Aarush Gupta

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Education

Indian Institute of Technology Roorkee *Roorkee, India*
B.Tech. in Computer Science & Engineering *2016 - Present*

- Cumulative Grade Point Average: 8.727/10

DAV Senior Secondary School (Lahore) *Chandigarh, India*
Senior Secondary Education *2014 - 2016*

- Secured 90.4% in 12th standard (Examination conducted by Central Board of Secondary Education, India).

Navy Children School *Port Blair, India*
Secondary Education *2012 - 2014*

- Secured 10.0/10.0 CGPA in 10th standard (Examination conducted by Central Board of Secondary Education, India).

Publications

An Attention Model for Group-Level Emotion Recognition *ICMI 2018*
Aarush Gupta* | Dakshit Agrawal* | Hardik Chauhan | Jose Dolz | Marco Pedersoli ***Paper Link***

Gupta, Aarush, Dakshit Agrawal, Hardik Chauhan, Jose Dolz, and Marco Pedersoli. "An Attention Model for group-level emotion recognition." In Proceedings of the 2018 on International Conference on Multimodal Interaction, pp. 611-615. ACM, 2018.

Experience

Harvard University, Cambridge, USA *Cambridge, USA*
Research Internship | SN Bose Scholars Program | Prof. Hanspeter Pfister *May 2019 - Present*

- Worked on developing a connectivity-aware segmentation algorithm to detect instances of mitochondria in EM brain volumes.
- Experimented with using skeleton representations to preserve connectivity of articulate instances.
- Used a hybrid UNet model with both 2D and 3D modules and squeeze-and-excitation layers to regress the skeleton-based watershed energy of instances.
- Developed a post-processing pipeline to get the segmentation map from regressed distance transform.
- Preparing submission for IEEE Transactions on Medical Imaging and working on extending the method to the Cityscapes and SK-Large datasets.
- **[Report Link] [Presentation Link]**

Indian Institute of Science Bangalore, India *Bangalore, India*
Research Internship | Dr. Venkatesh Babu *Dec 2018 - Jan 2019*

- Developed an encoder-decoder architecture to generate a high dynamic range image from a group of images captured with different exposure settings.
- The encoder extracts brightness variant and invariant features of each image in the exposure stack.
- The brightness variant features of each image are fused together and stacked with the invariant features to obtain an aggregate representation of the HDR image.
- The aggregate representation is fed into the decoder (trained to reconstruct images) to generate an output image with a balanced exposure level.

École de Technologie Supérieure Montréal *Montral, Canada*
Research Internship | Dr. Marco Pedersoli | Prof. Jose Dolz *May 2018 - Jul 2018*

- Developed a two-branched neural network for jointly learning the scene and facial features of an image for group-level emotion recognition.
- The model was submitted to ICMI 2018 EmotiW Group-Level Emotion Recognition Challenge and achieved **4th rank** among all participants. A short paper for the same was accepted for publication in ACM International Conference on Multimodal Interaction 2018.
- **[Paper Link] [Presentation Link] [Poster Link] [GitHub Link]**

Projects

Explainable Medical Diagnosis Using Deep Learning

IIT Roorkee

Bachelor Thesis Project | Prof. Marco Pedersoli | Prof. Jose Dolz | Prof. Balasubramanian Raman

Aug 2019 - Present

- Developing a deep learning model to generate radiograph reports with visually grounded evidence.
- Established and trained 3 state of the art baselines on the IU-XRay dataset.
- Developed an improved method for marking regions of the X-Ray conducive for generation of particular sentences in the diagnosis.
- **[Report Link] [Poster Link]**

Triplet VAE for Zero-Shot Learning

IIT Roorkee

Undergraduate Research Project | Prof. Biplab Banerjee

Jan 2018 – Apr 2018

- Developed a Zero-Shot Learning classifier matching the SOTA performance on the Animals with Attributes dataset.
- Used Deep Metric Learning to learn a joint latent embedding of the visual and semantic features of the data points using a custom VAE based on the Triplet Loss function.

Unsupervised Human Action Detection in Videos

IIT Roorkee

Undergraduate Research Project | Prof. Biplab Banerjee

Aug 2017 – Jan 2018

- Developed a model which divides a video into clusters of video frames based on the human actions depicted by the frames.
- Implemented Spectral Clustering, using the Normalized Cuts Algorithm, for unsupervised clustering of video frames which constitute a common human action.
- Used Gaussian Mixture Models and Conditional Random Fields for incorporating the temporal features of the frames into the clustering algorithm.

Other Significant Projects and Contributions

Some other significant projects are as follows:

- **Deep Learning Topics:** Made a GitHub repository (300+ stars) listing essential topics for Deep Learning interviews. **[GitHub Link]**
- **Deep Learning Survey:** Prepared a short report on Deep Learning as a part of a course project. **[Report Link]**
- **Sentiment Analysis:** Trained various DL models on Kaggle's Twitter Dataset for tweet sentiment prediction.

Achievements

2019 **SN Bose Scholar**: awarded by IUSSTF to nurture future innovators and thought leaders **[Link]**.

2016 **All India Rank 363**: Joint Entrance Examination(Advanced); 200,000 candidates

2016 **Air India Rank 3436**: Joint Entrance Examination(Mains); 1,000,000 candidates

2015 **KVPY Fellowship Holder**: highly prestigious national fellowships awarded by **Indian Institute of Science** and **Government of India** to students who show talent and aptitude in research **[Link]**

Extracurricular Activities

Vision & Language Group (VLG)

IIT Roorkee

Co-President

Jul 2018- Present

- Core member of VLG, a student group that promotes **Deep Learning research culture** in the campus by discussing relevant research papers and working on related projects. **[Link]**.
- Involved in overall planning of the group, including organizing and moderating paper discussions, contributing to projects, etc.

ACM Student Chapter

IIT Roorkee

Vice-Chair

Juy 2019- Present

- Vice-Chair of the IIT Roorkee student chapter of ACM, which aims at uniting the computing fraternity at IIT Roorkee under one tag and allowing the students to learn together as well as share their knowledge of different CS domains.

Student Mentorship Program

IIT Roorkee

Student Mentor

2018-Present

- Mentoring freshmen for their smooth transition to campus life, motivating their academic and co-curricular endeavors.

Faculty Development Program

IIT Roorkee, India

Teaching Assistant

Apr 2018

- Delivered a tutorial on Keras and MNIST digit classification as a part of faculty development program organized by Electronics and ICT Academy.