Shahzaib Waseem

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Skills (GitHub)

Programming: Python, C, C++, Java, Kotlin, MATLAB, SQL, MongoDB, JavaScript.
Tools: Android Studio, Git, GitHub, Travis CI, Linux/Unix, Jupyter, Tableau, Power BI, Azure.
DS / ML / AI: OpenCV, Pillow, Sklearn, Pandas, NumPy, NLTK, CUDA, Keras, TensorFlow, PyTorch.

Experience

Graduate Research Assistant   *Simon Fraser University (SFU)*   **Sep 2021 – Aug 2024**
- **Skills**: *Hyperspectral Reconstruction, Transformers, Near Infrared, Mobile Devices, PyTorch*.

RipeTrack   *Code*, *Android*, *Demo*
- Designed a Hyperspectral (HS) reconstruction model, with spectral losses and model trimming to outperform state of the art (3.5% better RMSE) with a 67-97% faster runtime on smartphones (*RipeTrack – Under Review*).
- Based on estimated chemical composition, RipeTrack identifies fruit ripeness level with an accuracy of over 93%.
- Captured datasets on a $30,000 HS camera for tracking the ripening process of fruits based on chemical changes.
- Used object detection models to upscale only the region of interest, a 472 times reduction in processing time.

MobiSpectral   *Code*, *Android*, *Demo*
- Designed a reconstruction model to upscale images to HS bands to estimate chemical composition (MobiCom'23).
- The downstream application for MobiSpectral was a HS classification model which achieved 92% mean accuracy.
- Integrated white balancing model to map diversely illuminated images to standard illumination for in the wild usage.
- Implemented Android apps for MobiSpectral and RipeTrack to run on phones with a 6% accuracy drop in the wild.

Software Engineer   *Cognitive Healthcare International (CHI)*   **Jun 2020 – Jul 2021**
- **Skills**: *Unsupervised Clustering, Computer Vision, Android*.
- Deployed a face auth model in the production app which made the system secure and reduced login time by 60%.
- Integrated a model for diabetic retinopathy on a custom patients' dataset, early diagnosing 100+ diabetic patients.
- Collaborated with business analysts and project managers, to translate business requirements into ML solutions.
- Developed and maintained APIs in tele-health android application, by coordinating with the UI and backend teams.
- Managed code with Git and Travis CI for timely feature delivery, improving deployment efficiency by 20%.
- Conducted workshops to explain the face authentication process to the marketing team.

Machine Learning Research Intern   *Furnwish*   **Jun 2019 – Sep 2019**
- **Skills**: *3D Upscaling, Augmented Reality, Apple, PyTorch*.
- Enhanced user engagement by designing an immersive furniture shopping experience on Apple AR-Kit.
- Deployed a CNN to upscale furniture images to 3D models, increasing page session time by 23% on the portal.
- Led a team of three engineers to ensure timely project completion within a 3-month deadline by streamlining workflows and enhancing collaboration by introducing Slack and Atlassian Jira.

Research Assistant   *Cognet Lab*   **Jun 2018 – Jun 2020**
- **Skills**: *GANs (W-GAN, DC-GAN, Fast-SRGAN), Optimization, TensorFlow*.
- Created a set of generative adversarial networks to generate photo-realistic images of architecture and painting.
- Used image synthesis techniques – glitching, watermarking – for a 40% reduced complexity with similar fidelity.

Publications

- **Waseem M. S.**, et. al, "RipeTrack: Assessing Fruit Ripeness and Remaining Lifetime using Smartphones" *Under Review*.
- Sharma N., **Waseem M. S.**, et. al., "MobiSpectral: Hyperspectral Imaging on Mobile Devices". MobiCom, October 2023.

Projects

- Badger: Developed sentiment analysis model to predict market index with time-series tweets, news, and stock prices.
- Ship Detector: Optimized UNET model, with transfer learning and digital signal processing to improve accuracy by 1%.
- COVID Literature Analysis: Clustered keywords and topics from COVID-19 literature based on similarity and relevance for making broader analysis about the content and make searching efficient.
- PDF-GPT: a GPT-powered chatbot using ChainLit and LangChain to integrate PDF content as knowledge base for document specific questions. Used ChromaDB with OpenAI's Ada text embedding, streamlining Retrieval Augmented Generation (RAG) for faster and more accurate knowledge access. Used RASCEF prompt engineering framework to answer domain specific questions form the document with better understanding.
- Edumeet: Campus-wide portal for students to search for jobs, seminars, news, and connect with alumni, etc.

Education

Simon Fraser University (SFU)   **Sep 2021 – Aug 2024**
MSc in Computer Science   *Supervisor*: *Prof. Mohamed Hefeeda*

Thesis: "*RipeTrack: Assessing Fruit Ripeness and Remaining Lifetime using Smartphones*".
Teaching: Intro to Computer Science and Programming 2, Software Engineering, Mobile Applications, Data Science.

National University of Sciences and Technology (NUST)   **Sep 2016 – Jun 2020**
BSc in Computer Science   *Supervisor*: *Prof. Syed Taha Ali*

Thesis: "*ArtGAN: Generation and Analysis of Art using Machine Learning*". See Cognet Lab Experience for more.

Honors and Awards

2021 – 23	**SFU – School of Computing Science**, Received full funding for the duration of my Master's degree at SFU.
2019	**AIESEC Fellow**, Selected for AIESEC summer research fellowship in Egypt.
2016 – 20	**NUST – Dean's List**, Received NUST-SEECS Dean's Scholarship multiple times.

References

Prof. Mohamed Hefeeda – Professor and Director CS, Simon Fraser University – mhefeeda@sfu.ca
Prof. Syed Taha Ali – Assistant Professor, National University of Sciences and Technology – taha.ali@seecs.edu.pk
Ahmad Amin – Co-Founder and Chief Technology Officer (CTO), Furnwish – a.amin@furnwish.net