Praveen Tirupattur, Ph.D.

Mail Scholar Github LinkedIn Twitter Website

Summary: Computer Vision and Machine Learning researcher with 8+ years of experience across academia and industry, specializing in image processing, video understanding, representation learning, and multimodal learning. Proven track record of delivering production-ready deep learning solutions with publications in top-tier venues including CVPR, ICML, ACM, and AAAI.

Research Interests: Representation Learning, Video Action Understanding, Large Language Models (LLMs), Large Video-Language Foundational Models, Dataset Condensation, Anomaly Detection, GenAI Detection.

Education

Aug 2017 – Aug 2024 **Ph.D. in Computer Science (GPA: 3.8)**
Center for Research in Computer Vision (CRCV)
University of Central Florida, Orlando, Florida, USA
Advisor: Prof. Mubarak Shah

Aug 2013 – Aug 2016 **M.Sc. in Intelligent Systems (GPA: 3.8)**
Technical University of Kaiserslautern, Kaiserslautern, Germany
Thesis title: *Violence Detection in Videos*.

Sep 2006 – Aug 2010 **B.Tech. in Computer Science (GPA: 3.4)**
Jawaharlal Nehru Technological University, Hyderabad, India

Skills

Programming Languages	Python, Java, C++
Deep learning frameworks	PyTorch, Keras, Tensorflow
Cloud Platforms	Amazon Web Services, Google Cloud Platform
Deployment & MLOps	Docker, Git, Modal, ONNX, Rest APIs
Libraries & Tools	Open-CV, scikit-learn, MATLAB
Languages	English, Telugu, Hindi, German (B1)

Experience

Machine Learning

Sep 2024 – Current **Machine Learning Researcher at PhotoDay**

- Developing image post-processing services, including background removal (image matting) and spill correction, using deep-learning models. Responsible for dataset curation, model training, evaluation, and deployment:
  - Optimized training pipeline, cutting compute costs by over 30% and accelerating model training.
  - Enhanced inference efficiency, reducing latency and driving a measurable drop in operational costs.
  - Deployed and monitored production-grade models, contributing directly to product revenue growth.
  - Reduced inference costs, leading to cost savings and revenue growth.
  - Curated and maintained in-house datasets, improving training robustness and reducing noise in predictions.

Aug 2017 – Aug 2024 **Graduate Research Assistant at University of Central Florida (CRCV)**

Experience (continued)

- Deep Intermodal Video Analytics (**DIVA**) program by IARPA:
  - Worked on solving video activity detection in security videos with large field-of-view. Developed models for actor localization and action classification, handling variations in the scale of objects and class imbalance in a multi-label classification setting.
  - Worked on optimizing data pre-processing pipeline to handle large-scale datasets and enable efficient model training.
  - Led the team at UCF and secured first place in ActEV SDL 2020 challenge (ActivityNet Challange, CVPR-2020) and second position in TRECVid 2019 challenge while competing with other teams from CMU, JHU, UMD, Purdue, IBM, and MIT.
  - Worked on various aspects of real-time action detection system including, building the data pipeline, improving the computational efficiency of models, and deployment of the system.
- Gait Recognition by CTTSO:
  - Developed skeleton-based gait recognition models, outperforming RGB baselines via feature-level fusion.
  - Successfully led team deliverables, meeting all contract milestones with enhanced performance metrics.
- Biometric Recognition and Identification at Altitude and Range (**BRIAR**) by IARPA:
  - Contributed to the development of a person-identification model aimed at learning robust representations invariant to variations in the scale of individuals resulting from their distance from the camera.
  - Worked on pre-processing the data for model training and building the pipeline for evaluation.

May 2023 – Aug 2023 **Research Intern at Amazon Inc.**

- Worked on representation learning for long-form video understanding with vision-language training.
- Explored the idea of leveraging pre-trained Large Language Models (LLMs) to improve temporal understanding of video models.

May 2022 – Aug 2022 **Research Intern at Pinterest Inc.**

- Worked on building a unified model for both image and video representation learning.
- Explored large-scale self-supervised training to learn representations for multiple visual modalities.
- Obtained improved performance over the in-house image-based model using multi-modal training.

Jan 2016 – Aug 2016 **Master Thesis Student at German Research Center for AI (DFKI)**

- Focused on detecting various types of violent activities from videos using visual, semantic, and audio features.
- Trained SVM classifiers on each modality and employed late-fusion to detect videos with violence.

Feb 2015 – Aug 2016 **Research Assistant at German Research Center for AI (DFKI)**

- Project - Kognit: Kognit is a tool developed to help dementia patients. It uses cognitive modeling and mixed reality to augment the cognition of the patients.
- Developed a desktop application in Java, to annotate images required to train a model for object detection.
- Focused on developing a REST-based web-service framework in Java, exposing the functionality of myCBR (Case-Based Reasoning) system and integrating it with the object detection module.

Software Development

Oct 2016 – July 2017 **Java Developer at XYRALITY GmbH**, Hamburg, Germany

Experience (continued)

- Worked on developing gaming logic for multi-player strategy games.
- Focused on back-end development working with Wonder frameworks and Web Objects.

Aug 2010 – Aug 2013 **Software Engineer at Progress Software**, Hyderabad, India

- Java and web development involving implementation of various features and bug fixing.
- Built POC for a new use-case involving the integration of existing products.
- Received the best employee of the month award for my efforts.

Research Publications (Citations: 303)

Conference Proceedings

1. J. A. Chan-Santiago, **P. Tirupattur**, G. K. Nayak, G. Liu, and M. Shah, "Mgd 3: Mode-guided dataset distillation using diffusion models," in *Proceedings of the International Conference of Machine Learning*, 2025, **[Oral Presentation]**.
2. N. Siddiqui, **P. Tirupattur**, and M. Shah, "Dvanet: Disentangling view and action features for multi-view action recognition," in *Accepted to AAAI Conference*, 2024.
3. R. Modi, A. J. Rana, **P. Tirupattur**, *et al.*, "Video action detection: Analysing limitations and challenges," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2022, pp. 4911–4920.
4. M. N. Rizve, U. Demir, **P. Tirupattur**, *et al.*, "Gabriella: An online system for real-time activity detection in untrimmed security videos," in *2020 25th International Conference on Pattern Recognition (ICPR)*, IEEE, 2021, pp. 4237–4244, **[Best Paper Award]**.
5. **P. Tirupattur**, K. Duarte, Y. S. Rawat, and M. Shah, "Modeling multi-label action dependencies for temporal action localization," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2021, pp. 1460–1470, **[Oral Presentation]**.
6. **P. Tirupattur**, Y. S. Rawat, C. Spampinato, and M. Shah, "Thoughtviz: Visualizing human thoughts using generative adversarial network," in *Proceedings of the 26th ACM international conference on Multimedia*, 2018, pp. 950–958.

Patents

1. Y. S. Rawat, M. Shah, A. J. B. Rana, **P. Tirupattur**, and M. N. Rizve, *Methods of real-time spatio-temporal activity detection and categorization from untrimmed video segments*, US Patent 11,468,676, Oct. 2022.

Awards and Achievements

2022 2^{nd} place, ActivityNet ActEV Challenge (CVPR)
2021 1^{st} place, ActivityNet ActEV SDL (CVPR)
2020 1^{st} place, ActivityNet ActEV SDL (CVPR)
2^{nd} place, TRECVID ActEV: Activities in Extended Video
Best Paper Award at ICPR
Won ASAPS Challenge, Contest-1 (NIST)
2019 2^{nd} place TRECVID ActEV: Activities in Extended Video

Awards and Achievements (continued)

2017 Awarded UCF ORC Doctoral Fellowship

Professional Activities

- Organized TinyAction ActivityNet Challenge (CVPR 2021, 2022)
- Mentored students of NSF Research Experience for Undergrad (REU) 2019, 2020, 2021 & 2024
- Reviewer for CVPR, ICCV, ECCV, CVIP, ACM-MM, IEEE Transaction on Multimedia, Pattern Recognition, Machine Vision and Applications, etc.