Shahzaib Waseem

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Education

Master of Science, Computer Science – *Simon Fraser University (SFU)* 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.

Bachelor of Science, Computer Science – *NUST University* June 2020

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

Experience

Machine Learning Research Assistant Sep 2021 – Sept 2024
NMSL Lab, SFU

- **Skills**: Deep Learning, Transformers, Hyperspectral Reconstruction, Mobile Development, PyTorch

RipeTrack Code, Android, Demo

- Designed a hyperspectral (HS) reconstruction model, using PyTorch, with spectral losses and model optimization 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 YOLO object detection models to upscale the region of interest, a 472 times reduction in processing time

MobiSpectral Code, Android, Demo

- Designed a transformer model to upscale images to HS bands to estimate chemical composition (*MobiSpectral*)
- The downstream application for MobiSpectral was an HS classification model with 92% mean accuracy
- Integrated white balancing model to convert all illumination to a standard one, increasing accuracy by 6%
- Deployed models on Android apps for RipeTrack and MobiSpectral, with 96% accuracy on smartphones

Software Engineer Jun 2020 – Jul 2021
Cognitive Healthcare International (CHI)

- **Skills**: Unsupervised Clustering, Computer Vision, Android
- Deployed a face auth model in the production app, making the system secure and reduced login time by 63%
- Integrated a model for diabetic retinopathy on custom patient dataset, early diagnosing 100+ diabetic patients
- Collaborated with business analysts and project managers, to translate business requirements into ML solutions
- Developed APIs for tele-health app by working with backend and hardware teams, with 41% faster deployments
- Managed code with Git and Travis CI for timely feature delivery, improving deployment efficiency by 18%
- Conducted workshops to explain the face authentication process to the marketing team and get feedback

Machine Learning Intern Jun 2019 – Sep 2019
Furnwish

- **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

Machine Learning Research Assistant Jun 2018 – Jun 2020
Cognet Lab, NUST

- **Skills**: GANs (W-GAN, DC-GAN, Fast-SRGAN), Optimization, TensorFlow
- Created a set of generative adversarial networks to generate over 1000 images of architecture and paintings
- Used image synthesis techniques – glitching, watermarking – for a 57% reduced complexity with high fidelity

Projects

- Badger: A sentiment analysis-based model to guide the users about what stocks will perform good. The model predicts the market index with time-series tweets, news, and stock prices with 5% error
- Ship Detector: Ranked 3rd on a Kaggle instance segmentation challenge using a Masked R-CNN
- CORD Analysis: A Natural Language Processing (NLP) project, where COVID-19 literature was organized by extracting topics and keywords, clustering them based on relevance and similarity
- PDF–GPT: A GPT based chatbot, built using LangChain and ChainLit, which employs RAG by using PDF content 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

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

Skills (GitHub)

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

Honors and Awards

SFU – School of CS – *Received full funding for the duration of my Masters degree at SFU* 2021 – 24
AIESEC Fellow – *Selected for AIESEC summer research fellowship in Egypt* 2019
NUST – Dean's List – *Received NUST–SEECS Dean's Scholarship multiple times* 2016 – 20

References

Prof. Mohamed Hefeeda – *Professor and Director CS, SFU* – mhefeeda@sfu.ca
Prof. Syed Taha Ali – *Associate Professor, NUST* – taha.ali@seecs.edu.pk
Ahmad Amin – *Co-Founder and Chief Technology Officer (CTO), Furnwish* – a.amin@furnwish.net