a Cognition Aware File Browser for Users in Rural India. Sinha, D, Basu, A, PerMIn 2012

TEACHING

Courses taught as Teaching Assistant at IIT Kharagpur:

- Introduction to Computer Programming (CS103) - 5 Semesters
- Operating Systems (CS204) - 1 Semester

Courses taught as Teaching Assistant at University of Warwick:

- Fundamentals of Fluid Mechanics (various) - 3 Semesters
- Parallel Computing (Dr. Debattista) - 1 Semester
- Fun with Programming (Dr. Low) - 2 Semesters

AWARDS

- Queen's Anniversary Prizes Fellowship, UK. - 2014
- Ministry of Human Resource Development Scholarship, India - 2010
- 99.2 Percentile in GATE - nationwide Graduate Aptitude Test in India. - 2009
- Podium finish in IIT Kharagpur Inter-Hall Badminton.

EXTRA CURRICULAR

- Indian Classical Vocalist (ex-Professional playback singer)
- Guitar and Piano player.
- Rowing and Badminton enthusiast.
- Poetry and Critical Analysis enthusiast. (Ex-Editor of three literary magazines.)