Shivam Chhirolya

8817558400 cshivam@iisc.ac.in/shivamchhirolya@gmail.com /shivam-chhirolya/ live:.cid.ec0a2aa1dfc2a8d1

Education

M.Tech in Artificial Intelligence **Sep. 2020 – June 2022**
Indian Institute of Science, Bangalore *CGPA: 8.30/10 (Rank 2^{nd})*

B.Tech in Electronics and Communication Engineering **Sep. 2015 – May 2019**
Jabalpur Engineering College Jabalpur, Madhya Pradesh *CGPA: 7.82/10*

Relevant Coursework

- Advance Deep Learning
- Pattern Recognition
- Digital Video
- Computer Vision
- Digital Image Processing
- Optimization
- Stochastic Models
- Linear Algebra

Internships

Video Systems Team, QUALCOMM Bangalore **Jun 2021 – July 2021**

Deep Learning-Based Post-Processing Algorithms for Video Compression Artifacts Removing

- Designed CNN architecture to remove different types of artifacts that occurred due to video compression using HEVC
- Residual Learning, Inception blocks from GoogleNet concepts used in CNN architecture
- Designed a GAN architecture with different types of Losses (VGG-19 perceptual loss, smooth loss, and M.S.E. loss)
- Tools: Pytorch, HM Encoder, HEVC, Qualcomm Encoder

Publications

Low-Light Video Enhancement by Learning on Static Videos with Cross-Frame Attention BMVC 2022

Projects

Low-Light Video Enhancement by Learning on Static Videos with Cross-Frame Attention **Jun 2022**

- The novel use of a cross-attention module that exploits inter-frame interactions for superior enhancement of dynamic videos despite the model being trained only on static videos.The use of dilated cross-attention for effective enhancement in videos with large motion.
- The creation of a novel dynamic low light video dataset that consists of real world distortions with synthetic motion for performance evaluation.
- Superior objective or subjective performance on multiple datasets of dynamic low-light videos when compared to other methods also trained on static videos.

Unsupervised Learning for Optical Flow **Sept 2021**

- Explored and reproduced the results of various optical flow algorithms (supervised and unsupervised) like Flow-Net, PWC-Net, PWC-net small, Un-flow, AR-flow.

SuperPoint & SuperGlue: Learning Feature Matching with Attentional Graph Neural Networks **Aug 2021**

- Finding feature points using SIFT & SuperGlue(Self Supervised) and feature matching using SuperGlue.
- Homographic Adaption, Attentional Graph neural networks, and optimal Transport techniques are used.

Deep Reinforcement Learning with Double Q-learning **June 2021**

- Implemented a specific adaptation to the D.Q.N. algorithm and showed that the resulting algorithm not only reduces the observed overestimations, as hypothesized but that this also leads to much better performance on several games.

Image Denoising using BM3D Algorithm and Analysis of Parameters **Apil 2021**

- Implement BM3D algorithm from scratch and experimentally analyze parameters like block size, number of blocks in a group, grouping threshold, type of transforms (D.C.T., Wavelet), etc.

Link Prediction System for Social Network **Mar 2021**

- calculated Jaccard Score, Katz Score, and Commute and Hitting time (Implemented in C).

Image Compression using Principal Component Analysis **Jan 2021**

- Implement and understand the P.C.A. algorithm from scratch (using MATLAB) for image compression.
- Analyze the error between an original image and a compressed image for different principal components.

Technical Skills

Languages | **Tools**: Python, C, MATLAB, PyTorch, Numpy, OpenCV.
Technical: Video / Image Processing, Computer Vision, Machine Learning, Deep Learning, Optimization Algorithms.

Academics Accomplishments | Extracurricular

- **Selected among the top 40 prestigious students from all India for Reliance Foundation Scholarship in Artificial Intelligence and Computer Science for the year 2020-21.**
- 99.60^{th} Percentile in GATE 2020, Electronics & Communication Engineering.
- TA for courses : Pattern Recognition and Neural Networks, Digital Image Processing
- Subject Matter Expert in Electrical Engineering at CHEGG and Mentor Online Communities at Shiksha.com