Kritarth Dandapat

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Professional Summary

Passionate Computer Science student and AI researcher with expertise in computer vision, deep learning, and healthcare technology. Currently conducting research on AI-driven dental health applications (OralScan) and symmetry-aware graph neural networks for materials science. Demonstrated ability to develop innovative solutions including ship detection (98.72% accuracy) and full-stack applications. Proven track record of academic excellence (3.8+ GPA, Dean's List) and managing an **accelerated academic path, on track to graduate in three years** while taking 21-22 credit semesters. Seeking opportunities to apply AI/ML expertise to solve real-world challenges.

Education

Bachelor of Science in Computer Science — August 2023 - June 2026
University at Buffalo, SUNY — Buffalo, NY
Minor in Statistics — GPA: 3.8+ (Dean's List: Fall 2023, Spring 2024, Fall 2024)
Presidential Scholarship: $15,000 per annum — **(Accelerated 3-year program)**

Research Experience

Research Assistant — *June 2024 - Present*
Embedded Sensing and Computing (ESC) Group, University at Buffalo — Buffalo, NY

- Developing **OralScan**, a mobile application using a **YOLOv8 model** for real-time dental **disease classification** and **tooth numbering** from intraoral images.
- Building mobile and web applications using React Native and React for healthcare diagnostics.
- **Co-authored a paper** on the system's formative usability and acceptability study, submitted to the *Smart Health* journal.
- Currently developing an **orthodontics extension** to **track patient braces movements** and classify braces types using **YOLO-based models**.
- Creating deep learning models for accurate orthodontic scoring using depth sensors.

Undergraduate Researcher — *June 2025 - Present*
Peng Research Lab, University at Buffalo — Buffalo, NY

- Conducting research on **symmetry-aware graph neural networks (GNNs)** for crystalline materials, contributing to work detailed in **arXiv:2409.13851**.
- **Migrated** the lab's model tracking and **hyperparameter optimization workflows** from SigOpt to **Weights & Biases (wandb)** for final paper revisions.
- **Benchmarked** and trained models on new GNN architectures, including **ALIGNN**, to evaluate performance for resubmission.
- Contributed to a recent commentary paper on **agentic AI for catalyst discovery** (Peng et al., 2025, ChemRxiv).
- Collaborating with graduate students on high-throughput atomistic simulations and data pipelines.

Professional Experience

Tutor & Peer-Assisted Leader — *August 2024 - Present*
Tutoring & Academic Support Services, University at Buffalo — Buffalo, NY

- Conducting two interactive 1-hour sessions per week, improving students' understanding of Statistics by 30% based on quiz performance and feedback
- Providing in-depth explanations, answering student queries, and reinforcing key concepts during PAL sessions
- Serving as both a tutor and Peer-Assisted Learning (PAL) leader, helping students master statistical concepts

Founder & Vice President (NSDC) — *October 2023 - May 2024*
UB National Student Data Corps — Buffalo, NY

- Led the development and launch of the NSDC website, improving event coordination and communication
- Co-founded and led the University at Buffalo chapter of the National Student Data Corps
- Planned and executed various data science workshops and networking events, establishing a strong network of data science enthusiasts at UB.

Technical Projects

Marine Guardian: Ship Detection in Satellite Imagery *Computer Vision & Deep Learning*

- Developed computer vision system for detecting ships using first principles of computer vision
- Implemented roundness-based classification achieving **98.72% accuracy with MobileNetV2**
- Created fast detection algorithm using geometric properties for real-time maritime monitoring
- Used transfer learning with pre-trained EfficientNet as encoder with custom decoder
- Technologies: Python, OpenCV, TensorFlow, EfficientNet, MobileNetV2, ResNet50, KMeans

OralScan: AI-Powered Dental Care *Healthcare AI & Mobile Development*

- Developed mobile and web app for accessible, AI-driven oral health diagnostics and care recommendations
- Built React Native mobile app and React web dashboard for real-time dental screening
- Integrated **YOLOv8** for disease/tooth detection and **ResNet50-based CNNs** for image analysis
- Empowered seniors and underserved communities with real-time, at-home dental screening
- Implemented guided camera system for easy image capture and secure server for data storage
- Technologies: React Native, React, Python, **YOLOv8**, ResNet50, Secure Server

People Counting using CSRNet *Deep Learning & Computer Vision*

- Developed deep learning system for accurate people counting in dense crowd scenarios
- Implemented CSRNet architecture to handle occlusions and improve detection robustness
- Technologies: PyTorch, CSRNet, Computer Vision, CUDA, OpenCV

Human Emotion Detection *Computer Vision & AI*

- Engineered emotion detection system leveraging CNN, ResNet-34, and Vision Transformer (ViT)
- Achieved 87.5% accuracy in classifying human emotions from images
- Technologies: PyTorch, TensorFlow, CNN, ResNet-34, Vision Transformer, OpenCV

Pathfinding Visualizer *Algorithm Visualization*

- Developed interactive pathfinding visualizer in Python using Pygame
- Implemented A* search algorithm for real-time visualization with customizable grid-based interface
- Technologies: Python, Pygame, A* Algorithm, Data Structures

Personalized Student Shell (PSS) *Command Line Interface*

- Designed command-line shell to enhance student workflow with custom aliases and command history
- Implemented auto-completion, code execution, tutorials, and gamification elements
- Technologies: Python, SQLite, JSON, CLI, Gamification

UB Hacking Classifier Web App *Web Development*

- Co-developed Classifier Web App during a hackathon, focusing on backend and database architecture
- Built responsive front-end using ReactJS, MUI, and CSS
- Technologies: React, MUI, Firebase, Node.js, Express.js

Competitions & Challenges

- **Russell L. Agrusa CSE Student Innovation Competition** (November 2024) - Team Member, OralScan project
- **Aging Innovations Challenge** (November 2024) - Team Member, OralScan project
- **Community Champions for Disability Health Challenge** (October 2024) - PI, OralScan project

Research Presentations

- **Oral Presentation and Demo** - CTSI Research Group of Doctors, Nurses, and Medical Students (April 2024)
- **Oral Presentation** - SUNY Undergraduate Research Conference (SURC) (April 2024)

Publications & Preprints

- Soni, P., **Dandapat, K.**, Gherardi, A., Bo, W., Li, R., & Xu, W. (2025). "OralScan, an AI-Powered Mobile Tool for Geriatric Oral Healthcare: A Formative Usability and Acceptability Study." (Submitted to *Smart Health*).
- Peng, J., Liu, C., Luo, Y., & **Dandapat, K.** (2025). "Accelerating Multimetallic Catalyst Discovery with Robotics and Agentic AI." *ChemRxiv*, ver. 1. DOI: 10.26434/chemrxiv-2025-13n3f.
- Peng, J., et al. (2024). "Learning Ordering in Crystalline Materials with Symmetry-Aware Graph Neural Networks." *arXiv Preprint*, arXiv:2409.13851. (Contributed to revisions and benchmarking).

Honors & Awards

- **Cybersecurity Excellence:** Qualified for Top 100 in the World, Northeastern Cybersecurity C2C Finals, Placed 10th in the final, 2025
- **Collegiate Lockdown:** Top Two Teams Representing UB, Placed 4th in Finals, 2025
- **Dean's List:** University at Buffalo (Fall 2023, Spring 2024, Fall 2024)
- **Presidential Scholarship:** Awarded $15,000 per annum

Certifications & Credentials

- **Machine Learning Specialization** - Stanford University & DeepLearning.AI (Coursera)
- **Deep Learning Specialization** - Stanford University & DeepLearning.AI (Coursera)
- **PyTorch for Deep Learning** - Udemy Certificate
- **Deep Learning Masterclass** - TensorFlow 2, Neural.ai
- **Django Masterclass** - Tim Buchalka (Udemy Certificate)
- **Node.js, Express, MongoDB** - Jonas Schmedtmann (Udemy Certificate)
- **The Ultimate React Course 2023** - Jonas Schmedtmann (Udemy Certificate)
- **Python Programming Masterclass** - Tim Buchalka (Udemy Certificate)

Technical Skills

- **Programming Languages:** Python, JavaScript, Java, C++, Rust
- **AI/ML Frameworks:** PyTorch, TensorFlow, Computer Vision, Deep Learning, CNN, ResNet, Vision Transformer
- **Web Development:** React, React Native, Node.js, Django, Express.js
- **Databases:** MongoDB, SQL, Firebase, SQLite
- **Tools & Libraries:** Git, CUDA, OpenCV, NumPy, Matplotlib, Pygame
- **Cloud & Deployment:** Firebase Hosting, Google Colab

Research Interests

- Artificial Intelligence and Machine Learning
- Computer Vision and Deep Learning
- Healthcare Technology and Digital Health
- Quantum Computing Applications
- Energy Systems Optimization
- Mobile and Web Development