Shahzaib Waseem

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Education

Simon Fraser University (SFU) – M.S. in Computer Science Sept 2024

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

National University of Sciences and Technology (NUST) – B.S. in Computer Science June 2020

Thesis: "ArtGAN: Generation and Analysis of Art using Machine Learning".

Experience

Graduate Research Assistant ***Simon Fraser University (SFU)*** **Sep 2021 – Sept 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*).
- Based on estimated chemical composition, RipeTrack identifies fruit ripeness level with an accuracy of over 93%.
- Captured dataset 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).
- The downstream application for MobiSpectral was a HS classification model with 92% mean accuracy.
- Standardized illumination using a white balancing model for real-life diversely illuminated images.
- Implemented Android apps for MobiSpectral and RipeTrack to run on phones with 90% accuracy 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, making the system secure and reduced login time by 60%.
- Integrated 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 app, 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 and get feedback.

Machine Learning 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 GAN models, using TensorFlow, to generate over 1000 images of architecture and paintings.
- Used image synthesis techniques – glitching, watermarking – for a 40% reduced complexity with similar fidelity.

Projects

- Badger: A sentiment analysis model to predict market index with time-series tweets, news, and stock prices.
- Ship Detector: Optimized UNET, 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 based chatbot which employs Retrieval Augmented Generation (RAG) by using content from PDFs as knowledge base. Used RASCEF prompt engineering framework to answer domain specific questions.
- Edumeet: Campus-wide portal for students to search for jobs, seminars, news, and connect with alumni, etc.

Publications

- RipeTrack: Assessing Fruit Ripeness and Remaining Lifetime using Smartphones. *Under Review*.
- MobiSpectral: Hyperspectral Imaging on Mobile Devices. *MobiCom*, Oct 2023.

Skills (GitHub)

Languages: Python, C, C++, SQL, Android, Git, Docker, Linux/Unix, Shell, Jupyter, Chroma DB.
Data and ML: Power BI, AWS, OpenCV, scikit-learn, pandas, NumPy, NLTK, CUDA, TensorFlow, PyTorch, LLMs.

Honors and Awards

2021 – 23 **SFU – School of CS**, 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