CHANDAN KUMAR

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PROFESSIONAL SUMMARY

Assistant Professor of Computer Science with Ph.D. specializing in Computer Vision and Deep Learning, currently teaching foundational programming and advanced AI courses. Experienced researcher with expertise in unsupervised learning, multimodal foundation models, and edge computing, demonstrated through recent positions at Oak Ridge National Laboratory and Pacific Northwest National Laboratory. Published author with 10+ peer-reviewed papers in top-tier venues (ICLR, CVPR, etc.) and successful grant recipient ($180K+ NSF funding). Proven industry impact through cybersecurity AI development at Cygeniq Inc and award-winning edge computing solutions at Hagie Manufacturing (John Deere). Strong technical proficiency in Python, PyTorch, Vision Transformers, and scalable machine learning frameworks, with demonstrated ability to bridge academic research and practical applications.

EDUCATION

- **Ph.D. in Computer Science (Focus: Computer Vision, Deep Learning)** May 2025
  Iowa State University, Ames, IA
- **M.S. in Computer Science** Dec 2022
  Iowa State University, Ames, IA
- **B.Tech. in Computer Science (With Distinction)** Jun 2015
  B.I.T. Sindri, India

PROFESSIONAL EXPERIENCE

Assistant Professor, Computer Science — Aug 2025 - Present

Alfred University, Alfred, NY

- Delivering foundational programming concepts, algorithmic thinking, and computational problem-solving to undergraduate students, establishing core technical skills essential for computer science education.
- Teaching advanced machine learning techniques, neural network architectures, and computer vision applications, guiding students through cutting-edge AI methodologies and practical implementation of deep learning models.

Research Scientist — Jun 2025 - Aug 2025

Cygeniq Inc, Remote, USA

- Developed and implemented a specialized language model for automated threat detection that analyzes security alerts and maps attack patterns to MITRE ATT&CK tactics and techniques, reducing manual incident classification time by 75% and improving threat response accuracy.
- Designed and trained a machine learning pipeline for real-time security alert processing that automatically categorizes cyber threats according to MITRE ATT&CK Matrix for Enterprise, enabling SOC analysts to prioritize high-risk incidents and accelerate threat hunting workflows.

Graduate Researcher — Sep 2024 - May 2025

Oak Ridge National Laboratory, Oak Ridge, TN

- **Developed Multimodal Foundation Model:** Designed and trained a multimodal model with 1B+ parameters using Vision Transformers for reconstructing building footprints and road networks from satellite imagery, achieving 95% accuracy in vector polygon generation.
- **Optimized Polygonization Algorithms:** Engineered scalable, parallelized algorithms for building footprint polygonization, reducing processing time by 400% while maintaining 98% geometric accuracy.

- **Collaborated with Cross-Functional Teams:** Worked with a team of 8 researchers to integrate multimodal models into existing workflows, improving model performance by 35%.

Visiting Researcher **May 2024 - Dec 2024**

Pacific Northwest National Laboratory, Richland, WA

- Developed unsupervised semantic segmentation models for material thrust analysis using Contrastive Learning in HPC environment.

Graduate Research Assistant **Jan 2023 - Sep 2024**

Iowa State University, Ames, IA

- Developed an unsupervised learning algorithm for object detection, achieving 85% accuracy without labeled data.
- Developed segmentation and retrieval algorithms with ResNet and ViT architectures for Multimodal Learning.
- Implemented real-time computer vision algorithm for hand dimension analysis, accurately detecting and measuring hand components with 95% precision using OpenCV and TensorFlow.
- Developed ML-based landmark detection system that processes 21 distinct hand points in real-time, converting pixel measurements to real-world distances with sub-millimeter accuracy.
- Created predictive modeling algorithm for smoke toxicity analysis using Python and scikit-learn, enabling early detection of harmful particles during fire incidents.
- Built and deployed machine learning model to quantify multiple toxic compounds in smoke emissions throughout fire progression stages, achieving 90% prediction accuracy across 15+ particle types.
- Published 4 peer-reviewed papers and secured $180K+ in research grants.

Data Scientist **Jan 2022 - Jan 2023**

Hagie Manufacturing (John Deere), Clarion, IA

- **Established Edge Computing Infrastructure:** Designed and deployed a scalable edge computing framework using Raspberry Pi devices for real-time computer vision applications on the manufacturing floor.
- **Developed Real-Time Computer Vision Solutions:** Implemented 5+ computer vision models for classification and detection, enabling live monitoring and quality control with 99% uptime.
- **Optimized Model Performance:** Achieved real-time inference speeds of 30+ FPS on edge devices, reducing manual inspection time by 75%.
- **Laid Foundation for Future Solutions:** Created reusable frameworks and best practices for edge-based computer vision, enabling the deployment of 10+ additional solutions by subsequent teams.
- **Collaborated Cross-Functionally:** Worked with engineering and manufacturing teams to integrate computer vision solutions into existing workflows, improving operational efficiency by 40%.

Graduate Research Assistant **Jan 2019 - Dec 2021**

Iowa State University, Ames, IA

- Developed a Machine learning algorithm for object detection from edge devices , achieving 85% accuracy.
- Developed Machine Learning model for Volume estimation from UAVs.
- Designed a real-time driver assist system using 16 cameras and edge devices, processing 30+ FPS with 99.9% uptime.
- Published 3 peer-reviewed papers.

Graduate Teaching Assistant **Jan 2017 - Dec 2020**

Iowa State University, Ames, IA

- Led hands-on laboratory sessions and provided individualized support for Introduction to Spreadsheets and Databases course serving 1,200+ students, managing weekly office hours and evaluating student assignments to ensure learning objectives were met.

- Instructed Applied AI laboratory sessions, delivering practical training in machine learning fundamentals while providing comprehensive student support through one-on-one office hours and detailed assignment feedback.
- Designed and delivered Web Programming curriculum covering HTML5, CSS, JavaScript, PHP, SQL, and jQuery, enabling students to build full-stack web applications through hands-on coding exercises and projects

Business Analyst **Feb 2016 - Dec 2016**

EXL Services Pvt. Ltd., Gurugram, India

- Received Rising Star Award for exceptional performance and project contributions within first 90 days, recognized among 1500+ new employees for delivering high-impact analytics solutions.
- Leveraged SAS Analytics to perform advanced statistical analysis and data mining on 1M+ customer records, generating actionable insights that drove 25% increase in customer engagement metrics.
- Designed and implemented automated reporting dashboards using Excel and Tableau, performing customer segmentation analysis across 50K+ accounts that resulted in 30% improvement in targeted marketing campaign effectiveness.

TECHNICAL SKILLS

- **Languages:** Python, Java, C/C++ JavaScript, HTML/CSS
- **Frameworks:** PyTorch, OpenCV, TensorFlow, HuggingFace, Slurm
- **Tools:** Docker, ArcGIS, QGIS, AWS, Git, Unix/Linux, CUDA
- **Libraries:** NumPy, Pandas, Matplotlib, Scikit-Learn, Shapely
- **Platforms:** Databricks, Alteryx, Jenkins, Ignition, IoT

PUBLICATIONS

- **"A Novel Unsupervised Contrastive Learning Approach for Efficient Object Lookup and Retrieval"**
  Chandan Kumar; Jansel Herrera-Gerena, John Just, Ali Jannesari. *(Intellisys 2025)*
- **"Learning Location-Aware Visual Representations through Anchor-Based Contrastive Learning"**
  Chandan Kumar; Jansel Herrera-Gerena, John Just, Ali Jannesari. *(Intellisys 2025)*
- **"Learn and Search: An Elegant Technique for Object Lookup using Contrastive Learning"**
  Chandan Kumar; Jansel Herrera-Gerena, John Just, Matthew Darr, Ali Jannesari. *(Mar 2024)*
- **"Unsupervised learning based object detection using Contrastive Learning"**
  Chandan Kumar; Jansel Herrera-Gerena, John Just, Matthew Darr, Ali Jannesari. *(Feb 2024)*
- **"Discerning Self-supervised Learning and Weakly Supervised Learning"**
  Chandan Kumar; Matthew Darr, Ali Jannesari. *(ICLR 2024)*
- **"Optimal Deep Learning model for UAVs: A Case Study"**
  Chandan Kumar; Ali Jannesari. *(IEEE WMPC 2023)*
- **"Deep Learning and Pattern-based Methodology for Multivariable Sensor Data Regression"**
  Jiztom Kavalakkatt Francis; Chandan Kumar; Jansel Herrera-Gerena; Kundan Kumar; Matthew J Darr. *(IEEE ICMLA 2022)*
- **"Efficient Volume Estimation for Dynamic Environments using Deep Learning on the Edge"**
  Chandan Kumar, Yamini Mathur, and Ali Jannesari. *(PAISE @ IPDPS 2022)*
- **"Pattern Based Multivariate Regression using Deep Learning (PBMR-DP)"**
  Jiztom Kavalakkatt Francis, Chandan Kumar, Jansel Herrera-Gerena, Kundan Kumar, Matthew J Darr. *(LXAI @ CVPR 2022)*
- **"Efficient Object Detection Model for Real-Time UAV Applications"**
  Subrahmanyam Vaddi, Dongyoun Kim, Chandan Kumar, Shafqat Shad, Ali Jannesari. *(Computer and Information Science)*

AWARDS AND GRANTS

- **NSF ACCESS Grant (Co-PI):** $174,090 for Unsupervised Object Detection (2022)
- **NSF ACCESS Extension Grant (Co-PI):** $8,000 (2023)
- **Intel Edge AI Scholarship Recipient** (2019)
- **PyTorch Scholarship Challenge Recipient** (2018)

SERVICE AND LEADERSHIP

- **Program Committee Member:** AAAI-25
- **Reviewer:** ECCV-24, ICML, ICLR-24, ICLR-25, ICLR-26 NeurIPS-24, NeurIPS-26, WACV-24
- **Journal Reviewer:** Journal of AI Research (JAIR), IEEE-GRSS
- **President:** Served as President of Graduate Student Organization raising more than $100,000 in funds and sponsorships from different organizations for the activites and upliftment of graduate students.

INVITED PRESENTATIONS & SEMINARS

- Delivered invited talk at AU Energy Conference 2025, Alfred, NY, USA : "AI and Computer Vision for modern, sustainable and resilient Power Grids"
- Delivered research presentation at Int'l 7-in-1 Symposium, CGC, Denmark: "Volume Analysis for Dynamic Environments" (2021)