

Ankita Ghosh

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PROFILE

My research interest and experience lies in the field of deep learning, computer vision and image processing. I am also exploring computer graphics and interaction.

EDUCATION

Manipal Institute of Technology <i>B.Tech in Computer Science and Engineering (Minor in Graphics and Visualization)</i>	2018 – Present CGPA: 9.25/10
Hiranandani Foundation School, Thane <i>Higher Secondary (ISC)</i>	2016 – 2018 93.8%
Hiranandani Foundation School, Thane <i>Secondary School (ICSE)</i>	2006 – 2016 97.7%

EXPERIENCE

Mitacs Research Intern <i>Social and Intelligent Robotics Research Laboratory, University of Waterloo</i>	June 2021 – September 2021 Waterloo, Ontario
<ul style="list-style-type: none">Recipient of the Mitacs Globalink Research Internship and accompanying scholarship of 15,000 CAD.Worked under the supervision of Dr. Moojan Ghafurian and Dr. Kerstin Dautenhahn 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 extensive literature review on computational emotion models like ALMA, TAME, MA/SDEC, etc.Designed facial expressions for Furhat robot using Facial Action Coding System and developed a model which maps emotions to facial gestures.	
Undergraduate Research Assistant <i>Manipal Institute of Technology</i>	April 2021 – Present Manipal, India
<ul style="list-style-type: none">Working under Dr. Harish Kumar J. R. on a deep learning project in the field of ophthalmology, submitting research paper to IEEE TMI Journal.Developed a model for fovea disc segmentation using semi-supervised learning built on DeepLabV3+ architecture with ResNet-18 as the backbone.Working on macular degeneration classification using multi-task deep learning.	
Undergraduate Research Assistant <i>Kumudha Health Tech. Pvt. Ltd.</i>	November 2019 – November 2020 Manipal, India
<ul style="list-style-type: none">Worked under the guidance of Dr. Hareesha K S to render anatomical parts in a virtual environment using Oculus Rift, aided by 3D Slicer, Unity and other software.Used Insight Toolkit and Visualization Toolkit to perform image processing operations like registration and fusion on medical data.Developed Graphical User Interface to perform real-time processing operations on data using Qt Software.	
Co-Founder and Technical Head <i>The Research Society – MIT</i>	July 2020 – Present Manipal, India
<ul style="list-style-type: none">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 colors in images and render sketches with colored outlines.
- Used **conditional GANs** for image to colored sketch generation with the help of colorspace manipulation.

Semi-Supervised Classification and Segmentation on Aerial Images May 2021

*Accepted at Tackling Climate Change with ML workshop at **NeurIPS 2021** [arXiv](#) | [GitHub](#) | [Demo](#)*

- Worked on a dataset of 1450 datapoints with only 25% labels and a **class imbalance of ratio 6:1**.
- Generated pseudo-labels to perform **semi-supervised classification** using ResNet-18 model which fetched test accuracy of **96.70%**, an **increase of 3%** with less than **half the parameters** compared to the FloodNet paper.
- 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 in Responsible Computer Vision workshop, **CVPR 2021** [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 are on par 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** 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, Linux Shell Scripting

Tools and Libraries: OpenCV, NumPy, SciPy, Pandas, Matplotlib, Scikit-learn, PyTorch, Keras, Tensorflow, 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 fields.

[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.