Yusuf Hasan

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Education

Aligarh Muslim University — Aligarh, India
Bachelor of Technology in Computer Engineering — *2021 – 2025*

Technical Skills

Languages: Python, C/C++
Technologies/Frameworks: Keras, NumPy, TensorFlow, Pandas, Matplotlib, OpenCV, Open3D, PyTorch, LangChain.js, RAG
Tools: Git, GitHub, VS Code, Visual Studio, Google Colab, LaTeX, Docker
Operating Systems: Linux, Windows
IoT Platforms/Hardware: Arduino, NodeMCU, Raspberry Pi, Jetson Xavier, Electronic Speed Controller (ESC), Intel RealSense, Actuators
Web Development: HTML, CSS, JavaScript, Node.js, PHP, MySQL
Soft Skills: Communication, Teamwork, Creative Thinking, Adaptability, Critical Thinking

Experience

AI/ML Engineer — June 2024 – February 2025
Alinor-Tech — *Germany*

- Developed AI tool for automated single-tree detection and segmentation processing 50,000+ training polygons from airborne laser scanning and 4-channel aerial imagery
- Implemented multi-class tree classification system achieving 95% accuracy for coniferous/deciduous species and living/dead tree identification using CNN architectures with F1-Score of 80%
- Implemented crown delineation algorithms with 55% Intersection over Union (IoU) accuracy

AI/ML Engineer — June 2023 – March 2024
Geo Analysis Engineering — *Germany*

- Designed and deployed scalable deep learning systems for real-time microcrack detection, building robust data pipelines to process high-throughput sensor data from ultrasonic grids
- Designed and implemented MicroCracksAttNet50E using transformer architectures with optimized self-attention mechanisms and 1D convolution layers, achieving 15% performance improvement over baseline while reducing computational overhead by 30%
- Developed hybrid CNN-GRU architecture with custom loss functions and optimized activation layers, creating lightweight microservices for both batch and real-time inference with comprehensive testing and monitoring frameworks

Full Stack Web Developer Intern — February 2023 – May 2023
Green Genius Enviro Solutions — *India*

- Designed and developed a comprehensive website to automate data monitoring and analysis for cloud-connected environmental devices
- Built full-stack web application with frontend and backend components for real-time data visualization
- Created company profile and services pages highlighting environmental monitoring offerings and capabilities
- Integrated cloud-based solutions for scalable and reliable environmental data handling and storage

Projects

GitHub Webhook Receiver with Flask + MongoDB | *Flask, MongoDB, HTML/CSS/JS* — *Link*

- Created a webhook listener that receives GitHub events (push, pull request, merge) using Flask framework and stores them in MongoDB database
- Built a responsive frontend UI to display received events in real-time with automatic refresh functionality every 15 seconds

InSight Scholar | *LangChain.js, OpenAI API, Node.js*

- Designed and developed a RAG-based intelligent chatbot leveraging LangChain.js and OpenAI's API for answering queries on scientific research papers.
- Integrated a scalable frontend-backend architecture using Node.js.

- Aimed to assist researchers and students in extracting insights and understanding key aspects of academic publications.

Perception and Control Stack for ROV | *Computer Vision, Machine Learning, Python* *Link*

- Developed custom machine learning and computer vision algorithms for underwater object identification and classification based on size, shape, and texture
- Trained deep learning models on large synthetically generated datasets to enable robust underwater perception in challenging conditions
- Implemented real-time object detection and tracking system for remotely operated vehicle navigation

Stewart Platform Control Tool | *Streamlit, Computer Vision, Neural Networks* *Link*

- Built a Streamlit-based AI tool for controlling a Stewart Platform using multimodal neural networks (ResNet50, VGG, PoseNet) to predict 6-DOF motion
- Integrated OpenCV and ArUco marker tracking for accurate pose estimation and real-time robot state monitoring
- Developed live video processing pipeline with IMU data fusion for enhanced motion prediction accuracy

Research Publications

MCMN Deep Learning Model for Precise Microcrack Detection in Various Materials
ICMLA 2024, Florida, USA
Yusuf Hasan, Fatahlla Moreh, Zarghaam Haider Rizvi, Frank Wuttke, Sven Tomforde *Link*

- Proposed the MicroCracksMetaNet50E (MCMN) model inspired by Meta's SAM architecture.
- Introduced a novel decoder design enabling improved microcrack detection over conventional methods.

Wave-Based Neural Network with Attention Mechanism for Damage Localization in Materials
ICMLA 2024, Florida, USA
Yusuf Hasan, Fatahlla Moreh, Zarghaam Haider Rizvi, Frank Wuttke, Sven Tomforde *Link*

- Developed a wave-based neural network that leverages attention mechanisms to reduce complexity while maintaining performance.
- Demonstrated effectiveness in localizing microcracks within material structures.

Real-time Underwater Video Feed Enhancement for Autonomous Underwater Vehicles (AUV)
SPIE Defense + Commercial Sensing 2024
Yusuf Hasan, Dr. Athar Ali *Link*

- Enhanced real-time video feed quality for AUVs using deep learning and computer vision techniques.
- Addressed underwater visibility and distortion issues through real-time enhancement and detection systems.

Design and Implementation of Autonomous Underwater Vehicles' Software Stack
PIECON 2023, Aligarh, India
Yusuf Hasan, Disha Singh, Kulsoom Masood, Nabeel Jamshed, Yahya Farooq, Huzaif Ahmad *Link*

- Developed a comprehensive software stack for underwater vehicle control and perception.
- Integrated object detection and sensor fusion for robust navigation and stability maintenance.

Achievements

March 2024	First Prize winner in MTS Nanda Student Innovation Award presented by MTS India Section.
March 2023	Selected among top 25 student projects to represent the university in MTS Nanda Student Innovation Award presented by MTS India Section.
February 2023	Third Prize in AMUROVc 2.0, a national-level Remotely Operated Underwater Vehicle Challenge organized by Marine Technology Society AUV-ZHCET Club, AMU.
February 2023	Secured 3rd Rank in the last semester of Computer Engineering in a class of 65 students at AMU, Aligarh.