Aditya Kumar Singh

Portfolio: rodosingh.github.io

Email: aks16ms023@gmail.com
LinkedIn: Aditya Singh

Experience

- **ML Research Engineer - AMD India** — OnSite
  AIG Team led by Pratik and Zicheng Liu; Direct Mentor: Pratik — *Aug 2024 - Present*
  - **Responsibility:** Building AMD GPU compatible MLLMs from scratch.
- **Research Intern - Microsoft Research India** — OnSite
  M365 Systems Innovation Team; Mentor: Dr. Supriyo Ghosh — *Jan 2024 - Jun 2024*
  - **[FSE'24] Root Cause Analysis (RCA)** of cloud incidents — A step closer to *Unified Service Copilot.*
  - **Responsibility:** Trying to generate root cause for cloud-based issues (e.g., regarding installation and their interruption, Trouble-shooting, etc.) using LLMs (GPT-4) and suggest the best possible solution. We avoid fine-tuning such heavy models by leveraging in-context learning (similar to zero-shot setting) which saves us a lot of time and cost.
- **Associate ML Intern - Wadhwani AI** — Remote
  Anthropometry Team; Certificate — *May 2023 - Aug 2023*
  - Constructing VWM (virtual weighing machine) for newborn babies (1-42 days).
  - **Responsibility:** Mainly focusing on explaining the model. Analyzing model uncertainties through conformal estimation and developing a confidence model using quantile regression and Gaussian process to compute confidence range.
- **Graduate Research Assistant - CVIT Lab @ IIIT Hyderabad** — OnSite
  Research student (Full-time) under Dr. Makarand Tapaswi — *Jan 2022 - Dec 2023*
  - **[CVPR'24] Generating story-summaries** from long-from videos (*e.g.* TV Shows and movies) by extracting key sub-story segments. Here we leverage recaps (as supervision) for our model training. *Coming Soon!*
  - **[CVPR'23] - Learning emotion/mental states for movie characters and scenes:** via joint-modeling on action, characters, and dialog signals to predict multi-label emotions/mental states for each character and scene. Link
- **ML Intern - Ignitarium** — Remote
  ML Engineer (Part-time); Certificate — *May 2021 - Jul 2021*
  Creating a real-time Japanese vehicle number plate recognition model for Raspberry Pi and Nvidia Jetson Nano.
- **MS Thesis @ ISI Kolkata** — OnSite
  Project Student (Part-time) under Dr. Uma Shankar — *Aug 2020 - Jul 2021*
  - **Modeling and Reviewing:** Performed multi-label classification on highly imbalanced Amazon rainforest images using transfer learning on all possible fine-tuned pre-trained models used in the ImageNet challenges until 2020. Additionally, we did ablations with promising classical ML models (Random Forest, XGboost, GBC, etc.) to evaluate performance.
  - **Final touch:** Ensembled all the above ImageNet models in *Integrated Stacking* format and fine-tuned them using (*Meta learning*) to achieve the best result among all the tried-out methods. Link
- **Teaching Assistant (Head TA) @ IISER Kolkata** — *Aug 2020 - Jul 2021*
  - **CS3102 – Programming in Python (Instructor: Dr. Dwaipayan Roy)** For Ph.D. and Masters student.
  - **CS1101 – Introduction to Programming (Instructor: Dr. Dwaipayan Roy)** For UnderGrad students

Education

- **International Institute of Information Technology** — Hyderabad, India
  MS by Research - CSE; CGPA: 9.5/10 — *Aug 2021 - Dec 2023*
  Courses:
  - *Statistical Methods in AI: Classical ML — (kNN, Naive Bayes, MLE, LDA, PCA, SVM (& variants), Data Clustering (k-means & variants), Decision Trees (Ensemble)) ⟶ Deep Learning — (MLP, Data-preprocess, Train/Test strategies, Hyperparam selection)*
  - *Digital Image Processing: Image enhancement process (filter, smooth,* etc.*) ⟶ morphological-processing, segmentation, feat-desc.*
  - *Computer Vision: Classic Vision (Camera model, HOG/SURF/SIFT, Face/Person-Detection, Optical-flow) ⟶ Modern Vision (Tracking, Object-Detection/Segmentation/Captioning, Action localization, Transfer-learning)*
  - *NLP: Classical NLP (Tokenization, Language modeling, POS Tagging) ⟶ Modern NLP (RNN, LSTM, BERT, GPT, LLM, RAG)*
  - *Multivariate Statistics: Quadratic forms (Multivariate form of Moments), Spectral decomposition, Random vectors & Matrices, Mean/covariant matrices, Regression models, Hypothesis-Testing, ANOVA, MANOVA, Fleiss' κ, Cronbach's α*
  - *Data Analytics: Theory and practice of data warehousing and data mining techniques and algorithms.*

- **Indian Institute of Science Education and Research** — Kolkata, India
  MS - Mathematics & Statistics; CGPA: 8.38/10 — *Aug 2019 - Jul 2021*
  BS - Mathematics & Statistics; CGPA: 8.04/10 — *Aug 2016 - Jul 2019*
  Probability & Stats Courses: *Regression Analysis, Time-Series Analysis, Multivariate Analysis, Probability II, Machine Learning and Network Analysis, Statistics II, Statistical Inference, Statistics I*
  Others: *DSA I/II, ODE/PDE, Linear Algebra I/II, Real Analysis I/II/III, Complex/Functional Analysis, Group/Ring Theory*

Skills Summary

- **Languages** Python, C, MATLAB, R
- **Frameworks** WandB, Scikit/SciPy, NLTK, SpaCy, TensorFlow, Keras, PyTorch, Huggingface, Fortuna-AWS
- **Tools & Platforms** Linux, Web, Windows, Docker, Git
- **Soft Skills** Leadership, Event & Time Management, Writing, Public Speaking

Publications

- **[CVPR'24]: "Previously On..." From Recaps to Story Summarization.** Link
- **[CVPR'23]: How you feelin'? Learning Emotions and Mental States in Movie Scenes.** Link
- **[FOSS-CIL T24]: FolkTalent: Enhancing Classification and Tagging of Indian Folk Paintings.** *Best Student Paper award*; Coming Soon!
- **[FSE'24]: X-lifecycle Learning for Cloud Incident Management using LLMs.** Link
- **MS Thesis @ IISER Kolkata: Multi-Label Classification on Remote-Sensing Images.** Link

Honors and Awards

- Best Student Paper Award for "FolkTalent: Enhancing Classification and Tagging of Indian Folk Paintings."
- **Finalist at QIF** (Qualcomm Innovation Fellowship India - 2022) - May, 2022
- **Winner at ICVGIP 2021** Contest - Audio-Visual Retrieval Track - Dec, 2021
- **INSPIRE** scholarship holder funded by DST Govt. of India, 2016 to 2021

Projects

- **Video Object Segmentation:** involves segmenting moving objects from the background using UVOS Methods: MATNet and RTNet & SVOS: TransVOS. *Tech & Tools: Python, MATLAB, PyTorch, OpenCV (May'22).* MATNet Link
- **Hypernym Discovery - NLP:** Generate possible hypernyms for a given hyponym via detecting hyponym-hypernymy relation for a list of pairs of words. *Tech & Tools: Python, NLTK, PyTorch, Pyhocon (May'22).* Project Link
- **Vehicle Tracking and Counter - Kalman Filtering:** *Tools: OpenCV, Tkinter (Dec'21).* Project Link
- **Natural Language Understanding with the Quora Question Pairs Dataset:** Detect duplicacy within the given pair of questions from Quora. *Tech & Tools: Python, Huggingface, Scikit-Learn, PyTorch (Nov'21).* Project Link
- **Modelling the spread of COVID-19:** Predict future trends of the outbreak via SEIR modeling on past information of the virus spread. *Tech & Tools: SciPy, NetworkX, Pandas (Aug'20).* Project Link
- **Airplane Reservation System:** System for managing airplane reservations solely through CLI. *Tools: C.* Project Link
- **Shapiro-Wilk test for Normality:** Reading Project on Normality Testing *(May'21).* Link

Volunteer Experience

- **Member @ Student Parliament IIIT Hyderabad** — Hyderabad, India
  Addressed & resolved issues faced by students (e.g., placement, technical, and hostel) — *Mar 2022 - Mar 2023*
- **Placement coordinator @ Student Placement Committee IIIT Hyderabad** — Hyderabad, India
  Handled logistics of invited companies and organized interviews. — *Aug 2022 - Aug 2023*