Muhammad Hamza Shafiq

Senior Research Engineer (AI)

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in **hamzashafiq28**   ○ **hamzashafiq28**   ℍ **Personal Webpage**

Profile

Results-driven Senior Research Engineer with expertise in AI, computer vision, generative AI, and language models. Skilled in developing and optimizing deep learning models for image restoration, object detection, segmentation, and tracking. Experienced in model optimization techniques like pruning and quantization for edge devices. Strong analytical, problem-solving, and communication skills.

Areas of Expertise

Deep Learning - Computer Vision - Generative AI - NLP - Image Processing - AI for Healthcare - Data Analysis

Professional Experience

Senior Research Engineer *(IK Lab)*   **Seoul, South Korea** *03/2024 - present*

- **Develop and optimize** deep learning models for real-world AI applications, specializing in **computer vision, generative AI, and language models**.
- **Implemented model optimization** techniques, including **pruning, quantization, and TensorRT acceleration**, achieving a **10× increase in FPS for turbulence mitigation**.
- **Develop and maintain** deep learning pipelines for projects like **hit-and-run investigation system, turbulence mitigation, and wildfire monitoring**.
- **Integrate AI models** into production systems, collaborating with cross-functional teams for seamless deployment.
- **Conduct performance evaluations** using industry-standard benchmarks and improve model efficiency.

Research Assistant *(UET Lahore)*   **Pakistan** *09/2020 - 08/2021*

- Collaborated on a funded project **"Intelligent Heart Monitoring"** with a university supervisor.
- Applied deep learning methods to analyze a heart sound dataset, achieving highly accurate results of up to **98%**.
- Deployed the resulting network on embedded devices for real-world applications.
- Founded **SA Cardiac**, a company focused on developing digital wireless stethoscopes for doctors during the COVID-19 pandemic, leveraging expertise in heart monitoring and medical device technology. Incubated in the **National Incubation Center**.

Education

MS Information and Communication Engineering *Chosun University*   **Gwangju, South Korea** *2024*

Relevant Courses: Advanced Artificial Intelligence, Theory of Artificial Intelligence, Advanced Database, Mobile Computing.

- Worked on a research project focused on **image restoration and colorization**.
- Developed and evaluated deep learning models to enhance and restore grayscale or degraded images.
- Published research findings in peer-reviewed journals and conferences.

Skills

- **Machine Learning:** Neural Networks, Deep Learning, Supervised Learning, Unsupervised Learning, Reinforcement Learning, Language Models
- **Computer Vision:** OpenCV, Image Segmentation, Object Detection, Pattern Recognition, 3D Reconstruction, Low Light Enhancement, Super-Resolution, Object Tracking, Turbulance Mitigation, Anomoly Detection
- **Programming:** Python (Expert) (PyTorch, TensorFlow), C++ (Proficient), MATLAB (Proficient), CUDA, Docker, GIT, Java, RestAPI, FastAPI
- **Data Management & Visualization:** SQL, NoSQL, Data Preprocessing, Data Visualization, Pandas, NumPy, Excel

- **Cloud Computing:** AWS, Azure, GCP

Publications & Patents

- **DentAll: A unified approach for tooth instance segmentation and missing tooth detection and localization using contextual spatial attention, positional encoding, and missing tooth location predictor**
  Shaily Bajpai, **Hamza Shafiq**, and Bumshik Lee
  Under Review at *Engineering Applications of Artificial Intelligence (EAAI)*, 2025

- **ColorFormer: A Novel Colorization Method Based on a Transformer**
  Hamza Shafiq, Truong Nguyen, and Bumshik Lee
  Available at SSRN 4703443, 2025
  Neurocomputing (in revision)

- **Transforming Color: A Novel Image Colorization Method**
  Hamza Shafiq, and Bumshik Lee
  Electronics, 2024

- **Image Colorization Using Color-Features and Adversarial Learning**
  Hamza Shafiq, and Bumshik Lee
  IEEE Access, 2023

- **ELECTRONIC DEVICE FOR COLORING BLACK AND WHITE IMAGE USING GAN BASED MODEL COMPRISING TRANSFORMER BLOCK AND METHOD FOR OPERATION THEREOF (Application)**
  US Patent

- **GAN 기반의 모델을 이용하여 흑백 이미지를 컬러링하기 위한 전자 장치 및 그 동작 (Application)**
  Korean Patent

Languages

- **Urdu** [Native]
- **Korean** [Basic] - A1
- **English** [Proficient] - C1

References

- **Bumshik Lee**, Associate Professor (Head of Department), Department of Information and Communication Engineering, Chosun University, South Korea bslee@chosun.ac.kr

- **Muhammad Azhar**, Assistant Professor, Department of Applied Data Science, Hong Kong Shue Yan University, azhar@hksyu.edu

- **Danial Javaheri**, Research Professor, Department of Computer Science & Engineering, Korea University, Seoul, javaheri@korea.edu