Muzammil Nawaz Khan

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Professional Summary

Versatile AI Engineer with strong expertise in **Generative AI**, **Voice Agents**, and **Computer Vision**. Proven experience in building real-time conversational agents using OpenAI and LiveKit, as well as optimizing deep learning models for biomedical image segmentation (Winner, COMPPEC 2025). Skilled in Python, PyTorch, and deploying automated workflows to solve complex enterprise challenges.

Technical Skills

AI & Machine Learning: PyTorch, TensorFlow, Keras, Scikit-learn, OpenAI API, LLMs.
Voice & Agents: LiveKit, Silero VAD, ElevenLabs, n8n (MCP Server), SIP Trunking, STT/TTS.
Computer Vision: OpenCV, U-Net, SegFormer, YOLO, Image Processing, Object Detection.
Languages & Tools: Python, C++, SQL, Git, NumPy, Pandas, Docker.

Professional Experience

CareCloud Remote / On-site
AI Engineer *July 2025 – Present*

- **Voice AI Front Desk Agent:** Developing a real-time conversational AI agent using **LiveKit**, **OpenAI**, and **ElevenLabs**, integrating **Silero VAD** for seamless voice activity detection.
- **Agent Orchestration:** Implemented an **n8n** workflow acting as a Model Context Protocol (MCP) server to manage conversation state, backend prompts, and call routing logic.
- **Telephony Integration:** Configured **SIP Trunking** to handle inbound calls with logic-based transfer functionality to human agents.
- **Data Pipeline Automation:** Engineered Python scripts to interface with Hikvision NVR systems, fetching raw logs for facial recognition and optimizing workforce analytics.
- **Data Integrity:** Designed logic filters to clean noisy camera data (duplicate records/non-attendance), ensuring accurate HR tracking.

Risetech Islamabad, Pakistan
AI Research Intern *July 2024 – Aug 2024*

- **Neurofusion Project (FYP):** Spearheaded the development of a 3D brain tumor segmentation system using the BraTS20 dataset.
- **Model Optimization:** Benchmarked **3D U-Net** against **SegFormer3D**, selecting the latter to achieve **85%+ accuracy**.
- **Awards:** Won **1st Place at COMPPEC 2025** and received the Departmental Silver Medal for technical complexity.

Academic Projects

Retinal Image Segmentation | *Python, OpenCV*
- Developed a method for segmenting retinal structures using multi-level thresholding and morphological operations to enhance vessel visibility for medical analysis.

Optical Braille Recognition | *Python, OpenCV*
- Built a Python/OpenCV system to recognize Braille characters through dot pattern analysis and noise filtering.

Cat vs Dog Classification | *TensorFlow, Keras*
- Implemented CNN models comparing architectures with/without pooling and dropout to demonstrate effective regularization techniques.

Skin Image Segmentation | *Python, OpenCV*
- Designed a segmentation system using Connected Component Labeling (CCL) and thresholding, achieving high accuracy via post-processing refinement.

Education

National University of Sciences and Technology (NUST) Islamabad, Pakistan
Bachelor of Computer Engineering (CGPA: 3.25) *Nov. 2021 – July 2025*

Professional Certifications

IBM AI Engineering Professional Certificate (Deep Learning, PyTorch, Keras)
IBM Generative AI Engineering Professional Certificate (LLMs, Transformers)
IBM RAG & Agentic AI Professional Certificate (LangChain, LangGraph)
LLMOps (Large Language Model Operations) Specialization – *Duke University*
Informed Clinical Decision Making using Deep Learning – *University of Glasgow*
Modern Data Strategy for Enterprise GenAI – *Fractal*
Complete Modern C++ (C++11/14/17) – *Packt*