Muhammad Umer Farooq

Computer Science Student

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Projects

AI-POWERED PRECISION AGRICULTURE USING AUTONOMOUS DRONES AND IOT SENSORS | Final Year Project

Oct 2024 - Present | Namal University

- Developed machine learning models for crop monitoring, irrigation optimization, and predictive analysis using large agricultural imagery datasets.
- Created user-friendly mobile and web applications for farmers and agri-businesses to enhance productivity and resource efficiency.
- Designed models to identify healthy vs. unhealthy crops, detect pesticide usage, optimize irrigation, and diagnose crop diseases with actionable insights.

NETWORK SECURITY MONITORING WITH WAZUH AND SURICATA | Cybersecurity Project

July 2024 | Namal University

- Installed and configured Wazuh, including the indexer, manager, and dashboard to establish a robust security monitoring infrastructure.
- Integrated Suricata for real-time network threat detection and developed a logging system to monitor and save network traffic effectively.
- Utilized Wazuh's tools for security insights and reporting, enabling enhanced threat analysis and mitigation strategies.

CYBERATTACK DETECTION ON IOMT DEVICES | Deep Learning Approaches

May 2024 | Namal University

- Developed advanced machine learning and deep learning techniques to detect cyberattacks on IoMT devices in healthcare, enhancing device security.
- Utilized the CICIoMT dataset for training and evaluation, focusing on various attack classes, including DDoS and spoofing attacks.

HEDY IN URDU | Converting Hedy -A Gradual Programming language to Urdu

Nov 2022 – May 2023 | Namal University

- Collaborated under the guidance of Dr. Junaid Akhtar to adapt Hedy, a gradual programming language, for Urdu speakers, enhancing accessibility.
- Developed a proof of concept showcasing the functionality of the Urdu adaptation, demonstrating its potential in programming education.

WHY PAKISTAN IS THE WAY IT IS? | Data Science Project

Feb 2022 | Namal University

- Conducted a comprehensive data science project to rank countries based on economic, social, and environmental well-being using the Gapminder dataset from 1952 to 2012, employing pandas for data preprocessing and analysis.
- Formulated hypotheses on socio-economic factors affecting Pakistan, translating them into actionable insights and visualizations that addressed the question, "Pakistan Aisa Kyun Hai?"

Education

NAMAL UNIVERSITY

Mianwali, Punjab

Bachelor of Science in Computer Science

Class of 2025

CGPA: 3.48 / 4.0

Skills

LANGUAGES

Proficient:

C • JavaScript • SQL • Python • HTML • CSS

Experienced:

Python • LaTeX • C++

Familiar:

Shell • Assembly • TypeScript

LIBRARIES/FRAMEWORKS

Django • Flask • FastAPI • TensorFlow • Pytorch

TOOLS/PLATFORMS

Git • Docker • AWS
Firebase • MongoDB • MySQL

Hardware:

Raspberry Pi • Arduino

TECHNOLOGIES

Linux • Tkinter • Pandas • Numpy
scikit-learn • Matplotlib • OpenCV

Coursework

Quantitative and Computational Reasoning • Object Oriented Programming • Data Structures and Algorithm • Artificial intelligence • Machine Learning • Analysis of Algorithm • Software Engineering • Digital Image Processing • Computer Vision • Information Security • Cyber Security

Experience

GENERATIVE INTELLIGENT SYSTEMS (GENISYS) LAB | Research Assistant

Aug 2024 – Present | Namal University, Mianwali

- Collaborated with Dr. Khawar Khurshid on research projects focused on Urdu ligature recognition and its applications in computer vision, contributing to the development of algorithms for enhanced text recognition.
- Assisted in data collection, preprocessing, and analysis while participating in the design and implementation of experiments to evaluate the performance of proposed models and techniques.

NAMAL UNIVERSITY, MIANWALI | Linear Programming Course Teaching Assistant

Feb 2024 – Sep 2024 | Mianwali, Punjab

- Assisted in the Linear Programming course by grading assignments, conducting lab sessions, providing one-on-one student support, and designing practice problems, enhancing the learning experience for over 50 students.

NAMAL UNIVERSITY, MIANWALI | Machine Learning Course Teaching Assistant

Oct 2024 – Present | Mianwali, Punjab

- Supported Dr. Israr in the Machine Learning course by grading assignments, leading lab sessions, offering individual student assistance, and developing practice problems, thereby enriching the educational experience for over 50 students.

Publication

USEQNET: A LARGE-SCALE SYNTHETIC DATA FRAMEWORK FOR SEQUENTIAL NEURAL ARCHITECTURE IN URDU TEXT RECOGNITION | Co-Author | 2025

Status: In Progress

Namal University, Mianwali

- Conducted an exhaustive study on Urdu ligature recognition, generating a custom dataset focused on five-letter words of about 1100,000 words to enhance the training of machine learning models.
- Currently drafting a research paper detailing our findings and the development of a custom architecture that demonstrates superior performance across various Urdu ligature datasets, addressing the challenges of resource-scarce languages.

PARALLEL ATTENTION-ENHANCED PA-NET FOR RETINAL VESSEL SEGMENTATION WITH EDGE-GUIDED REFINEMENT | Co-Author | 2025

Status: In Progress

Namal University, Mianwali

- Extended PA-Net by integrating a Lightweight Parallel Transformer (LPT) module at the bottleneck to enhance long-range dependency modeling and local vessel detail preservation.
- Designed Adaptive Feature Fusion Modules (AFFMs) to selectively merge multi-scale encoder and decoder features, promoting fine-grained context aggregation.
- Incorporated an auxiliary Edge Prediction Branch to refine vessel boundary detection, improving segmentation accuracy for thin and low-contrast vascular structures.

Volunteering

NAMAL ENVIRONMENTAL SOCIETY (NES) | Marketing Head

Jan 2024 – Oct 2024 | Namal University, Mianwali

- Assisted in managing and coordinating society activities, fostering member collaboration to cultivate a culture of innovation and learning in environmental conservation.
- Organized workshops, seminars, and events to enhance environmental awareness and knowledge-sharing among students, bridging the gap between knowledge and action.

NAMAL SOCIETY FOR SOCIAL IMPACT (NSSI) | Teacher

Jan 2023 – June 2023 | Namal University

- Teaching a diverse curriculum including mathematics, computer science, and English to underprivileged students, aiming to enhance their academic skills and promote digital literacy.

NAMAL OPENSOURCE SOCIETY (OSS) | Research Assistant

Jan 2022 – Dec 2022 | Namal University, Mianwali

- Led initiatives to raise awareness about open-source technologies among students, organizing events and workshops that promoted collaboration and knowledge sharing.

- Directed a team of technology students to develop projects, fostering a culture of innovation and teamwork within the society.

Awards

HACKATHON WINNER | Codex Competition | 2023

Namal Computing Society, Namal University

- Secured **first place** in the **Codex Competition 2023**, demonstrating outstanding performance in problem-solving and coding against top talent from various universities in Pakistan.

VISIO SPARK CODING COMPETITION | National Level | 2024

COMSATS University, Wah Campus

- Achieved **third place** in the Visio Spark National Level Coding Competition, competing among talented programmers from across Pakistan, showcasing strong analytical and technical abilities.

CODEX 2.0 | National Level | 2024

Namal Computing Society, Namal University

- Secured **first place** in the Codex 2.0, a national-level coding competition, excelling in algorithm design and problem-solving among participants from leading institutions across Pakistan.