MOHAMMAD AQIB

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PROFESSIONAL SUMMARY

- Excellent organization and attention to detail, ensuring high-quality results and consistency across all tasks.
- Good written and verbal communication skills, facilitating clear documentation and effective teamwork.
- Proactive and adaptable team player, thriving in dynamic environments while maintaining strong interpersonal relationships.

EDUCATION

Master of Science (Cross-disciplinary), University of Alberta *July 23 – September 25*
Bachelor of Technology, Aligarh Muslim University *September 18 – July 22*

WORK HISTORY

Research Assistant *August 25 – Present*
University of Alberta *Edmonton, AB*

- Developed an AI-powered Excel platform to automate early-stage budgeting for civil infrastructure projects.
- Leveraged several LLMs (Gemini, Qwen, etc.), tuned parameters such as temperature and max tokens to optimize accuracy.
- Automated total budget calculation from the bid forms and Alberta Transportation Unit Price Report.
- Reduced manual estimation time from 3-4 hours per bid to under 2 minutes, increasing efficiency and consistency.

Graduate Research Fellow *July 23 – September 25*
University of Alberta *Edmonton, AB*

- Designed an interactive RAG system for intelligent design generation using National Building Code of Canada.
- Applied PEFT's LoRA to fine-tune LLMs and VLMs and assessed several retrieval algorithms using evaluation metrics.
- Collaborated with cross-functional team to achieve an accuracy of 82.36 % to facilitate easy access to NBCC.
- Contributed to a publication and communicated findings in Smart Construction, ELSP publishing. **(Accessible here)**

AI Researcher *January 25 – April 25*
University of Alberta *Edmonton, AB*

- Developed an AI agent for Lloyd Sadd using Model Context Protocol (MCP), prompt engineering and RAG.
- Enabled capabilities such as sending emails, scheduling meetings, querying databases, generating reports, and automating onboarding workflows.
- Implemented OpenAI GPT-4.1 to enable dynamic reasoning, utilize external tools, manage contextual memory, and optimize performance through prompt engineering.
- Built a FastAPI application, containerized with Docker, and deployed on AWS EB for scalable and managed hosting.

Research Assistant *September 2024 – December 2024*
University of Alberta *Edmonton, AB*

- Automated grading of handwritten assignments using LLMs and VLMs, improving evaluation using data driven optimisation.
- Designed a multi-modal pipeline integrating OCR, image preprocessing, and semantic scoring for transparent evaluation.
- Developed an interface using Streamlit-based web app enabling TAs to grade over 200 submissions with 81.5% accuracy.
- Collaborated with researchers to build an interpretable grading interface and presented findings at ASEE. **(Accessible here)**

PROJECTS

Concrete crack detection in building using CNN *September 23 – November 23*
University of Alberta *Edmonton, AB*

- Developed a deep learning pipeline for automated concrete crack detection using CNN architectures such as ResNet, DenseNet, InceptionV3 and VGG16.
- Applied data augmentation, preprocessing, and transfer learning to improve model generalization.
- Achieved over 95% accuracy using metrics like precision, recall, and F1-score; deployed best model using streamlit web app.

Construction Worker Safety Monitoring using VLMs and Jetson Nano *June 2025 – August 2025*
University of Alberta *Edmonton, AB*

- Implemented a vision-based safety monitoring system on NVIDIA Jetson Nano to detect PPE compliance and unsafe worker behavior in real time.
- Utilized pre-trained VLMs for multimodal analysis of video streams to identify helmet, vest, and harness violations.
- Enabled real-time alerts through MQTT protocol and dashboard visualization using Streamlit.

SKILLS

- Python, LangChain, Hugging Face, Transformers, PyTorch, TensorFlow, Cloud Platforms, FastAPI, R&D, Azure, NLP.