

Russel Shawn Dsouza

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EDUCATION	Masters, Artificial Intelligence & Machine Learning University of Birmingham, UK	2022 – 2023
	Bachelors, Electronics & Communications Engineering National Institute of Technology Karnataka, India	2017 – 2021
	K-12 Little Rock Indian School, India	2004 – 2017
RESEARCH INTERESTS	Real-Time Computer Vision for Augmented Reality Image and Video Retrieval, Compression and Representation learning	
RESEARCH EXPERIENCE	Research Intern CMInDS and CSRE, IIT Bombay, India <i>May 2021 – Sep 2021</i> <ul style="list-style-type: none">– Designed and developed model variants for multi-modal, pixel-wise classification of land-use from hyper-spectral and LiDAR satellite imagery with vision transformers and CNNs.– Improved model peak-performance by over 10% through the use of state-of-the-art Bayesian hyper-parameter optimisation. Winter Research Intern Deep Learning Lab, NIT Karnataka, India <i>Dec 2019 – Mar 2020</i> <ul style="list-style-type: none">– Implemented cutting-edge models and established high-performance data pipelines for nuclear segmentation in histopathology images of kidney and liver tissues.– Collaborated on the detection of <i>Urothelial Carcinoma</i> from whole slide images of bladder tissues with an average size of 4 billion pixels.– Created an open-source project to benchmark segmentation models on histopathology datasets, resulting in improved reproducibility and standardisation of results.– Presented a comprehensive report reviewing the state-of-the-art methods for nuclear segmentation in histopathology, providing valuable insights and recommendations for future research. Summer Research Intern Deep Learning Lab, NIT Karnataka, India <i>May 2019 – Jul 2019</i> <ul style="list-style-type: none">– Revamped and maintained high-performance data pipelines for deep learning-based image segmentation and classification models, resulting in improvements in accuracy and processing speed.– Streamlined classical image processing algorithms for large datasets, achieving a 20% reduction in processing time in some cases.– Conducted extensive literature surveys and reproduced state-of-the-art results from seminal papers in automated histopathology, contributing to the lab's cutting-edge research.	
MISC.	Selected as a full-time research intern at the Robert Bosch Center for Cyber-Physical systems, Indian Institute of Science, Bangalore, to work on “Simultaneous Localisation And Mapping - SLAM”.* <i>July 2020</i> 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”.* <i>Mar 2020</i>	
MASTER'S DISSERTATION	Examining adversarial alignment-subversion in generative language models Advisor: Dr Venelin Kovatchev <i>Jun 2023 – Sept 2023</i> <ul style="list-style-type: none">– Exploring the automation of detection of adversarial attacks on language models.– Analysing intermediate layers of large language models to better understand triggers for adversarial attacks.	

* Could not undertake due to COVID-19

BACHELOR'S DISSERTATION	Low-light image enhancement on low-power devices 19/20 Advisor: Dr Ramesh Kini Aug 2020 – May 2021 <ul style="list-style-type: none"> – Designed hardware- and software-optimised algorithms to capture vibrant and detailed low-light photos with inexpensive camera sensors, without using obtrusive flashlights. – Optimised the neural network to have less than 100k parameters and require only about 5 GFlops of compute for a 256×256 colour image, resulting in a 35% reduction in model size and a 20% improvement in processing speed. – Redesigned the entire image processing pipeline on the edge-device using C++, resulting in a 10% reduction in latency and a 50% reduction in memory usage.
SKILLS	Languages: Python, Java, C++, C, SQL, JavaScript, Go, Rust, MATLAB Frameworks: PyTorch, Keras, OpenCV, scikit-learn, Numeric & Scientific Python Tools: git, Docker, bash, vim, Linux Hardware: Verilog, ngSPICE, Arduino, Xilinx Artix
WORK EXPERIENCE	Frontend Developer and UI Designer Aug 2018 – Apr 2019 IRIS, NIT Karnataka, India <ul style="list-style-type: none"> – Debugged and maintained critical parts of the front-end code at IRIS, the official student portal with over 10k daily active users – Created a new, streamlined UI system from the ground up in Figma. – Developed the design system in Vue.js and spearheaded the integration of JavaScript with legacy Rails code.
NOTABLE PROJECTS	Fashion Discovery for Video Commerce Oct 2021 – Mar 2022 <ul style="list-style-type: none"> – Worked on “Exact street-to-shop” i.e. matching products in consumer photos to those in manufacturer catalogues - a cross-domain image-based image retrieval problem. – Pitched the prototype software to a top-3 short-video platform in India. Multi-lingual speech enhancement Feb 2021 – May 2021 <ul style="list-style-type: none"> – Developed a deep neural network to improve the quality and intelligibility of noisy speech recordings by up to 30%, even in out-of-sample languages. – Conducted extensive experiments on a large dataset of diverse languages and noise types, demonstrating that our approach outperforms state-of-the-art methods in terms of intelligibility without sacrificing quality. Information extraction from PDFs Apr 2021 <ul style="list-style-type: none"> – Developed a program to extract information embedded in table cells within PDFs with upto 70% accuracy, as part of a system to automate summarising insurance policies. Muon Physics Mar 2020 – Jun 2020 <ul style="list-style-type: none"> – Conceptualised and programmed a custom model to classify muon momenta trained on monte-carlo simulated data from the Cathode Strip Chambers at the CMS experiment of the Large Hadron Collider at CERN. Segmentation of brain tumours in MRI images Dec 2019 <ul style="list-style-type: none"> – Reproduced state of the art semantic segmentation models in Keras/TF to segment brain tumours and surrounding edema from MRI images with upto 83% accuracy. – 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 <ul style="list-style-type: none"> – Designed and developed a custom model using CNNs and stacked auto-encoders to accurately classify smart contracts deployed on the Ethereum blockchain into 16 categories, delivering results in under 48 hours for a coding sprint. – Trained the model on raw bytecode of smart contracts extracted from the blockchain using Google BigQuery, publicly available Solidity source code of popular smart contracts, and a dataset of 184 known Ponzi schemes.