

Aarush Gupta

COMPUTER SCIENCE GRADUATE · INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, INDIA

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Education

Indian Institute of Technology Roorkee

Roorkee, India

B.TECH. IN COMPUTER SCIENCE & ENGINEERING

2016 - 2020

- Cumulative Grade Point Average: 8.81/10

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).

Accepted Publications

MitoEM Dataset: Large-scale 3D Mitochondria Instance Segmentation from EM Images

MICCAI 2020

DONGLAI WEI | ZUDI LIN | DANIEL FRANCO BARRANCO | NILS WENDT | XINGYU LIU | WENJIE YIN | XIN HUANG | **AARUSH GUPTA** |

[Paper Link](#)

WON-DONG JANG | XUEYING WANG | IGNACIO ARGANDA-CARRERAS | JEFF LICHTMAN | HANSPETER PFISTER

Wei D. et al. (2020) MitoEM Dataset: Large-Scale 3D Mitochondria Instance Segmentation from EM Images. In: Martel A.L. et al. (eds) Medical Image Computing and Computer Assisted Intervention – MICCAI 2020. MICCAI 2020. Lecture Notes in Computer Science, vol 12265. Springer, Cham.

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

Rephrase.ai

Bangalore, India

RESEARCH ENGINEER

May 2020 - Present

- Working on the video generation pipeline for the Rephrase.ai product: generating personalized human speaker videos from audio.
- Experimented with a neural network that learns emotions in an unsupervised manner while generating the facial features from audio.
- Integrated a neural network module into the facial feature generation pipeline to control basic emotions in the generated videos.
- Developed a neural rendering GAN which seamlessly integrates a rendered mouth on a person's face generating temporally consistent video frames (work done as an intern in Winter 2019).
- Currently working on improving the lip synchronization in generated videos of Indian speakers.

Harvard University

Cambridge, USA

RESEARCH INTERNSHIP | SN BOSE SCHOLARS PROGRAM | PROF. HANSPETER PFISTER | DR. DONGLAI WEI

May 2019 - Jul 2019

- Worked on developing a connectivity-aware segmentation algorithm to detect instances of mitochondria in the MitoEM dataset.
- Used a hybrid UNet model with both 2D and 3D modules and squeeze-and-excitation layers to regress the skeleton-based watershed energy for each instance.
- Developed a marker-based watershed pipeline to obtain the final segmentation from regressed energy maps with false merges automatically resolved.
- [\[Report Link\]](#) [\[Presentation Link\]](#)

Indian Institute of Science Bangalore

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

Automatic Chest X-Ray Report Generation

IIT Roorkee

BACHELOR THESIS PROJECT | PROF. BALASUBRAMANIAN RAMAN

Sept 2019 - Apr 2020

- Developed a deep learning model to generate chest radiograph reports with visually grounded evidence.
- Established and trained a dual-LSTM + disease classifier baseline on the IU-XRay dataset.
- Mined the dataset for labels to capture the broad class of abnormalities that have been recorded in the dataset and designed a knowledge graph depicting relationships between these abnormalities.
- Integrated a spatial attention module and a graph based explanation module into the dual-LSTM model to induce a stronger prior into the model.
- [\[Report Link\]](#) [\[Presentation Link\]](#)

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 - Apr 2020

- 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

July 2019 - Apr 2020

- 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 - 2020

- 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.

References

Prof. Hanspeter Pfister

Cambridge, USA

AN WANG PROFESSOR OF COMPUTER SCIENCE, HARVARD UNIVERSITY

Email: pfister@seas.harvard.edu

Prof. Marco Pedersoli

Montreal, Canada

ASSISTANT PROFESSOR, ÉCOLE DE TECHNOLOGIE SUPÉRIEURE (ETS), MONTREAL

Email: marco.pedersoli@etsmtl.ca

Prof. Biplab Banerjee

Mumbai, India

ASSISTANT PROFESSOR, CENTRE OF STUDIES IN RESOURCE ENGINEERING, IIT BOMBAY

Email: bbanerjee@iitb.ac.in

Nisheeth Lahoti

Bangalore, India

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