A R N A B
GHOSH

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ABOUT ME

Master's student in Imaging Science with 3 years of experience in Computer Vision and Image Processing. Recognized for developing an Object Aware Surround View System and currently researching Shift Variant Image Deconvolution using Deep Learning and Numerical Simulation of Chiral Liquid Crystals.I am eager to apply this expertise to real-world challenges. Graduating Fall 2023.

SKILLS

● ● ● Programming Languages: Python, C++, C

● ● ● Deep Learning (CNN , GAN, Transformers, Auto Encoders) , Image Processing, Computer Vision, Deploying AI models on Jetson TX2

● ● ● PyTorch, Pytorch Lightning, NumPy, Scikit-Learn, OpenCV ,ImageJ,LaTeX

● ● ● Calculus , Probability and Statitics , Fourier Analysis, Fourier Optics

● ● ○ Calculus of Variation , Finite Element Methods,FENICS, MATLAB

● ● ○ Weights and Biases , Git

● ○ ○ CuDA, Tensorflow, TensorRTArduino, Embedded C, Wave Generation Circuits

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EXPERIENCE

GRADUATE RESEARCH ASSISTANT   2022-2023
Rochester Institute of Technology | Rochester, New York

- **Shift Variant Image Deconvolution using Deep Learning**:Developed a novel deep learning model that generates a restored deblurred image from a Shift-Variant blurred image. Improves the PSNR of the image by 0.2 dB compared to popular deblurring methods(Master Thesis)
- **Energy Minimization of Nematic Liquid Crystal**:Developed Computational Simulation of the director field of an Chiral Liquid Crystal under different constraints using Finite Element Method
- **Small Self-Supervised Contrastive Models**:Evaluated and performed hyper-parameter tuning to improve the performance of small self-supervised Contrastive models.
- **Narrow Band FIR Filter**:Designed a sharp cut-off FIR filter using a cascade combination of well-known frequency-response masking (FRM) technique and a recursive running sum (RRS) filter equalizer approach
- **Computer Generated Hologram**:As a part of Fourier Imaging curriculum, developed a codebase to generate printable holograms of 2-dimensional images.

GRADUATE TEACHING ASSISTANT   2021-2022
Rochester Institute of Technology | Rochester, New York

- Graded assignments and provided additional support to students for Imaging Science fundamentals coursework.

SENIOR ENGINEER   2018-2021
Larsen and Toubro Technology Services | Bengaluru, India
(Compute Vision Team)

- **PID Digitization**: Developed Image Processing and Machine Learning Algorithms for Extraction of Shapes and Symbols from hand-drawn degraded piping and instrumentation diagrams to aid digitization.
- **Bird Eye View Object Analytics**: Developed a Real-Time Alarm System based on Surround View video feed using Yolo-V3 and deployed it on Nvidia Jetson-TX2 for edge computing.
- **Action Recognition**: Developed and Optimized Action Recognition algorithm to classify videos based on actions like walking using STIP feature engineering on Nvidia-Jetson-TX2 for edge computing.

EDUCATION

M.S IN IMAGING SCIENCE   2021-2023
Rochester Institute of Technology | Rochester, New York

- Coursework: Deep Learning, Image Processing and Computer Vision, Probability and Noise, Fourier Optics, Fourier Imaging, Human Visual System, Radiometry,
- Thesis topic: "Shift Variant Image Deconvolution using Deep Learning"

B.E. IN INSTRUMENTATION AND ELECTRONICS ENGINEERING   2014-2018
Jadavpur University | Kolkata, India

- **Graduated First Class with Honours** ranking among top-2 in the department.
- Thesis: Prefilter-Equalizer Based Structure: A New Design Strategy for Narrow-band FIR Filters

ACHIEVEMENTS

Awards
- **Best Student Paper Award** at IEEE Western New York Image and Signal Processing Workshop (WNYISPW)
- **Employee of the Month Award** for contribution to the Compute Vision Team at Larsen and Toubro Technology Services

Scholarships
- Fully Funded Masters at Rochester Insititute of Technology

PUBLICATIONS

Articles

Ghosh, Arnab, Subhabrata Roy, and Abhijit Chandra (2018). "Prefilter-Equalizer Based Structure: A New Design Strategy for Narrow-band FIR Filters". In: *2018 IEEE Applied Signal Processing Conference (ASPCON)* 42, pp. 229–233. DOI: 10.1109/ASPCON.2018.874870.

Ghosh, Arnab and Grover Swartzlander (2023). "ShiVaNet: Shift Variant Deconvolution using Deep Learning". In: *Accepted in 2023 Western New York Image and Signal Processing Workshop (WNYISPW).*

CONFERENCES

IEEE WESTERN NEW YORK IMAGE AND SIGNAL PROCESSING WORKSHOP   2023
Rochester, New York

- Presented my research on Shift Variant Image Deconvolution using Deep Learning as a leading author

INDUSTRIAL ASSOCIATES SYMPOSIUM   2023
Rochester, New York

- Gave a presentation about my research on Shift Variant Image Deocnvolution and how to simulate shift varying blur compuatationally

ROCHESTER ACADEMY OF SCIENCE   2023
Rochester, New York

- Gave a presentation about my research on Shift Variant Image Deocnvolution and how to simulate shift varying blur compuatationally

REFERENCES

Dr. Grover Swartzlander
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