

SAHIL KHOSE

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EXPERIENCE

Artificial Intelligence and Robotics Lab (AIRL), IISc Bangalore

AI Research Intern

July 2021 - Present

- Working on **Continual Generalized Zero-Shot Learning (CGZSL)** under Dr Suresh Sundaram.
- Working on Sketch Based Image Retrieval and Object Recognition in a CGZSL setting.

Manipal Institute of Technology (*Prof Harish Kumar J.R.*)

AI Research Intern

April 2021 - Present

- Developed a model for **fovea disc segmentation** using semi-supervised segmentation.
- Working on **macular degeneration classification** using multi-task deep learning.

Project MANAS

AI Perception Member

Feb 2019 - May 2021

- Worked on a AGV for the **27th Intelligent Ground Vehicle Competition** held at Michigan, USA
- Worked on building a **level 2-3 autonomy** car on Indian roads for the Mahindra **\$1Million Challenge**.

PUBLICATIONS

BERT based Transformers lead the way in Extraction of Health Information from Social Media

Published in proceedings of **NAACL 2021** [\[GitHub\]](#) [\[achweb\]](#)

Apr 2021

- ADE classification:** Handled a **7% 93% class imbalance** dataset. Trained *RoBERTa* and *BioBERT*. Achieved valid F1: 85% test F1: 61%. **[Rank: 1]** (*ADE: Adverse Drug Effects*)
- ADE span detection:** *RoBERTa* based NER pipeline. Achieved valid F1: 54% test F1: 50%. **[Rank: 2]**
- COVID classification:** *RoBERTa*, *DeBERTa*, *Covid-Twitter BERT*, *BERTweet*, and *ensemble* were trained for the 3 class classification problem. Achieved valid F1: 99% test F1: 94%. **[Rank: 2]**

Semi-Supervised Classification and Segmentation on High Resolution Aerial Images

Submitted to workshop at **NeurIPS 2021** [\[GitHub\]](#) [\[arXiv\]](#) [\[Blog\]](#) [\[Demo\]](#)

May 2021

- Handled a dataset of 1450 images with just **25% labelled** data and a **class imbalance of 12.5% 77.5%**.
- ResNet18 with our implemented semi-supervised pipeline fetched **96.70% test** accuracy beating the best model of the **FloodNet** paper by a **huge 3% margin** with **less than half** the parameters.
- Implemented a **semi-supervised multi-class segmentation** pipeline for 10 class segmentation. DeepLabv3+ with a EfficientNet-B3 backbone fetched us 52.23% mIoU on the test set.

XCI-Sketch: Extraction of Color Information from Images for Generation of Colored Outlines and Sketches

Submitted to workshop at **NeurIPS 2021** [\[GitHub\]](#) [\[arXiv\]](#) [\[Demo\]](#)

Aug 2021

- c-GAN for image to colored sketch generation and an unsupervised method for rendering colored outlines.

A Studious Approach to Semi-Supervised Learning

Submitted to workshop at **NeurIPS 2021** [\[GitHub\]](#) [\[arXiv\]](#)

Sep 2021

- Distillation for semi-supervised learning producing better and smaller models for real-time deployment.

PROJECTS

- Self-Driving Car and AGV - Project MANAS** [[GitLab](#)] *Feb 2019 - May 2021*
- Successfully implemented **Lane Detection, Speed Bump Detection, Driving Imitation System, Depth map generation** using multiple camera and LiDAR input using Deep Learning.
- StackGAN for text to image generation** [[GitHub](#)] *Oct 2020*
- Implemented the **StackGAN** (2 stage GAN) architecture from scratch in PyTorch with enhanced BERT data representations for synthesizing photo realistic bird images from their textual descriptions.
- QANet for SQuAD 2.0 (Question-Answering)** [[GitHub](#)] *Sep 2020*
- Implemented the **QANet** architecture from scratch in PyTorch consisting exclusively of convolution and self-attention, achieving **13x** faster train & **9x** faster inference than the BIDAf model (previous SOTA)
- Stock Prediction using Hyper Graphs** [[GitHub](#)] *Aug 2020*
- Developed a Hypergraph structured dataset and built a Hypergraph NN based architecture with **Hyper-graph CNN, BERT, LSTM and attention network** for stock prediction of 500 stocks over time.
- Neural Machine Translation** [[Demo](#)] [[GitHub](#)] *July 2020*
- Built a Neural Machine Translation model using a seq2seq bi-LSTM architecture with attention and hybrid character-word level language modelling. Achieved **37 BLEU** on Spanish-English translation.

ACHIEVEMENTS

- Project MANAS stood **World Rank 1** at the 27th Intelligent Ground Vehicle Competition (IGVC 2019).
- **IGVC Awards:** Interoperability - 1st, Design - 2nd, Cybersecurity - 3rd, Grand prize - Lescoe Cup
- Project MANAS won the Million Dollar Mahindra Rise Prize. (**top 13 out of 153 teams in India**)
- Led a team of 3 to secure an **All India Rank 19** in the Flipkart GRiD 2.0 - level 1
- Led a team of 4 to secure **Rank 1** in Google Hash Code 2020 in Manipal hub, ranked 500 in India

TECHNICAL SKILLS

Programming	Python, C++, Java, C
Libraries & Tools	PyTorch, NumPy, OpenCV, Matplotlib
Experienced in	Computer Vision, NLP, Zero-Shot Learning, Semi-supervised learning, Distillation

EDUCATION

Manipal Institute of Technology	<i>2018-2022</i>
BTech CCE (<i>Minor in Big Data</i>)	<i>CGPA: 8.49</i>

EXTRA CURRICULARS

- FruitPunch AI** (AI expertise head) Aug 2021 - Present
- Leading the first chapter in India to organise **AI for Good Challenges** for nonprofits.
- YouTube Channel** (Online Educator) June 2021 - Present
- Conducts **weekly presentations** on cutting edge research papers in the field of AI.
- Research Society Manipal** (AI division mentor) Nov 2020 - Present
- **Mentoring** and **guiding** several students to pursue research in the field of Deep Learning.