Aneeshan Sain *Curriculum vitae*

CONTACT INFORMATION

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RESEARCH INTERESTS

Computer Vision, Pattern Recognition, Image Processing, Machine Learning, Deep Learning.

EDUCATION

University of Surrey, UK since Oct 2019

- Centre for Vision, Speech and Signal Processing (CVSSP)
- Department of Electrical and Electronic Engineering
- Faculty of Engineering and Physical Sciences
- Current Status: Postgraduate Research Student

Institute of Engineering & Management, Kolkata (India) 2017
University: Maulana Abul Kalam Azad University of Technology
Formerly known as West Bengal University of Technology

- Department of Electrical Engineering
- DGPA: 8.14/10 (Including all 8 Semesters)
- Current Status: Graduated with Bachelor of Technology in Electrical Engineering
- B.Tech Thesis: *'Intelligent Battery Management System'*

St. Xaviers Collegiate School, Kolkata (India) 2013
- Indian School Certificate(12^{th} Standard)
- Aggregrate: 94.3%

St. Xaviers Collegiate School, Kolkata (India) 2011
- Indian Certificate for Secondary Education (10^{th} Standard)
- Aggregrate: 95.2%

REFEREED JOURNAL PUBLICATIONS

1. **Aneeshan Sain**, Ayan Kumar Bhunia, Partha Pratim Roy, Umapada Pal, "Multi-Oriented Text Detection and Verification in Video Frames and Scene Images", **Neurocomputing**, Elsevier**(I.F. - 3.317).** (DOI:10.1016/j.neucom.2017.09.089) [PDF]

   Highlights:

   - An efficient approach is proposed which is able to detect horizontal, non-horizontal and curved oriented texts in video frames and scene images.
   - The concept of skeletonization is proposed that improves the detection process of text region.
   - HMM verification is applied to improve the accuracy of results.
   - Finally, the framework has been tested with 4 different scripts(English, Chinese, Hindi and Bengali) to demonstrate its efficiency.

2. Chenqiu Zhao, **Aneeshan Sain**, Ying Qu, Yongxin Ge, Haibo Hu "Background Subtraction based on Integration of Alternative Cues in Freely Moving Camera", **IEEE Transactions on Circuits and Systems for Video Technology(CSVT) (I.F. - 3.558).** (DOI:10.1109/TCSVT.2018.2854273) [PDF]
   Highlights:

- An efficient approach is proposed to separate the foreground pixels from the background image in video frames obtained from a freely moving camera.
- A novel background subtraction framework has been applied to increase robustness of the proposed method.
- Finally the framework has been tested with FBMS dataset, and the results have been compared with other existing methods to demonstrate its efficiency.

3. Ayan Kumar Bhunia, Subham Mukherjee, **Aneeshan Sain**, Ankan Kumar Bhunia, Partha Pratim Roy, Umapada Pal, "Indic handwritten script identification using offline-online multi-modal deep network", **Information Fusion**, Elsevier**(I.F. - 10.716).** (Arxiv link) [PDF] (DOI:10.1016/j.inffus.2019.10.010)
Highlights:
   - A fresh approach towards word-level Indic script identification has been proposed here, that uses only character-level data in training stage.
   - A novel multi-modal deep network has been constructed that inputs both offline as well as online modalities of the data, for joint exploration of information.
   - Finally the framework has been tested against seven scripts, namely, Devanagari, Bangla, Odia, Gurumukhi, Tamil, Telegu and English, and compared the results with existing methods to demonstrate its efficiency.
   - Competitive results on both word and character levels using only character training.

Conference Publications

1. Ankan Kumar Bhunia, Ayan Kumar Bhunia, **Aneeshan Sain**, Partha Pratim Roy, "Improving Document Binarization via Adversarial Noise-Texture Augmentation", **ICIP 2019**. (Arxiv link) [PDF]
Highlights:
   - A novel adversarial learning approach has been applied to the classical Binarization Problem in Image Processing.
   - A Texture Augmentation Network has been constructed that transfers the texture element of a degraded reference document image to a clean binary image.
   - The two networks are jointly trained to increase the adversarial robustness of the system.
   - Finally the framework has been tested with DIBCO datasets, and the results have been compared with other existing methods to demonstrate its efficiency.

Research Experience

Nov 2015 to Oct 2017
Text detection in Video Frames/Scene Images,
Image Retrieval, Logo Detection.
Advisor: Prof. Partha Pratim Roy, Ph.D.
- Indian Institute of Technology, Roorkee, India.
Advisor: Prof. Dr. Umapada Pal , Ph.D.
- Head, Computer Vision and Pattern Recognition Unit.
- Indian Statistical Institute, Kolkata, India.

Oct, 2019 to Present
Modelling Hierarchy in Sketch Analysis,
Supervisor: Dr. Yi-Zhe Song, Ph.D.
- Dept. of Electrical and Electronics Engineering.
- CVSSP, University of Surrey, UK.
Co-Supervisor: Prof. Dr. Tao Xiang , Ph.D.
- Professor of Computer Vision and Machine Learning.
- CVSSP, University of Surrey, UK.

Relevant Projects

- Scene-text detection in Scene Image and Video Frames.
- Logo detection in Scene Images and Video Frame.
- Feature Design for Image Retrieval.
- Deep Learning Based Scene Text Detection
- Video Text Frame Categorization

Achievements

- Secured rank 3333 in WBJEE among 1.5 lakhs students, 2013.
- Secured state rank 963 in JEEMAINS, 2013.
- Got selected in Indian National Olympiad in Informatics 2013.
- Got selected in Zonal Informatics Olympiad 2013.
- Ranked 74 out of 2000 competitors in an online coding competition on Hackerrank.

Relevant Coursework

(i) Linear Algebra & Diff. Eqn. (ii) Statistics & Probability (iii) Control System
(iv) Digital Image Processing (v) Digital Signal Processing (vi) Signals and System

Technical Skills

- Programming Languages: C, C++, MATLAB, Python, JAVA, JCL, COBOL.
- Low level Programming : Atmel AVR (Atmega32) & 8085 Assembly, ASSEMBLER.
- ML Framework: Scikit-learn.
- Deep Learning Framework: Tensorflow, Pytorch.
- Hardware Exposure: AVR Micro-controller, Arduino.
- Mathematics: Linear-algebra, Probability, Statistics.
- Miscellaneous: OpenCV, LIBSVM library, HTK library.

Professional Experience

Organisation	: Cognizant Technological Solutions
Job Title	: Programmer Analyst
Role	: Mainframe Developer
Technology Used	: JCL,COBOL,ASSEMBLER

References

Dr. Yi-Zhe Song
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Dr. Partha Pratim Roy
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