Ankita Ghosh

(+91) 88507 08677 . ghoshankita0907@gmail.com
Website . LinkedIn . GitHub . Google Scholar

Profile

Specialised in the field of deep learning, computer vision and image processing, also exploring computer graphics and interaction. Ardent coder with keen interest in research.

Education

Manipal Institute of Technology 2018 – Present
B.Tech in Computer Science and Engineering (Minor in Graphics and Visualization) *CGPA: 9.25/10*

Hiranandani Foundation School, Thane 2016 – 2018
Higher Secondary (ISC) *93.8%*

Hiranandani Foundation School, Thane 2006 – 2016
Secondary School (ICSE) *97.7%*

Experience

Mitacs Research Intern June 2021 – September 2021
University of Waterloo *Waterloo, Ontario*

- Recipient of the **Mitacs Globalink Research Internship** and accompanying scholarship.
- Worked under the supervision of **Dr. Moojan Ghafurian** and **Dr. Kerstin Dautenhahn** at the **Social and Intelligent Robotics Research Laboratory** to develop an emotion recognition system which can be deployed on social robots.
- Worked on the social robot **Furhat** and implemented **Affect Control Theory** after conducting literature review on computational emotion models.
- Designed **facial expressions** for Furhat robot using **Facial Action Coding System** and developed a model which maps emotions to facial gestures.

Undergraduate Research Assistant April 2021 – Present
Manipal Institute of Technology *Manipal, India*

- Working under **Dr. Harish Kumar J. R.** on a deep learning project in the field of opthalmology, submitting research paper to IEE TMI Journal.
- Developed a model for **fovea disc segmentation** using semi-supervised learning built on DeepLabV3+ architecture with ResNet as the backbone.
- Working on **macular degeneration classification** using multi-task deep learning.

Undergraduate Research Assistant November 2019 – November 2020
Kumudha Health Tech. Pvt. Ltd. *Manipal, India*

- Worked under the guidance of **Dr. Hareesha K S** to render anatomical parts in a **virtual environment using Oculus Rift**, aided by software like 3D Slicer and Unity.
- Used Insight Toolkit and Visualization Toolkit to perform image processing operations like **registration and fusion on medical data**.
- Developed **Graphical User Interface** for the project using Qt Software.

Co-Founder and Technical Head July 2020 – Present
The Research Society – MIT *Manipal, India*

- Founded the Research Society at Manipal Institute of Technology with the core aim of promoting inter-disciplinary research, publishing papers and securing funding for projects and patents across **10 domains** including AI, Electronics, Design and Psychology, Biotechnology etc.
- In addition to **hosting numerous webinars** with top researchers and conducting interactive sessions to foster research collaborations in our forming year, we had **15 papers** accepted in prominent international journals and conference proceedings like ICML, CVPR, ACL and IEEE.
- Administered a student body of **100+ members** by managing project timelines and mentorship, executing collaborative events and resolving conflicts.
- Currently involved in providing active guidance to undergraduate students on research projects in the fields of deep learning and computer vision.

Projects and Research Work

Extraction of Color Information from Images for Generation of Colored Sketches August 2021

Accepted at New in ML workshop at NeurIPS 2021 *arXiv* | *GitHub* | *Demo*

- Applied image processing techniques and **unsupervised learning** to quantize and extract colours in images and render sketches with coloured outlines.
- Used **conditional GANs** for image to coloured sketch generation with the help of colorspace manipulation.

Semi-Supervised Classification and Segmentation on Aerial Images May 2021

Accepted at Tackling Climate Change with Machine Learning workshop at NeurIPS 2021 *arXiv* | *GitHub* | *Demo*

- Worked on dataset with only 25% labels for 1450 datapoints and a **class imbalance of ratio 6:1**.
- Generated pseudo-labels to perform **semi-supervised classification** using ResNet18 model which fetched test accuracy of **96.70%**.
- Developed **semi-supervised multi-class segmentation** pipeline for 10 classes by comparing various architectures like UNet, DeepLabV3+ and PSPNet.

ExplainableAI: Variations of Score-CAM Algorithm September 2020

Accepted as extended abstract in Responsible Computer Vision workshop, CVPR'21 *arXiv* | *GitHub*

- Developed two novel algorithms– SS-CAM and IS-CAM, by integrating **SmoothGrad** and **IntegratedGrad** algorithms with **Score-CAM** respectively.
- Performed evaluations based on **faithfulness**, **localization**, and **visual comparisons** on the ImageNet dataset for architectures VGG-16, SqueezeNet1.0 and ResNet18. Our algorithms perform better or at power with the state of the art- AUC insertion: **48.13%**, AUC deletion: **9.92%**, Localization: **43.52%**

Lane Detection Algorithm for Autonomous Vehicles March 2019

Mars Rover Manipal research member, globally 8th rank holder in University Rover Challenge 2019 *GitHub*

- Built an algorithm by combining the **SegNet** and **LSTM** deep learning architectures. Test accuracy: **93.5%**
- Performed image processing techniques using OpenCV to determine radius of curvature and other features of the lane like edge detection, offset calculation etc.

Technical Skills and Certifications

Languages: Python, C, C++, Java, Kotlin, MATLAB, GNU Octave, SQL, Linux Shell Scripting, HTML, CSS
Tools and Libraries: OpenCV, NumPy, SciPy, Pandas, Matplotlib, Scikit-learn, Keras, Tensorflow, PyTorch, Insight Toolkit, Visualization Toolkit, Qt Creator, 3D Slicer, Unity, Visual Studio
Certifications: Deep Learning Specialization (Coursera), Image and Video Processing (Coursera)

Extracurricular

Member of ACM-Women in Computing September 2019-present

Agile participant in the ongoing activities, events and panels of the student club. Providing mentorship to female undergraduates with the aim of creating a community for women in STEM.

Writer in Manipal The Talk Network August 2020-April 2021

Wrote and published a plethora of articles ranging from informative articles on technology to creative pieces on literature in the largest independent media organization in Manipal, Karnataka.

Volunteer at Teach Code for Good, Manipal October 2019-October 2020

Tutored underprivileged students in a needful school on Computer Science topics and programming languages like Python and HTML.