YUSUF HASAN

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Research Interests

Deep learning, Computer vision, Cyber Security and Autonomous/Remotely Operated Vehicles

Education

- **B.Tech Computer Engineering |** *Zakir Husain College of Engineering and Technology, AMU* *2021 - 2025*
  8.67 CPI

Skills

Languages – Python, C/C++,Java

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 System – Linux, Windows.

IoT – Arduino, Node MCU, Raspberry pi, Jetson Xavier, Electronic Speed Controller (ESC), Intel realsense, Actuators.

Web Development– HTML, CSS, Javascript, NodeJs, PHP, MYSQL.

Soft Skills – Communication, Teamwork, Creative Thinking, Adaptable and Critical Thinking.

Professional Experiences

1. **AI/Ml Engineer at Alinor-Tech Germany** **(June 2024 - February 2025)**
   - Developed AI software solutions for automated tree localization and classification from multimodal datasets
   - Implemented machine learning algorithms to classify trees as deciduous, coniferous, living, and dead using point cloud and RGB image data

2. **AI/Ml Engineer at Geo Analysis Engineering Germany** **(June 2023 - March 2024)**
   - Conducted research and development on neural network-based crack detection systems for infrastructure monitoring
   - Implemented and evaluated multiple deep learning architectures including Hyper Convolutional Neural Networks and Transformer models and state-of-the-art computer vision models including Meta's Segment Anything Model (SAM)
   - Delivered comprehensive analysis and recommendations for optimal crack detection methodologies

3. **Full stack web developer Intern at Green Genius Enviro Solutions** **(March-May 2023)**
   - Designed and developed a website for automating data monitoring and analysis for cloud-connected environmental devices.
   - Worked on both frontend and backend development.
   - Key features:
     - Company Profile and Services: Highlights the company's mission and services in environmental monitoring.
     - Device Dashboards: Allows users to view real-time data, historical trends, and analysis from their devices online.
   - Integrated cloud-based solutions for reliable and scalable data handling.

Projects

- **InSight Scholar: A RAG-Powered Chatbot for Processing and Analyzing Scientific paper**
  - This project implements a RAG-based intelligent chatbot leveraging LangChain.js and OpenAI's API, integrated into a scalable frontend-backend stack using Next.js and deployed via Vercel.
  - InSight Scholar is an intelligent chatbot designed to assist researchers, students, and analysts in interactively exploring, understanding, and deriving insights from scientific literature.

- **Perception and Control stack for Remotely Operated Vehicle (ROV) 🔗:**
  - Developed a custom machine learning and computer vision algorithms to identify and classify objects based on their size, shape, texture, and other features.
  - Trained the model on a large synthetically generated dataset.

- **GitHub Webhook Receiver with Flask + MongoDB 🔗 :**
  - This project implements a Flask-based webhook receiver that listens to GitHub events (push, pull_request, merge) and stores them in MongoDB.
  - A minimal frontend UI displays these events in real-time, refreshing every 15 seconds.

- **Android Malware Detection**
  - Developed a Machine Learning-based Android Intrusion Detection Systems
  - successfully developed a Machine Learning-based Android Intrusion Detection System.
  - This system leverages advanced machine learning techniques to identify and mitigate potential threats and malicious activities on Android devices.

Research Publications

- **"MCMN Deep Learning Model for Precise Microcrack Detection in Various Materials"**
  2024 International Conference on Machine Learning and Applications (ICMLA) Florida, USA
  Yusuf Hasan, Fatahlla Moreh, Zarghaam Haider Rizvi, Frank Wuttke, Sven Tomforde
  This paper presents the MicroCracksMetaNet50E (MCMN) deep learning model, inspired by Meta's Segment Anything Model (SAM). MCMN model incorporates a novel decoder architecture that sets it apart from traditional approaches.
- "**Wave-Based Neural Network with Attention Mechanism for Damage Localization in Materials**"
  2024 International Conference on Machine Learning and Applications (ICMLA) Florida, USA
  Yusuf Hasan, Fatahlla Moreh, Zarghaam Haider Rizvi, Frank Wuttke, Sven Tomforde
  Our work demonstrates the effectiveness of attention mechanisms in reducing network complexity while maintaining robust performance and was able to detect micro cracks.
- "**Real-time underwater video feed enhancement for Autonomous Underwater Vehicles (AUV)**"🔗
  Multimodal Image Exploitation and Learning 2024 (SPIE Defense + Commercial Sensing 2024)
  Yusuf Hasan and Dr. Athar Ali
  Our research enhanced AUV-based underwater object detection using computer vision and deep learning models. We addressed visibility challenges and optical distortion in real-time through a real time image enhancement and object detection system.
- ''**Design and Implementation of Autonomous Underwater Vehicles' Software Stack"**🔗
  2023 International Conference on Power, Instrumentation, Energy and Control (PIECON), Aligarh, India
  Yusuf Hasan, Disha Singh, Kulsoom Masood, Nabeel Jamshed, Yahya Farooq and Huzaif Ahmad
  The software stack has been designed for maneuvering a vehicle with in-depth perception. This involves underwater object detection and sensor data fusion for navigation and maintaining stability.

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.

MOOCs and Online Certifications

- *Completed* – AI for Everyone: Master the Basics A course of study offered by IBM on EDX.
- *Completed* – Python A course offered by Kaggle.
- *Completed* – Intro to Machine Learning A course offered by Kaggle.
- *Completed* – Programming with C++ Language: The Complete Course
- *Completed*— Deep Learning A-Z TM: Hands-On Artificial Neural Network

Volunteer Experience

1. **Computer Team Lead : Marine Technology Society (MTS) AUV-ZHCET** **(Present)**
   MTS AUV-ZHCET Club, Aligarh Muslim University
2. **Team Captain AMUROVc : Marine Technology Society (MTS) AUV-ZHCET** **(Feb 2023)**
   Aligarh Muslim University
3. Gave a talk on STEM and Robotics in various workshops organized by the student club.