Dr. Debmalya Sinha

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INTERESTS

High-Fidelity Rendering, Ray Tracing, Light Fields, Light Transport, Augmented Reality, Game Engine development, HDRi, Machine Learning, and Computer Vision.

EDUCATION

Doctor of Philosophy (Ph.D.)), Engineering
University of Warwick, UK. Grad: 2018
Concentration: Computer Graphics, Light Fields, Augmented Reality
Thesis: Temporal Incident Light Fields.
Experience: Light Fields, Ray Tracing, Global Illumination, Light Transport, Montecarlo methods, Augmented Reality, Unity, C++11, OpenGL, OpenCV, Adobe Actionscript, HDRi, Design and Execution of Qualitative and Quantitative experiments.

Master of Science (MS) through Research, Computer Science and Engineering
Indian Institute of Technology Kharagpur, India. Grad: 2013
Concentration: Human Computer Interaction. GPA 8.89/10.0
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. GPA 8.27/10.0

EXPERIENCE

Rendering Engineer   August 2019 - present
Improbable Worlds Ltd., Cambridge, UK.
- Project 1: Research and Development of a high performance rendering technique for persistent minecraft style voxel worlds.
- Project 2: A networking friendly imposter generation for large number of rapidly moving animated entities.
- **Experience in:** Algorithmic efficiency in Ray-casting, Unreal Engine, Procedural geometry, Profiling.

Rendering Engineer   Oct 2018 - July 2019 (Firm went to administration)
Automaton Games Ltd., Cambridge, UK.
- Research and Development of a novel high-fidelity high performance rendering technique for massive game worlds.
- Developed a CryEngine based standalone non-polygonal rendering technique where any scene with infinite detail can be stored into a suitable Sparse Voxel OctTree (SVO) based hierarchical acceleration structure.
- Optimised SIMD processing for data retrieval with a screen-space ray casting engine with interleaved frames.
- **Experience in:** Ray-tracing, Voxel GI, SVO, DX11, C++11, Compute shaders, Deferred shading, CryEngine, Optimised SIMD processing, Human Cognitive Theory (HCT), Colour Theory, HDRi processing.

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.
- **Experience in:** Image Processing, HDR, stereo video processing, HDR video codecs, depth perception, computer vision, Physically-based rendering, 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. (Editor of various literary magazines.)