

RUKHSANA PERVEEN

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GitHub: <https://github.com/Rukh-sana>

SUMMARY

Embedded AI researcher with 5+ years' experience integrating hardware and machine learning for autonomous systems. Seeking to leverage expertise in efficient LLMs, sensor fusion, and real-time systems for PhD research in real-time mission optimization for autonomous UAVs.

RESEARCH PUBLICATIONS

- Perveen, K., Perveen, R., & Yasin, A. (2022). Survey of multilingual script identification techniques on wild images. LC International Journal of STEM (ISSN: 2708-7123), 3(1), 1-14.
 - Perveen, R., Hassan, A., & Awais, M. (2020). A synchronverter-based static synchronous compensator approach to compensate nonlinear loads in wind integrated power system. International Transactions on Electrical Energy Systems, 30(9), e12504.
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EDUCATION

Masters in Electrical Engineering

Aug 2015 - Dec 2018

FAST, NUCES, Islamabad

- **Specialization:** Power Electronics, Power Systems, DSP, Smart Grid.
- **Thesis:** Research in Renewable Energy and Power Control Systems.

Bachelors in Electrical Engineering

Oct 2009 - Oct 2013

University of Gujrat, Gujrat Pakistan

- **Specialization:** Power Systems, Generation, Transmission, and Distribution.
 - **Final Year Project:** Design and Implementation of a Solar Power System.
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PROJECTS

Embodied AI Navigation with VLMs

- Implemented Vision-Language Models in Habitat 2.0 to create intelligent agents capable of understanding natural language navigation instructions and performing spatial reasoning tasks with enhanced accuracy.
- Github Repository: <https://github.com/Rukh-sana/embodied-temporal-reasoning/tree/main>

Customer Assistant ChatBot

- Built an AI-powered customer support chatbot using Streamlit, Groq LLM API, FAISS vector search, and Sentence Transformers for intelligent, context-aware customer query resolution with customizable personas and automated CI/CD deployment.
- Github Repository: <https://github.com/Rukh-sana/Customer-Assistant-ChatBot>

LIPINC-V2: Detecting Lip-Syncing Deepfakes

- Developed LIPINC-V2, a state-of-the-art lip-sync deepfake detection framework using Vision Temporal Transformers with multi-head cross-attention to identify spatiotemporal inconsistencies in mouth movements, and created LipSyncTIMIT dataset with 9,090+ deepfake videos from 5 SOTA lip-sync models.
- Github Repository: <https://github.com/Rukh-sana/Multi-Modal-Deepfake-Detection>

ConfigGuard - Firewall Configuration Validator

- Automated firewall configuration validator that analyses rule syntax, detects conflicts, and ensures security policy compliance across network infrastructure.
- **Github Repository:** <https://github.com/Rukh-sana/firewall-config-validator>

IoT-Based Smart Lock for Home Security

- Designed and prototyped a secure IoT locking system, developing the hardware/firmware foundation for on-device voice AI integration.

CERTIFICATIONS & TRAINING

- Google Crash Course on Python – Coursera
- Prompt Engineering for ChatGPT – Vanderbilt University (Coursera)
- 3-Day Workshop on Women Empowerment & Leadership – UN
- 3-Day Workshop on Open Source IC Design Tools – FAST-NUCES
- One-Day CPD Training on Time & Stress Management

WORK EXPERIENCE

Senior Lab Engineer, NUTECH Islamabad

Jun 2022 - Present

- Manage the IoT laboratory and mentor student research projects in embedded AI and machine learning.
- Prototyped and optimized lightweight machine learning models for real-time sensor processing on resource-constrained hardware (STM32, ESP32).
- Developed and implemented comprehensive lab curricula to integrate AI and IoT concepts into the engineering program

Research Associate, Gasame, California United Statesd

Dec 2023 - Apr 2024

- Researched the scope and feasibility of hydrogen-powered electric vehicles and refueling infrastructure.
- Co-developed a context-specific Retrieval-Augmented Generation (RAG) chatbot to assist hydrogen station staff with customer service and maintenance procedures, applying NLP techniques to a real-world industrial domain.

Design Engineer, CACSYS Engineering Islamabad

Dec 2020 - Jun 2022

- Designed and developed embedded systems for industrial automation, forming the hardware foundation for data acquisition used in predictive maintenance and SCADA systems.
- Designed printed Circuit Board (PCB)

Research Assistant, PCRET, Islamabad

Aug 2019 - Dec 2020

- Designed and developed embedded systems for industrial automation, forming the hardware foundation for data acquisition used in predictive maintenance and SCADA systems.
- Designed printed Circuit Board (PCB)

Electro Services, Islamabad

Mar 2015 - Jun 2019

- Developed embedded HMI systems using MATLAB and LabVIEW for real-time control and monitoring of electronic systems
- Created interactive control interfaces for automated system monitoring and human-Machine interaction applications

Teaching Assistant(TA), FAST NUCES, Islamabad

Sep 2016 - Jun 2017

- Developed embedded HMI systems using MATLAB and LabVIEW for real-time control and monitoring of electronic systems
 - Created interactive control interfaces for automated system monitoring and human-Machine interaction applications
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RESEARCH INTERESTS

- LLM Deployment in Drones (Leveraging reinforcement learning for real-time decision-making)
 - Efficient Large Language Models (compression, quantization, and edge deployment)
 - Embedded AI & IoT
 - Real-time OS for AI (AI workloads in autonomous devices)
 - Retrieval-Augmented Generation(RAG)
 - LLM Deployment in Drones (Leveraging reinforcement learning for real-time decision-making)
 - Transformers and Reinforcement Learning
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SKILLS

- **AI/ML:** Vision Transformers, CNNs, multimodal architectures, LLMs (fine-tuning, quantisation, RAG), deepfake detection, generative AI (GANs, diffusion models), PyTorch, TensorFlow, Hugging Face Transformers, OpenCV
 - **Programming:** Python, C/C++, CUDA | Tools: Streamlit, Gradio, Docker, Git, NumPy, Pandas, Flask
 - **Systems:** Embedded AI (STM32, ESP32, Raspberry Pi), edge ML deployment, FreeRTOS, PCB design (Altium Designer)
 - **Research:** LaTeX, technical writing,, multimodal deepfake detection, firewall security validation
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REFERENCES

- Will be provided upon request.