ADITYA KANE

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AREAS OF INTEREST

Efficient ML, Multimodal Large Language Models, Generative Models, Interpretability, Lifelong Learning

EDUCATION

Georgia Institute of Technology Fall 2023 - Present
MS in Computer Science

Pune Institute of Computer Technology, Pune (Affiliated to Savitribai Phule Pune University) 2019-2023
Bachelor of Engineering in Computer Engineering with Honors in Artificial Intelligence and Machine Learning
*CGPA: **9.728 / 10***

EXPERIENCE

Graduate Student Researcher | SHILabs, Atlanta August 2023 - Present
Prof. Humphrey Shi | *Computer Vision*

- Working on **multimodal large language models**. Currently exploring methods to improve the visual representations passed to the LLM.
- Working on **efficient vision transformers**. Currently exploring token reduction strategies to reduce computation. Exploring methods to make heirarchical vision transformers faster and more accurate.
- **Head Graduate Teaching Assistant** for CS6476: Computer Vision for Fall 2023.

Research Intern | Indian Institute of Science, Bengaluru May 2022 - December 2022
Prof. Suresh Sundaram and Dr. Chandan Gautam | *Out-of-Distribution (OOD) Detection and Open Set Recognition in NLP*

- Worked on **Out-of-Distribution and Open Set detection** in NLP at Artificial Intelligence and Robotics Lab, IISc, Bengaluru.
- Explored various methods for **few-shot unsupervised OOD detection** using meta learning and demonstration-based data augmentation.
- Investigated **unsupervised open set recognition** methods for NLP using **compute-efficient model** architectures.
- Explored few-shot and continual setups for open set detection in NLP.

Student Developer Intern at KerasCV | Google Summer of Code 2022 May 2022 - September 2022
Sayak Paul, Luke Wood | *Computer Vision*

- Implemented various model blocks like **StochasticDepth**, **DropPath**, **SqueezeAndExcite** and incorporated them into KerasCV.
- My code contributions included addition of augmentation layers with **bounding box support** like **Inception crop** and other bug fixes. Added a new **robust serialization test** which eliminated the need of hand-engineered tests for new modules.
- Worked on porting over Computer Vision models like **ResNets**, **EfficientNets**, **RegNets** to KerasCV. Report available here.

Student Developer Intern at TensorFlow | Google Summer of Code 2021 May 2021 - August 2021
Sayak Paul, Morgan Roff | *Computer Vision*

- Implemented and trained four variants of RegnetY from the paper **"Designing network design spaces"** on **ImageNet-1k** using **TensorFlow 2**.
- Created efficient data input pipelines and trained four variants of RegNetY on **Google Cloud TPUs**.
- The resulting models had **exceptional inference speeds** and are now publicly available via TFHub. Report available here.

Research Assistant | PICT, Pune October 2020 - July 2023
Prof. Geetanjali Kale | *Object detection*

- Working on the research project "Question Wise segmentation of Handwritten examination paper in AI-Assisted Grading System". Responsible for designing and maintaining codebase and dataset of the project.
- Used **RetinaNet** to **segment questions** in a handwritten answer sheet. Created scripts using **PyTorch** for training, testing and inference. Achieved significant improvement over present methods.
- Currently **drafting** the paper for submission to a scientific journal. Published a patent for this system (link).

PUBLICATIONS & RESEARCH

[C: Conference, W: Workshop, P: Patent]

C1. Unsupervised Out-of-Distribution Detection Using Few In-Distribution Samples June 2023
[Poster] ICASSP 2023 *Paper*

- *Authors: Chandan Gautam, **Aditya Kane**, Savitha Ramasamy, Suresh Sundaram*

C2. My Boli: Code-mixed Marathi-English Corpora, Pretrained Language Models and Evaluation Benchmarks
[Findings] IJCNLP-AACL 2023 *Paper*

- *Authors: Tanmay Chavan, Omkar Gokhale, **Aditya Kane**, Shantanu Patankar, Raviraj Joshi*

C3. Leveraging Class Name for Out-of-Scope Intent Classification

- *Under review*

P1. System and Method for Automated Evaluation of Multimodal Contents October 2022
The Patent Office Journal of India *Link*
· *Inventors:* ***Aditya Kane****, Mihir Godbole, Madhuri Wakode, Parth Rajwade, Geetanjali Kale*

W1. Task Arithmetic with LoRA for Continual Learning October 2023
[Poster] *WANT, R0-FoMo workshops* **NeurIPS 2023** *Paper* | *Code*
· *Authors: Rajas Chitale, Ankit Vaidya,* ***Aditya Kane****, Archana Ghotkar*

W2. Continual VQA for Disaster Response Systems October 2022
[Poster] *Tackling Climate Change with Machine Learning Workshop* **NeurIPS 2022** *Paper* | *Code* | *WandB*
· *Authors:* ***Aditya Kane****, V Manushree, Sahil Khose*

W3. Spread Love Not Hate: Undermining the Importance of Hateful Pre-training for Hate Speech Detection
[Poster] *I Can't Believe It's Not Better Workshop* **NeurIPS 2022** *Paper*
· *Authors: Omkar Gokhale,* ***Aditya Kane****, Shantanu Patankar, Tanmay Chavan, Raviraj Joshi*

W4. Efficient Gender Debiasing of Pre-trained Indic Language Models November 2022
[Oral] *Workshop on Deployable AI* **AAAI 2023** *Paper* | *Code*
· *Authors: Neeraja Kirtane, V Manushree,* ***Aditya Kane***

W5. An Efficient Modern Baseline for FloodNet VQA May 2022
[Oral] *NewInML Workshop* **ICML 2022** – Best Paper Award *Paper* | *Code*
· *Authors:* ***Aditya Kane****, Sahil Khose*

PROJECTS

Added RegNets to tf.keras.applications January 2022
Computer Vision
· Extended my project from Google Summer of Code to encompass a wider scope. Trained **24** variants of RegNets on the **ImageNet-1k** dataset.
· These models are now added to `tf.keras.applications` and are available in TensorFlow 2.9 and later.
· Collaborators: Sayak Paul. Models available at: `tensorflow.org/tf/keras/applications/regnet`

Course projects at Georgia Tech December 2023
Computer Vision
1. **Machine Unlearning**: Course project for Machine Learning with Limited Supervision (Instructor: Prof. Judy Hoffman). Worked on removing the influence of a few samples from a trained model, or ito make the model "unlearn" those datapoints. Project video available here.
2. **OOD detection using model explanations in ViTs**: Course project for Explainable AI (Instructor: Prof. Sonia Chernova). We use attention rollout and gradients of attention maps to determine whether a given input is out-of-distribution.

NLP shared tasks March 2023
Natural Language Processing
· Worked on multiple NLP shared tasks across various conferences:
1. ***[Oral]*** VarDial workshop at *EACL 2023* Paper
2. ***[Poster]*** EvoNLP workshop at *EMNLP 2022* Paper
3. ***[Poster]*** Arabic NLP workshop at *EMNLP 2022* Paper
4. ***[Oral]*** WASSA workshop at *ACL 2022* Paper

VOLUNTEER EXPERIENCE

TensorFlow User Group (TFUG) Pune September 2021 - July 2023
· Co-organizer of TensorFlow User Group, Pune. TFUGs are local communities of students and practitioners of the TensorFlow library. Our community has **3000+ registered members**. We enjoy a turnout of around 40 people for each monthly event.
· Received the **"Most Impactful Community Leader"** award by Google for consistently organizing most TFUG events in 2021.

Book review September 2022
· Reviewed the book "Practical Deep Learning for Computer Vision with Python" by David Landup.
· The book takes a code-first approach to computer vision. The book aims to deliver content on cutting-edge libraries and technologies, like KerasCV. Additionally, it provides guided projects for the readers to implement the concepts learnt in the book firsthand.
· The review demands studying the book thoroughly, including proofreading, implementing the code and guided projects and much more.

TECHNICAL SKILLS

Languages	Python, C++, PHP, SQL, HTML
Frameworks	NumPy, TensorFlow, Keras, PyTorch, JAX, Flax
Others	Git and GitHub, Google Cloud