



# Russel Shawn Dsouza

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CONTACT INFORMATION	Belgrave View 1 Belgrave Middleway Birmingham B5 7AJ	rshwndsz@gmail.com rshwndsz.github.io   rshwndsz
EDUCATION	Master of Science, Artificial Intelligence & Machine Learning University of Birmingham	2022 – 2023
	Bachelor of Technology, Electronics & Communications Engineering National Institute of Technology Karnataka, India	8.57 2017 – 2021
	K-12 Little Rock Indian School, India	X: 10.0, XII: 95.6% 2004 – 2017
SKILLS	<b>Languages:</b> Python, Java, C++, C, SQL, JavaScript, Go, Rust, MATLAB <b>Frameworks:</b> PyTorch, Keras, OpenCV, scikit-learn, Numeric & Scientific Python <b>Web Dev:</b> NodeJS, ExpressJS, postgresSQL <b>Tools:</b> git, Docker, bash, vim, Linux <b>Hardware:</b> Verilog, ngSPICE, Arduino, Xilinx Artix	
RESEARCH INTERESTS	Real-Time Computer Vision for Augmented Reality Image and Video Retrieval, Neural Hashing	
RESEARCH EXPERIENCE	<b>Research Intern</b> CMInDS and CSRE, IIT Bombay May 2021 – Sep 2021 <ul style="list-style-type: none"><li>– Iteratively designed &amp; developed novel model variants with vision transformers &amp; CNNs for the multi-modal, pixel-wise classification of land-use from hyperspectral &amp; LiDAR satellite imagery.</li><li>– Improved model search times with state of the art Bayesian hyperparameter optimisation.</li></ul> <b>Winter Research Intern</b> Deep Learning Lab, NIT Karnataka Dec 2020 – Mar 2020 <ul style="list-style-type: none"><li>– Implemented state of the art models and designed data pipelines for nuclear segmentation in histopathology images of kidney and liver tissues.</li><li>– Collaborated on the detection of Urothelial Carcinoma from whole slide images of bladder tissues with average dimensions of <math>80000 \times 50000</math>.</li><li>– Built an open-source project benchmarking segmentation models on histopathology datasets.</li><li>– Presented a report reviewing the different methods to perform nuclear segmentation.</li></ul> <b>Summer Research Intern</b> Deep Learning Lab, NIT Karnataka May 2019 – Jul 2019 <ul style="list-style-type: none"><li>– Designed and debugged efficient implementations of classical image processing algorithms on large datasets.</li><li>– Developed and maintained data pipelines for deep learning based image segmentation and classification models.</li><li>– Conducted in-depth literature surveys and reproduced results from seminal papers in the field of automated histopathology.</li></ul>	
WORK EXPERIENCE	<b>Frontend Developer and UI Designer</b> IRIS, NIT Karnataka Aug 2018 – Apr 2019 <ul style="list-style-type: none"><li>– Debugged and maintained parts of the frontend code at IRIS — The official student portal.</li><li>– Designed a new UI system from the ground up in Figma.</li><li>– Developed the design system in Vue.js and worked on integration with the legacy Rails code.</li></ul> <b>Python Developer</b> Pinnacle Media, Manipal, Karnataka May 2018 – Jul 2018 <ul style="list-style-type: none"><li>– Built and 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.</li></ul>	

BACHELOR'S THESIS	<b>Low Light Image Enhancement on Low Power Devices</b> 19/20 Advisor: Dr Ramesh Kini Aug 2020 – May 2021 <ul style="list-style-type: none"> <li>– <i>Objective</i>: 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.</li> <li>– Trained, optimised, and deployed PyTorch models for de-blurring and low-light enhancement.</li> <li>– Built the entire image processing pipeline on edge device in C++ to reduce latency and memory.</li> </ul>
NOTABLE PROJECTS	<b>Fashion Discovery for Video Commerce</b> Oct 2021 – Mar 2022 <ul style="list-style-type: none"> <li>– Solving 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.</li> </ul> <b>Change detection in SAR images</b> Feb 2021 – May 2021 <ul style="list-style-type: none"> <li>– Worked on developing a multi-sensor, multi-modal algorithm for change detection in bi-temporal Synthetic Aperture Radar (SAR) images.</li> <li>– Presented findings in a report as part of a course-project in <i>Image and Video Processing</i>.</li> </ul> <b>Multi-lingual speech enhancement</b> Feb 2021 – May 2021 <ul style="list-style-type: none"> <li>– Worked on improving the quality and intelligibility of noisy speech recordings using deep neural networks that generalize over multiple out of sample languages.</li> <li>– Presented findings that matched SOTA in certain areas and improved upon it in certain others.</li> </ul> <b>Information extraction from PDFs</b> Apr 2021 <ul style="list-style-type: none"> <li>– 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.</li> </ul> <b>Muon Physics</b> Mar 2020 – Jun 2020 <ul style="list-style-type: none"> <li>– 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.</li> </ul> <b>Segmentation of brain tumours in MRI images</b> Dec 2019 <ul style="list-style-type: none"> <li>– Reproduced state of the art semantic segmentation models in Keras/TfV1 to segment brain tumours and surrounding edema from MRI images</li> <li>– Presented results on multi-class segmentation with a custom model variant on the BRATS dataset as part of a workshop on medical imaging.</li> </ul> <b>Detecting Ponzi schemes in blockchain smart contracts</b> Aug 2019 – Sep 2019 <ul style="list-style-type: none"> <li>– 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.</li> <li>– Trained the model on the raw bytecode of Ethereum smart contracts mined from the Ethereum blockchain using Google BigQuery, publicly available Solidity source code of popular smart contracts, and a publicly available dataset of known Ponzi schemes.</li> </ul> <b>Predicting truth level of news articles</b> Jul 2019 – Aug 2019 <ul style="list-style-type: none"> <li>– Built a model to classify news articles into 6 different categories based on their truth level.</li> <li>– Trained the model on the LIAR-PLUS dataset containing news articles and fact-checking justifications from trusted sources.</li> </ul>
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 <b>full-time research intern</b> 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 <b>funded research internship</b> 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