Pavan Kumar Sathya Venkatesh

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Education

University of Massachusetts, Amherst **2025 - Present**
MS in Computer Science *Incoming*

Vellore Institute of Technology, Chennai **2021 - 2025**
B.Tech in Computer Science & Engineering *8.91/10 CGPA*

Research Projects

Ongoing Projects

- Venkatraman, S.*, **Kumar, P. S.***, Jayasankar, K. S.*, Sunil, M.*, Ajith, G.*, Malarvannan, S.*, Dhanith, J. P. R. (2025). "A Lightweight Continual Learning Approach via Retrieval-Augmented Generation for Personalized AI Assistants."
- Venkatraman, S.*, **Kumar, P. S.***, Jayasankar, K. S.*, Renuka, S., Pravin, S. C. (2025). "CerviLens: Deep Learning and Computational Imaging for Cervical Cancer Assessment and Therapy Recommendations."
- Venkatraman, S.*, **Kumar, P. S.***, Ramachandran, V., Elias, S. (2025). "EndoBuddy: AI-Assisted Real Time Landmark Detection for Upper Gastrointestinal Endoscopy
- **Kumar, P. S.**, Kumar, M. S., Thayyil, P. J., Pandiyaraju, V. (2025) Making Lies Visible: CM-TGT for Graph-Based Cross-Modal Deception Detection

Projects Under Review/Published

- Venkatraman, S.*, **Kumar, P. S.***, Raj, R.*, Chandrakala S (2025). "UGPL: Uncertainty-Guided Progressive Learning for Evidence-Based Classification in Computed Tomography." Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV) Workshops.
- Venkatraman, S.*, Raj, R.*, **Kumar, P. S.*** (2025). "PCM-NeRF: Probabilistic Camera Modeling for Neural Radiance Fields under Pose Uncertainty." The 36th British Machine Vision Conference (BMVC 2025). (Under review).
- Venkatraman, S., **Kumar, P. S.**, Pandiyaraju, V., Abeshek, A., Aravintakshan, S. A., Kannan, A. (2025). "SPROUT: Symptom-centric Prototypical Representation Optimization and Uncertainty-aware Training for Few-Shot Precision Agriculture." Computers and Electronics in Agriculture. (Under review).
- Venkatraman, S., Pandiyaraju, V., Abeshek, A., **Kumar, P. S.**, Aravintakshan, S. A., Kannan, A (2025). "Bayesian Uncertainty Propagation for Bone Fracture Diagnosis via Region-Aware Adaptive Label Refinement." Computers in Biology and Medicine. (Under review).
- Venkatraman, S., Pandiyaraju, V., Abeshek, A., **Kumar, S. P.**, & Aravintakshan, S. A. (2025). "Leveraging Bi-Focal Perspectives and Granular Feature Integration for Accurate, Reliable Early Alzheimer's Detection." IEEE Access, 13, 28678-28692.
- Venkatraman, S., Pandiyaraju, V., Abeshek, A., Aravintakshan, S. A., **Kumar, P. S.**, & Madhan, S. (2024). "Targeted Neural Architectures in Multi-Objective Frameworks for Complete Glioma Characterization From Multimodal MRI." Applied Soft Computing. (Under review)
- Pandiyaraju, V., Venkatraman, S., **Kumar, P. S.**, Malarvannan, S., & Kannan, A. (2024). "Exploiting Precision Mapping and Component-Specific Feature Enhancement for Breast Cancer Segmentation and Identification." Ain Shams Engineering Journal. (Under review).
- Pandiyaraju, V., Senthil Kumar, A. M., Praveen, J. I. R., Venkatraman, S., **Kumar, S. P.**, Aravintakshan, S. A., Abeshek, A., & Kannan, A. (2024). "Improved Tomato Leaf Disease Classification Through Adaptive Ensemble Models With Exponential Moving Average Fusion and Enhanced Weighted Gradient Optimization." Frontiers in Plant Science, 15.

Work Experience

Zestral — **Co-founder and CTO**
Chennai, India — *Oct 2024 - Present*

- **AI-COP**
  - Built a Speech-to-Text transcription application which records voice notes from physicians and transcribes it to text using LLMs appropriately .
  - Improved workflow efficiency by 60% in Kauvery Group of Hospitals, allowing medical professionals to dictate report findings directly, bypassing manual transcription and accelerating the creation of comprehensive medical records.

MedxAI Innovations Pvt Ltd. — **AI/ML and Software Developer Intern**
Chennai, India — *May 2024 - Jul 2024*

- **EndoBuddy**
  - Improved accuracy of landmark identification in Upper-GI Endoscopy by 30% by introducing EndoVision, a model quantization based algorithm along with attention mechanisms.
  - Developed an automated feedback system to assist gastroenterologists by analyzing time spent on each landmark during endoscopy, ensuring accurate and error-free procedures.
- **Mediscan**
  - Built an automated report generating application which could be used for different clinical procedures
  - Enhanced workflow efficiency by 60% and reduced data entry efforts by 70% in Anderson Diagnostics and Labs, streamlining processes and optimizing productivity.
- **CerviLens**
  - Leveraged Graph Neural Networks to develop a system based on Jetson Nano for improving cervical cancer-grade classification during colposcopy procedures.
  - Improved early-stage cancer lesion detection by integrating the system with multiscale lenses enhancing image resolution by 30%

Prodapt Solutions Pvt Ltd. — **Backend Developer Intern at NextGen Labs, Department of Delivery**
Chennai, India — *Sep 2023– Oct 2023*

- Conducted Time Series Analysis on the datasets provided by the company by utilizing machine learning techniques to identify trends, seasonality and anomalies.
- Utilized Flask API framework to develop application which involved authentication, session creation and database migration
- Developed an application for Optical Character Recognition (OCR) to extract specific text from documents and images.

Projects

ItinerEase (Smart India Hackathon 2024) — **Aug 2024 - Sep 2024**

- Tech Stack: Python, Django, HTML, CSS, JavaScript, AJAX
- Developed a personalized itinerary generator application for tourists powered by AI
- Elevated user satisfaction by improving trip recommendations utilizing RAG and increased personalization by applying continual learning

Augmented Autonomous Vision using GANs — **Mar 2024 - Jul 2024**

- Performed realistic day-to-night image translation and vice-versa by utilizing a deep convolutional CycleGAN-based solution for enhancing the adaptability and safety of autonomous vehicles in varying lighting conditions
- Boosted visual data robustness by optimizing image quality and environmental representation and improved AV's perception for safer navigation
- Earned access to AMD Radeon Instinct Cloud Accelerator with ROCm 6.1.2, worth $24,000.

Technical Skills

Languages: Python, C, C++, Java, SQL, HTML5, CSS3, JavaScript, R, Electron and PHP
Frameworks, Cloud and Databases: PyTorch, TensorFlow, Keras, Scikit-Learn, Hugging Face, streamlit, OpenCV, NLTK, Django, Postman, Flask, AMD Accelerator, PostgreSQL and MongoDB
Coursework: Machine Learning, Artificial Intelligence, Computer Networks, Cryptography and Network Security, Operating Systems, Theory of Computation

Extracurricular Activities

- Part of the operations department of the University's Game Development Club and extended support in terms of marketing and event management
- Served as a Teaching Assistant at Machine Learning Lab (BCSE424P) in VIT Chennai
- Served as a part of the organizing team for a university-wide gaming tournament with over 300 participants.