Usama Jahangir

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SYNOPSIS

Mechatronics Engineer with a focus on robotics and computing, backed by ~ 2 years of industry experience in embedded systems, industrial automation, and sensor fusion, complemented by academic research. Passionate about leveraging advanced algorithms, real-time systems, and human-robot interaction to develop adaptive technologies that address societal challenges.

EDUCATION

National University of Sciences and Technology Islamabad, Pakistan

BEng. Mechatronics Engineering (CGPA: 3.66, Rector's Gold Medal) Graduation Date: Jun 2023

Minor Coursework: Introduction to Machine Learning, Automotive Manufacturing Systems, Database Fundamentals

Audited Master's Courses: Artificial Neural Networks, Advance Embedded Systems, Biomedical Instrumentation

WORK EXPERIENCE

Software Motion Suzhou, China (Remote)

Algorithm Engineer Dec 2024 - Present

- Contributing to object and ego-motion modules of Level 2 ADAS by fusing camera and radar data for ACC, AEB, and LCC
- Designed algorithm for lane lines fusion (Kalman Filters) and tracking (Track-to-Track Association) for LAC and LDW using C

Cowlar Design Studio (Y-Combinator) Islamabad, Pakistan

Team Lead, Industrial Automation Sep 2024 - Oct 2024

- Led a team of 5 to automate fiber assembly processes using custom AI-powered robots, resulting in 4x throughput increase
- Directed client communication, weekly meetings, and task delegation to deliver mission-critical support for production robots
- Contributed to component integration, optimized control logic and data flow, driving improvements in automation performance

Embedded Design Engineer Jun 2023 - Aug 2024

- Led prototype development of a fiber insertion robot with 250 microns precision in 15 days, leading to successful demo
- Collaborated with a cross-functional team of 50+ professionals, contributing to 5 Android applications using Kotlin and C
- Developed "Sensor App" from scratch, integrating IMU, cameras and barcode scanners, currently deployed in smart carts
- Automated deployments with Docker and Shell based GitLab runners, improving various pipelines efficiency by upto 60%
- Created automation scripts for testing, and maintenance using Python and shell scripting, streamlining operational efficiency

Qadri Group Lahore, Pakistan

Leaders For Manufacturing Intern Jul 2022 - Sep 2022

- Conducted ergonomics analysis, tested fixtures designs to improve labor output for 3 parts, improving throughput by 33%
- Collaborated with multideciplinary team of 3 and presented feasibility reports and solutions, driving informed decision-making

National Centre of Robotics and Automation Jul 2021 - Aug 2021

Biomedical Research & Development Intern Rawalpindi, Pakistan

- Restored a 3D-printed, parallel manipulator-based "Upper Limb Prosthesis," enhancing control for people with amputations
- Programmed linear actuators in C, enabling multi-grasp capabilities to support dexterity and usability for prosthesis users

PUBLICATIONS

Usama Jahangir, Fahad Aamir, Wajid Ali, Mohsin Tiwana, Hamid Jabbar. (2024). "Assistive Feeding System: Design and Evaluation" Proceedings of the 6th IEEE International Conference of Robotics and Automation in Industry

TECHNICAL SKILLS

Software Development: Python, C, C++, Kotlin, Shell Scripting, Android SDK, Docker, GitLab CI / CD, Git, REST APIs

Embedded Systems: Protocols (CAN, I2C, UART, SMbus, MQTT), ESP32, FreeRTOS, SoC (BCM2711, RK3588, SG865W)

Robotics & AI: ROS2, Sensor Fusion (LKF, EKF), Computer Vision (OpenCV, YOLO), Sensor Integration

Simulation & Prototyping: Proteus, SOLIDWORKS, ANSYS, 3D Printing (FDM), MATLAB/Simulink

PROJECTS

Fiber Termination Line: Led the development of an AI-powered 5-stage optical fiber assembly system, leveraging Python and OrangePi to reduce processing time by 80% (from 60 to 12 minutes). Successfully deployed 1x robot into production workflow.

Fiber Sorting Robot: Contributed in sensor integration and control systems design for automated fiber sorting using Python and OrangePi, achieving 30x faster operation (240 to 8 seconds). 5x robots deployed to assist in production.

Assistive Feeding System: Led a team of 3 to develop a serial robotic manipulator to feed patients, successfully feeding rice to 3 test subjects. Programmed manipulation and control using Python on RaspberryPi 3B platform

Indigenous Harvesting Robot: Led team of 6 to develop mobile robot to harvest fruits, & participated in NERC'22 Competition

Wearable Exo-Glove: Developed TPU-based prototype of a tendon-driven exo-glove as assistive device for stroke patients

Serial USB Driver: Developed a driver in C using JNI to map tty device paths, enabling USB detection for custom devices

SMBus: Implemented SMBus over I2C on ESP32, debugged using logic analyzer and fixed mistakes in the BQ40Z50 manual

Chess 1.0: Created a CLI-based game with graphics using C++, enhancing user engagement through interactive gameplay

AWARDS & ACHIEVEMENTS

Houston Award (Cowlar, 2024)**:** Awarded for exceptional leadership and contributions in Industrial Automation sector

National Grassroots ICT Research Grant (IGNITE, 2024)**:** Awarded for capstone project "Assistive Feeding System"

5x National Television Interviews (2024)**:** Presented "Assistive Feeding System" on ARY News, Samaa TV and 3 more

Rector's Gold Medal (NUST, 2023)**:** Received for best capstone project in Dept. of Mechatronics Engineering NUST

1st Prize (COMMPEC, 2023)**:** Winner in electromechanical system category in this national-level competition

Distinguished Student Award (NUST, (2022, 2023))**:** Received for securing SGPA $>$ 3.5 for four or more consective semesters

VOLUNTEER EXPERIENCE

Alkhidmat Foundation Pakistan — Multan, Pakistan
Volunteer — Oct 2024 - Present

- Volunteering in "Alkhidmat Youth Gathering 9.0" to promote volunteerism by connecting young leaders, and public speakers

Robotics and Automation Club — Rawalpindi, Pakistan
Mentor & Advisor — Sep 2021 - Jun 2023

- Mentored 50+ cross-department students via 3D printing and a series of programming workshops for robotics beginners

NUST Space Systems — Rawalpindi, Pakistan
Team Lead, Avionics — Mar 2021 - Jun 2022

- Led the team to develop the avionics systems based on ESP32 for a model rocket targetting 10,000 ft apogee

LANGUAGES

English: C1 Level (TOEFL Score: 95/120 - Reading: 23, Listening: 26, Speaking: 24, Writing: 22) (Nov 2024)

REFERENCES

Dr. Umar Shahbaz Khan
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