Sankalp Vaish

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GitHub | Linkedin | Portfolio

PROFESSIONAL SUMMARY

Innovative and research-driven AI specialist with a strong focus on **computer vision, machine learning, and data-driven solutions**. Currently a PhD candidate exploring advanced techniques for **facial recognition, security systems, and intelligent automation**. Experienced in **vision analysis, web development, and AI-driven software solutions**, with ability to translate complex algorithms into real-world applications. Passionate about leveraging AI to solve challenging problems in security, automation, and biometric authentication while continuously expanding expertise in cutting-edge technologies.

TECHNICAL SKILLS

Programming Languages	:	PYTHON, JAVA, GNU Octave, C, C++, Solidity.
Field of study	:	Machine learning, Software Dev., Computer Vision, NLP, LLMs, Data Science.
Database and Frameworks	:	MongoDB, MySQL, PostgreSQL, SQL Server, .Net, Apache Ant.
Web Design	:	HTML, CSS, JavaScript, jQuery, React.js, Django, MERN, WebGL, THREE.js.
Cloud Platforms and CI/CD tools	:	Amazon Web Services, Microsoft Azure, JSON, GitHub and GitLab, Web APIs.

ACADEMIC PROFILE

University of Massachusetts Boston — Sep ’24 – Dec’ 26
PhD: Computer Science, GPA: 4.0

University of Massachusetts Boston — Sep ’22 - May ’24
Master of Science: Computer Science, GPA: 4.0

National Institute of Technology, Warangal — Sep ‘21- Aug ‘22
P.G. Diploma in Machine Learning and Artificial Intelligence, GPA: 4.0

National Post Graduate College, Lucknow — Oct ‘21- Jun ‘22
P.G. Diploma in Remote sensing and GIS, GPA: 3.5

University of Lucknow, Lucknow — Jul ‘18 - Jun ‘21
Bachelor of Science: Computer Science and Statistics, GPA: 3.5

PROFESSIONAL EXPERIENCE

Research Assistant—MobCP Lab, UMass Boston — May ‘25 – Present

- Designed and implemented a multimodal framework combining video (facial Action Units), audio (prosodic cues), and text (linguistic features) for early dementia and depression detection. Using models like MiVOLO, ResEmoteNet and OpenFace.
- Conducted comparative experiments across modalities and models (NN vs. LLM) to evaluate detection performance. Aim to develop a scalable, home-based, contactless screening tool for early cognitive impairment and mental health assessment.
- Design and implement a secure federated authentication framework integrating ADFS with Exchange Server 2019 and other enterprise applications. Configured claims-based authentication, custom SSL certificates, and certificate trust to strengthen identity management using YubiKey-based multi-factor and smart card authentication for Windows logins, and Fortinet VPN.

Research Assistant—Visual Attention Lab, UMass Boston — May ‘23 – May ‘25

- Worked on improving image quality by developing various filters for detecting blur or contrast for better face recognition.
- Developed a website to collect data of different users and then used this data to make a classifier to perform this action on its own.
- Developed a model to identify and select best image from a set, ensuring optimal data for training and preventing model corruption.
- Extracted frames and marked humans to create data for model training to improve human detection in video analysis.
- Implemented advanced techniques to fine-tune YOLOv8 for enhanced object and human detection in security camera footage.
- Performing Knowledge Distillation: transferring knowledge from teacher model like Grounding Dino to student model.
- Collaborating on projects related to healthcare technology, including the detection of dementia using voice assistant systems and for older adults. Analysing physical function such as gait speed, sit-to-stand ratio and balance for dementia detection.
- Elevator Analysis & Detection System: Developed a system to detect elevator regions, available floor space, current floor, movement direction, and door status in real time.

Teaching Fellow—Computer Science, UMass Boston — Sep ‘24 – Present

Instructor | Data Structures in Java

- Taught Data Structures in Java, covering topics like arrays, lists, stacks, queues, trees, and algorithmic problem-solving.

Instructor | Introduction to Programming in Python

- Taught Introduction to Python, focusing on fundamental programming concepts, data structures, and real-world applications.

Responsibilities- Develop and assess assignments, projects, and exams, Design interactive learning materials for student engagement. Provide mentorship and academic support to enhance problem-solving and coding skills.

Assistant Teacher—Sky Public School, Lucknow, India Dec '21 – Jul '22

- Teaching Python, basic concepts of database and assembly language to junior high school and high school students.
- Responsibilities- Teaching, In-charge of software and hardware solutions.

RESEARCH PAPERS AND PUBLICATIONS

- Rishank Singh, **Sankalp Vaish**, Xiaohui Liang, John Batsis, Jennifer Grace Poole, Danae Gross, Clinical Geriatric **Functional Assessment using Wearable Sensing and Machine Learning**, IEEE International Conference on E-health Networking, Application & Services, Healthcom 2024.

TECHNICAL PROFILE

Dementia Detection via Alexa Interactions Aug '25-Dec '25- Built a contactless system to assess cognitive decline in older adults by analysing facial muscles and speech during structured Alexa interactions, using multimodal features correlated with MoCA scores.
Diabetes Distress Sept '25-Nov '25- We built a voice-based sentiment analysis model that can analyse and predict distress levels from real audio and conversation transcripts from patients dealing with chronic disease, helping improve patient–doctor communication.
Cybersecurity Project May '25-Jun '25- Worked with a local government to integrate ADFS into their server environment, enabling secure single sign-on for multiple applications like Exchange. Implemented YubiKey-based multi-factor authentication with ADFS and configured smart card authentication for secure Windows logins. Also, integrated YubiKey-based authentication for Fortinet VPN.
Elevator Analysis Oct '24-Mar '25- Developed a real-time elevator detection system capable of identifying elevator regions. Leveraged computer vision and machine learning to enhance accuracy and responsiveness, enabling intelligent monitoring and automation in elevator.
Facial Recognition Jul '24-Nov '24- Designed an image scoring system to filter low-quality and misleading facial images before model training. Trained the model using centroids of image embeddings (EfficientNet), enhancing recognition robustness and efficiency.
Dementia Detection Apr '24-Jun '24- Conducted data analysis and model development to enhance early detection and monitoring of age-related functional decline. Designed a classification system to categorize changes in physical function into three classes: improved, similar, and declined. Enhanced dataset size by pairing features, eliminating the need for cross-validation, and ensuring robust training.
Object Detection and Tracking Jan '24-Mar '24- Developed an algorithm to track and count person in a video by calculating Euclidian distance between centroids of new and previous model using YOLOv8 and finetuning with custom dataset for better results.
UMass 3D Model Sep-Dec '23- A 3D visualization of University of Massachusetts Boston building models using blender and rendering them using three.js with floor maps for each floor for better navigation. It also includes 3D visualization of university from inside-link .
Predicting Hand Gestures Sep-Dec '23: Combining multivariate data of 25 dimensions and 51 timesteps into one, then creating atomic units by using clustering for each sample then using different models to train and predict 6 various hand gestures on deck of aircraft carrier.
FaceRank Website June '23-Aug '23- Developed a website MERN stack to collect data of ranking 3 best and 3 worst face images from a set of images of different users and then used this data to make a classifier to perform this action on its own to improve recognition.
Real-State Investment Website Feb '23-May '23- Developed a website using Django stack to show properties available for buying on location and implement a calculator which calculated cash on cash ROI and cashflow along with other relevant details from given data.
Forecast Cab Booking, Oct-Dec '22- Combined historical usage patterns with publicly available data sources, such as weather data, to predict if most people will book a cab in a city. Accordingly, the company could determine whether to deploy more or fewer cabs on a day.
Handwritten Character Recognition, Jul '22- The aim of this project is to automatically convert handwritten text into machine encoded text using deep learning, natural language processing, feature extraction and CTC decode layer after cleaning messy data.
Date Cleaner, July '20- Worked with messy medical data, used regular expression to extract information from it and sorted them.
Spelling Recommender, Jun '20-Different recommenders that takes misspelled word and recommends correct word using NLTK

AWARDS AND ACHIEVEMENTS

- Received Public Choice Award for AI Hackathon hosted by UMASS Boston for Diabetes Distress project, October 31, 2025
- Received grade A in Blockchain Professional Certificate by Edureka, November 17, 2021
- 100% in HTML, CSS, JavaScript certificate with by Johns Hopkins University through Coursera, June 26, 2021
- 91.2% in Applied Machine Learning certificate from University of Michigan through Coursera, August 29, 2020
- 96.16% in Applied Text Mining certificate from University of Michigan through Coursera, Sept 25, 2020
- 96.58% in Introduction to Data Science certificate from University of Michigan through Coursera, Aug 17, 2020
- Secured 91.6% in Neural Networks and Deep Learning certificate through Coursera, August 12, 2020
- Received 96.16% marks in What is Data Science certificate by IBM through Coursera, July 20, 2020
- Achieved 100% marks in Introduction to AI certificate by IBM through Coursera, June 12, 2021
- Awarded for obtaining 100% marks in ICSE Board Examinations in Computer Science, 2016
- Won a gold medal for 14th National Cyber Olympiad, 2015

COURSEWORK AND CERTIFICATIONS

- Earned a certification in Object-Oriented Programming in Java from LinkedIn Learning, September 15, 2022.
- Earned a certification in Data Structures in Java from LinkedIn Learning, September 12, 2022.
- Completed a certification in Deep Learning, Machine Learning, Python, and Pandas through Kaggle, Aug 2020.

INTERESTS

Teaching, Puzzle Solving, Travelling, Reading, Swimming.