Russel Shawn Dsouza

Contact Information

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Education

Master of Science, Artificial Intelligence & Machine Learning
University of Birmingham — *2022 – 2023*

Bachelor of Technology, Electronics & Communications Engineering — *8.57*
National Institute of Technology Karnataka, India — *2017 – 2021*

K-12 — *X: 10.0, XII: 95.6%*
Little Rock Indian School, India — *2004 – 2017*

Skills

Languages: Python, Java, C++, C, SQL, JavaScript, Go, Rust, MATLAB

Frameworks: PyTorch, Keras, OpenCV, scikit-learn, Numeric & Scientific Python

Web Dev: NodeJS, ExpressJS, postgreSQL

Tools: git, Docker, bash, vim, Linux

Hardware: Verilog, ngSPICE, Arduino, Xilinx Artix

Research Interests

Real-Time Computer Vision for Augmented Reality
Image and Video Retrieval, Neural Hashing

Research Experience

Research Intern
CMInDS and CSRE, IIT Bombay — *May 2021 – Sep 2021*

- Designed & developed novel model variants with vision transformers & CNNs for the multi-modal, pixel-wise classification of land-use from hyperspectral & LiDAR satellite imagery.
- Improved model search times with state of the art Bayesian hyperparameter optimisation.

Winter Research Intern
Deep Learning Lab, NIT Karnataka — *Dec 2020 – Mar 2020*

- Implemented state of the art models and designed data pipelines for nuclear segmentation in histopathology images of kidney and liver tissues.
- Collaborated on the detection of Urothelial Carcinoma from whole slide images of bladder tissues with average dimensions of 80000×50000.
- Built an open-source project benchmarking segmentation models on histopathology datasets.
- Presented a report reviewing the different methods to perform nuclear segmentation.

Summer Research Intern
Deep Learning Lab, NIT Karnataka — *May 2019 – Jul 2019*

- Designed and debugged efficient implementations of classical image processing algorithms on large datasets.
- Revamped and maintained data pipelines for deep learning based image segmentation and classification models.
- Conducted in-depth literature surveys and reproduced results from seminal papers in the field of automated histopathology.

Work Experience

Frontend Developer and UI Designer
IRIS, NIT Karnataka — *Aug 2018 – Apr 2019*

- Debugged and maintained parts of the frontend code at IRIS — The official student portal.
- Designed a new UI system from the ground up in Figma.
- Developed the design system in Vue.js and worked on integration with the legacy Rails code.

Python Developer
Pinnacle Media, Manipal, Karnataka — *May 2018 – Jul 2018*

- Deployed real-time face detection and recognition, using OpenCV, dlib, and scikit-learn, on a Raspberry Pi as a part of an 'employee attendance' system.

Bachelor's Thesis

Low Light Image Enhancement on Low Power Devices *19/20*

Advisor: Dr Ramesh Kini *Aug 2020 – May 2021*

- *Objective:* Design of hardware and software-optimized algorithms to capture vibrant and detailed low-light photos with inexpensive camera sensors without the use of obtrusive flashlights.
- Trained, optimised, and deployed PyTorch models for de-blurring and low-light enhancement.
- Redesigned the entire image processing pipeline on edge device in C++ to reduce latency and memory.

Notable Projects

Fashion Discovery for Video Commerce *Oct 2021 – Mar 2022*

- Researched the "Exact street-to-shop" i.e. matching products in consumer images to those in manufacturer catalogues - a cross-domain image-based image retrieval problem.
- Pitched the prototype software to a popular short-video platform in India.

Change detection in SAR images *Feb 2021 – May 2021*

- Developed a multi-sensor, multi-modal algorithm for change detection in bi-temporal Synthetic Aperture Radar (SAR) images.
- Presented findings in a report as part of a course-project in *Image and Video Processing*.

Multi-lingual speech enhancement *Feb 2021 – May 2021*

- Improved the quality and intelligibility of noisy speech recordings by upto 30% using deep neural networks that generalize over multiple out of sample languages.
- Reported findings that improved upon the state of the art in certain areas and matched it in others.

Information extraction from PDFs *Apr 2021*

- Developed a program to detect tables and extract information embedded in the table cells, as a part of a system to automate the summarisation of insurance policies.

Muon Physics *Mar 2020 – Jun 2020*

- Designed a custom model to classify muon momenta trained on monte-carlo simulated data from the Cathode Strip Chambers at the CMS experiment of Large Hadron Collider at CERN.

Segmentation of brain tumours in MRI images *Dec 2019*

- Reproduced state of the art semantic segmentation models in Keras/TFv1 to segment brain tumours and surrounding edema from MRI images.
- Presented results on multi-class segmentation with a custom model variant on the BRATS dataset as part of a workshop on medical imaging.

Detecting Ponzi schemes in blockchain smart contracts *Aug 2019 – Sep 2019*

- Designed a custom model to detect Ponzi smart contracts deployed on the Ethereum blockchain using CNNs and stacked auto-encoders, in under 48h as a part of a coding sprint.
- Trained the model on raw bytecode of smart contracts mined from the blockchain using Google BigQuery, publicly available Solidity source code of popular smart contracts, and a publicly available dataset of known Ponzi schemes.

Predicting truth level of news articles *Jul 2019 – Aug 2019*

- Built a model to classify news articles into 6 different categories based on truth level.
- Trained the model on the LIAR-PLUS dataset containing news articles and fact-checking justifications from trusted sources.

Relevant Scores

GRE - 163V 168Q 5A

TOEFL - 30R 30W 30L 25S

Honours

Offered the Australian National University Chancellor's International Scholarship to pursue the Master of Computing at ANU's School of Computing. *Mar 2022*

Selected as a **full-time research intern** at the Robert Bosch Center for Cyber-Physical systems, Indian Institute of Science, Bangalore, India's top research university, to work on "Simultaneous Localization And Mapping - SLAM". *July 2020*

Selected for a **funded research internship** at the Haute école du paysage, d'ingénierie et d'architecture de Genève, Haute Ecole Spécialisée de Suisse occidentale, Geneva to work on "NavTrack: A portable obstacle tracker for the rehabilitation of spatial neglect". *Mar 2020*