

# Abhay Kumara Sri Krishna Nandiraju

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## EDUCATION

- **University of Pittsburgh** Aug 2025 - Present  
Pittsburgh, USA  
*Doctor of Philosophy in Intelligent Systems (Multimodal Learning, Foundational Models)*
- **University of Arizona** Aug 2023 - May 2025  
Tucson, USA  
*M.S in Information Science: Machine Learning (GPA: 4.00/4.00)*
- **Indian Institute of Technology (IIT), Tirupati** Aug 2019 - July 2023  
Tirupati, India  
*B.Tech in Electrical Engineering (GPA: 8.84/10.00 = 3.80/4.00)*

## PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

- [C.1] A.K.S.K Nandiraju, et al. (2025). **Automated Feedback Loops to Protect Text Simplification with Generative AI from Information Loss.** *Intelligent Systems Conference 2025*.
- [T.1] Abhay Nandiraju (2023). **Efficient Data Augmentation for Tiny Drone Detection System.** Thesis submitted towards my Bachelor's final year project.

## APPLIED AI AND ENGINEERING EXPERIENCE

- **WML IT Solutions Pvt Ltd** Aug 2023 - Apr 2024  
Remote  
*Associate Consultant - AI Engineer*
  - Engineered a multi-source Retrieval-Augmented Generation (RAG) system enabling natural language querying across disparate data silos.
  - Developed a natural language-to-SQL agent and integrated Langchain with GPT-3.5 and SQLCoder to interact with Postgres, non-relational DBs, and PDFs.
  - Utilized Postgres as a vector database for efficient semantic search and retrieval of text document embeddings.
- **IIT Tirupati Navavishkar I-Hub Foundation** Oct 2022 - Aug 2023  
IIT Tirupati, India  
*Chanakya Fellow, Computer Vision Engineer*
  - Secured a 100,000 INR grant to architect, build, and deploy a portable real-time tiny drone detection system.
  - Engineered and optimized a lightweight YOLOv8-nano model, integrating mask-based data augmentation method from my B.Tech thesis.
  - Successfully deployed the end-to-end detection pipeline on a Raspberry-Pi 4, achieving low-inference times for real-world portability.
- **Visual Information and Signal Analysis Lab(ViSAL)** May 2022 - Sep 2022  
IIT Tirupati, India  
*Computer Vision Research Intern*
  - Investigated super-resolution techniques (BSRGAN, Bicubic interpolation) to enhance small object detection (< 32 × 32 px) in Faster-RCNN and YOLOv5 models.
  - Integrated super-resolution into training pipeline, achieving an 8% mAP improvement for the small objects in COCO dataset (> 200,000 images)

## RESEARCH AND PUBLICATION EXPERIENCE

- **Intelligent Computing for Clinical Imaging (ICCI) Lab, University of Pittsburgh** Aug 2025 - Present  
Pittsburgh, PA  
*PhD Graduate Student Researcher*
  - Developing multimodal deep learning models and foundational models for clinical imaging, aligning image and text data under the guidance of Dr. Shandong Wu.
- **Department of Management Information Systems, University of Arizona** Sep 2024 - May 2025  
Tucson, Arizona  
*Graduate Research Assistant - NLP Researcher*
  - Published an automated feedback loop framework to mitigate information loss in Generative AI-based biomedical text simplification.
  - Engineered a system to identify and re-insert missing biomedical named entities, increasing content overlap by 29.5% and semantic alignment by 8.2%.
  - Demonstrated that re-inserting all missing entities yielded the highest semantic alignment (0.9162 cosine similarity) and content overlap (0.6555 ROUGE-1) at the document level.
- **Visual Information and Signal Analysis Lab (ViSAL)** Sep 2022 - Aug 2023  
IIT Tirupati, India  
*Computer Vision Researcher*
  - Authored B.Tech thesis on a data augmentation technique for tiny object detection, addressing critical data scarcity for drone surveillance under the guidance of Dr. Rama Krishna Gorthi.
  - Designed an image composition pipeline to generate synthetic drone samples, using SiamMask to create binary segmentation masks for copy-paste augmentation.
  - Trained YOLOv5 and YOLOv8 models on the synthetic dataset, achieving 0.992 mAP outperforming models trained on the original ICPR dataset (0.984 mAP).

## SELECTED PROJECTS

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### • Improving Model Reasoning with GRPO

May 2025

*PyTorch, Transformers, Unslloth*

- Implemented a training pipeline using Group Relative Policy Optimization (GRPO) on gsm-8k dataset to enhance the reasoning capabilities of non-reasoning Gemma-3-1B base model.
- Demonstrated 5% improvement in model's performance on mathematics based reasoning tasks and reduced errors by 10%, validating policy optimization as an effective alignment strategy.

### • Hack Arizona AWS Tech Challenge 3rd Place

Mar 2025

*Python, Fast API, Amazon Bedrock*

- Secured 3rd Place in the AWS Tech Challenge at Hack Arizona 2025.
- Developed an AI-powered financial analyst agent based on Claude Sonnet-3.5 mimicking investment strategies of Warren Buffet, Bill Ackman, and Ray Dalio to perform sentiment analysis on market news, analyze stock performance, and generate investment summaries.

### • Commonsense Validation and Explanation ComVE - SemEval 2020

July 2024

*HuggingFace, BERT, Transformers*

- Fine-tuned a RoBERTa-based model for three sub-tasks: validating statement sensibility, identifying nonsensical reasons, and generating explanations.
- Achieved strong performance on the SemEval 2020 ComVE dataset, demonstrating model grasp of commonsense reasoning.

### • Efficient Satellite Image Classification

Sep 2022 - Dec 2022

*PyTorch*

- Designed and trained a 17-layer Residual Neural Network (ResNet) for real-time satellite image classification.
- Achieved 93.87% accuracy, nearly matching a 17-layer CNN (94.05%) while attaining significantly faster inference speeds.

## SKILLS

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- **Programming Languages:** Python, C++, SQL
- **Machine Learning and Data Science:** PyTorch, Scikit-Learn, Transformers, NumPy, Pandas, Langchain
- **Database & Tools:** Git, GitHub, Hugging Face, Docker, Postgres, MySQL, Postman, Vim

## HONORS AND ACHIEVEMENTS

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### • Distinguished Graduate Scholar, College of Information Science, University of Arizona

May 2025

### • Information Science Scholarship (\$5,000), University of Arizona

Aug 2024

### • Joint Entrance Examination (JEE) Advanced, All India Rank 3574 (Top 0.015%)

May 2019

### • Joint Entrance Examination (JEE) Mains, All India Rank 3722 (Top 0.003%)

May 2019