Abhay Kumara Sri Krishna Nandiraju

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Education

- **University of Pittsburgh** *Aug 2025*
  PhD in Intelligent Systems (AI, Computer Vision, Medical Imaging) Pittsburgh, USA
- **University of Arizona** *Aug 2023 - May 2025*
  M.S in Information Science: Machine Learning (GPA: 4.00/4.00) Tucson, USA
  - **Related Coursework:** Machine Learning, Advanced ML Applications, Neural Networks, Applied Natural Language Processing, Artificial Intelligence, Algorithms, Data Mining, Data Warehousing and Analytics in the Cloud
- **Indian Institute of Technology(IIT), Tirupati** *Aug 2019 - July 2023*
  B.Tech in Electrical Engineering (GPA: 8.84/10.00 = 3.796/4.00) Tirupati, India
  - **Related Coursework:** ML for Image Processing, Deep Learning for Computer Vision, Statistical Signal Processing, Speech Signal Processing, Probability and Statistics, Artificial Neural Networks, Control Theory

Skills

- **Programming Languages:** Python, C++, R, SQL, HTML, CSS, JavaScript, React
- **Database Systems:** Postgres, MySQL, DuckDB
- **Frameworks & Libraries:** Langchain, Pytorch, Keras(Tensorflow), Scikit-Learn, Transformers, NumPy, Pandas, Django, Flask, OpenAI
- **Tools:** Git, Github, Vim, PyCharm, Postman, HuggingFace, Jupyter Notebooks, AWS, VSCode

Experience

- **Department of Management Information Systems, University of Arizona** *Sep 2024 - May 2025*
  Graduate Research Assistant - NLP Researcher Tucson, Arizona
  - Working on the NIH funded project supervised by Dr Gondy Leroy in the Deep Target NLP research group
  - I work with complex biomedical texts from medical journals and identify the missing information in the summarized version of the texts using various natural language processing methods like text matching and topic modeling
  - Developing an automated framework to evaluate information loss in the summarized biomedical texts
- **Headstarter** *July 2024 - Sep 2024*
  Software Engineer Fellow Remote
  - Developed various projects over the course of three months using latest tech stack like Next.js and React
  - Built AI powered software applications and integrated open-source language models like Llama2 and Mistral
- **WML IT Solutions Pvt Ltd** *Aug 2023 - Apr 2024*
  Associate Consultant - AI Engineer Hyderabad, India
  - Developed a natural language to SQL agent and a reusable chatbot script that doesn't require configuring packages or modules making it suitable for integrating in various projects
  - Developed a Retrieval-Augmented Generation(RAG) based Question & Answer system that enabled users to interact and retrieve answers from relational databases, non-relational databases, CSV files, excel files and PDFs
  - Utilized Postgres as a vector database, Langchain and Flask to integrate GPT-3.5 and SQLCoder from HuggingFace and engineered the Question & Answering task on the text documents
- **Visual Information and Signal Analysis Lab(ViSAL)** *Sep 2022 - Aug 2023*
  Computer Vision Researcher IIT Tirupati, India
  - Developed an efficient data augmentation method for detecting drones towards my bachelor's thesis under the guidance of Dr Rama Krishna Gorthi
  - Generated synthetic dataset using binary segmentation masks and augmented it to the original data to increase the drone occurrences in the image

- Trained the Yolov5 and Yolov8 models on the synthetic data and observed a 1% increase in the mean average precision(mAP)
- Verified the methodology across multiple datasets to confirm consistency and reliability

- **IIT Tirupati Navavishkar I-Hub Foundation** *Oct 2022 - Aug 2023*
  Chanakya Fellow, Computer Vision Engineer IIT Tirupati, India
  - Developed an efficient tiny drone detection system that can be portably deployed anywhere and received a grant of 100,000 INR to implement the detection model
  - Designed a lightweight real-time drone detection model based on the YOLO architecture and integrated mask based data augmentation method to improve the recall and precision of the model
  - Deployed the trained YOLOv8-nano model on Raspberry-Pi 4 and successfully detected drones with low-inference times, high precision and high recall

- **Visual Information and Signal Analysis Lab(ViSAL)** *May 2022 - Sep 2022*
  Computer Vision Research Intern IIT Tirupati, India
  - Worked under the supervision of Dr Rama Krishna Gorthi at IIT, Tirupati in the field of small object detection(less than 32px by 32px)
  - Integrated super-resolution techniques like BSRGAN and Bicubic interpolation into the architecture of Faster-RCNN and Yolov5 models
  - Trained Faster-RCNN and Yolov5 models on more than 200,000 images from Common Objects in Context(COCO) dataset and observed an 8% improvement in the mean average precision(mAP) of small objects

- **Edvizo** *Apr 2020 - Jun 2020*
  Physics Question Paper Developer
  - Developed high quality physics questions for students preparing to give India's most difficult and prestigious Joint Entrance Examination(JEE)
  - Prepared 500 conceptual and numerical questions on the topics of Thermodynamics, Radioactivity, Electric Circuits, Gravitation, Electromagnetics and Modern Physics

PROJECTS

- **Commonsense Validation and Explanation ComVE - SemEval 2020** *July 2024*
  HuggingFace, BERT, Transformers
  - Developed a BERT based model to evaluate whether a statement makes sense or not and provide a reason
  - Fine-tuned RoBERTa model on the ComVE dataset to distinguish between sensical and non-sensical statements, identify reason for non-sensicality and generate explanations
  - The fine-tuned model performed reasonably well in the three sub-tasks of ComVE.

- **Text Classification using multiple models** *Aug 2024*
  Transformers, BERT, Ensemble models
  - Developed three types of models to classify the text into 7 different categories
  - Implemented 7 binary classifiers and created an ensemble of the models and a multi-label classification model
  - Fine-tuned the BERT model on the training data and compared it the Ensemble and multi-label classification models
  - Identified that each model performed better than others in the context of various metrics like precision, recall and f1-score.

- **NLP Statistics on Bio-Medical Text** *Aug 2024*
  Flask, NLTK, Cloudscraper and Beautiful Soup
  - Developed a python script to scrape and extract useful information from 100 pages of a health-related website
  - Computed NLP related statistics and designed a website to compare the statistics of user given text with the statistics of text extracted from the website

- **Loan Defaulter Analysis** *May 2024*
  Decision trees, xgboost, catboost, lightgbm

- Developed seven tree based models and predicted whether the customer defaults on their loan or not
- Implemented Bagging, Random Forest, Gradient Boosting, Adaboost, XGBoost, Catboost and LightGBM models and trained them on the German loan defaulter dataset
- Compared the performances and identified that Adaboost is best suited to predict customers that are likely to default since it has high recall(0.87), good accuracy and decent precision values on the test dataset.

- **Efficient Satellite Image Classification** *Sep 2022 - Dec 2022*
  PyTorch
  - Developed a Residual Neural Network for satellite image classification with low inference time
  - Implemented and compared the accuracies and inference times of a 17 layer CNN(94.05%) with a 17 layer residual neural network(93.87%)
  - Identified that the residual neural network classified images in real-time speeds with 0.15% reduction in accuracy

- **AI Chatbot** *Dec 2022*
  HTML, CSS, Javascript, Gradio, Langchain, OpenAI, HuggingFace
  - Developed an AI chatbot based on the GPT-3.5 model using the OpenAI API and Langchain
  - Hosted the chatbot on the HuggingFace space with the help of Gradio

- **Spam and Ham Classifier** *Aug 2021 - Oct 2021*
  scikit-learn
  - Collected and pre-processed several messages to create a spam and ham dataset from scratch
  - Trained a Naive-Bayes classifier achieving 99% accuracy in classifying messages as spam and ham

Patents and 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*.

[S.1] Abhay Nandiraju, et al. (2024). **Novel Self-Annotation Framework for Robust Multi Drone Detection and Tracking**. Manuscript under review for publication in the journal *Multimedia Tools and Applications*.

[T.1] Abhay Nandiraju (2023). **Efficient Data Augmentation for Tiny Drone Detection System**. Thesis submitted towards my Bachelor's final year project.

Honors and Achievements

- **Distinguished Graduate Scholar** *May 2025*
  College of Information Science, University of Arizona
  - I was recognized by the College of Information Science as a Distinguished Graduate Scholar.

- **Hack Arizona AWS Tech Challenge 3rd Place** *Mar 2025*
  University of Arizona
  - Secured 3rd position in the AWS Tech Challenge hosted at Hack Arizona and won $400 for our AI Finance Analyst project.

- **Information Science Scholarship** *Aug 2024*
  University of Arizona
  - Secured a scholarship of $5000 towards my MS in Information Science: Machine Learning at the University of Arizona

- **Chanakya Fellow** *Oct 2022*
  IIT Tirupati Navavishkar I-Hub Foundation (IITTNiF)
  - This fellowship is offered to exceptional students and researchers working in the field of science and technology
  - Secured the Chanakya fellowship and received a grant of 100,000 INR for the development of a portable real-time object detection model to detect drones
  - Successfully developed the drone detection model based on the YOLOv8 architecture and deployed it on Raspberry-Pi 4 to use it anywhere
  - This project is successfully extended to detect persons stuck in the 2024 Vijayawada floods

- **Joint Entrance Examination - Advanced** *May 2019*
  JEE Advanced
  - Secured an All India Rank(AIR) of 3574(0.015%) among 245,000 students in the JEE Advanced exam

- This is a rigorous 6 hour national examination for admission to prestigious Indian Institutes of Technology(IITs), testing strong analytical and problem solving abilities in Mathematics, Physics and Chemistry.

- **Joint Entrance Examination - Mains** *Apr 2019*
  JEE Mains
  - Secured an All India Rank(AIR) of 3722(0.003%) among 1,147,000 students in the JEE Mains exam
  - This is a 3 hour examination that tests the student's problem solving skills in Mathematics, Physics and Chemistry.

Volunteer Experience

- **Local Coordinator** *Aug 2020 - Jun 2023*
  Purdue University
  - I worked with the EPICS team at IIT Tirupati which is associated with the Purdue University in developing a Mobile Science Laboratory to deliver hands-on experience in science to students from rural schools
  - I developed a series of interactive science experiments, effectively bridging the gap between theoretical concepts and practical applications for schools lacking laboratory infrastructure
  - I translated the experiments from English to Telugu making it accessible to students from Telugu medium

- **Sponsorship Committee Core Member** *Dec 2020 - Mar 2021*
  Tirutsava IIT Tirupati
  - Served as Core Member of the Sponsorship Committee for Tirutsava 2021, successfully leading sponsor acquisition initiatives and managing advertising partnerships
  - Demonstrated strong negotiation skills by securing crucial sponsorship deals, directly contributing to the event's financial success while ensuring value delivery to stakeholders
  - Built and maintained strategic relationships with sponsors, effectively communicating value propositions

- **Volunteer** *Aug 2019 - Jul 2023*
  National Service Scheme(NSS)
  - Coordinated and organized various competitions in the local schools around the Indian Institute of Technology, Tirupati
  - Planted trees and cleaned the campus premises to spread awareness about the importance of clean and plastic-free environment
  - Guided curious school children regarding various STEM activities and labs across the campus

Certifications

- **CITI: Biomedical Research Investigators** *Sep 2024*
- **Meta: Introduction to Databases for Back-End Development** *Jun 2024*
- **Meta: Version Control** *May 2024*
- **Meta: Programming in Python** *Apr 2024*
- **Meta: Introduction to Back-End Development** *Mar 2024*