

# Russel Shawn Dsouza

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CONTACT INFORMATION	National Institute of Technology Karnataka NH66, Srinivasnagar, Surathkal, Mangalore Karnataka, India 575025.	rshwndsz@gmail.com rshwndsz.github.io   rshwndsz
RESEARCH INTERESTS	Real-Time Computer Vision for Augmented Reality Image and Video Retrieval, Neural Hashing	
EDUCATION	<b>National Institute of Technology Karnataka (NIT-K)</b> Bachelor of Technology, Electronics and Communication Engineering <b>Little Rock Indian School, Brahmavara</b> K-12	8.57 2017 – 2021 X: 10.0, XII: 95.6% 2004 – 2017
FINAL YEAR PROJECT	<b>Low Light Image Enhancement on Low Power Devices</b> <i>Advisor: Dr Ramesh Kini</i> <ul style="list-style-type: none"><li>– 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.</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>	19/20 Aug 2020 – May 2021
RESEARCH EXPERIENCE	<b>Research Intern, CMInDS/CSRE, IIT-Bombay</b> <i>Advisor: Prof Biplab Banerjee</i> <ul style="list-style-type: none"><li>– Worked on multi-modal, pixel-wise land-use classification from hyperspectral &amp; LiDAR satellite imagery.</li><li>– Iteratively designed &amp; developed novel model variants with vision transformers &amp; CNNs and Bayesian hyperparameter optimisation.</li></ul> <b>Winter Research Intern, Deep Learning Lab, NIT-K</b> <i>Advisor: Dr Shyam Lal</i> <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>– Worked on the detection of Urothelial Carcinoma from whole slide images (average dimensions of 80000×50000) of bladder tissues.</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, Deep Learning Lab, NIT-K</b> <i>Advisor: Dr Shyam Lal</i> <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>– Worked on reproducing results from seminal papers in the field of automated histopathology.</li></ul>	May 2021 – Aug 2021  Jan 2020 – Mar 2020  May 2019 – Jul 2019
WORK EXPERIENCE	<b>Frontend Developer and UI Designer</b> <i>IRIS, NIT-K</i> <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> <i>Pinnacle Media, Manipal</i> <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>	Aug 2018 – Apr 2019  May 2018 – Jun 2018
RELEVANT SCORES	GRE - 163V 168Q 5A TOEFL - 30R 30W 30L 25S	

SKILLS	<p><b>Languages:</b> Python, Go, C++, C, SQL, Rust, MATLAB, JavaScript, Verilog, SPICE</p> <p><b>Frameworks and packages:</b> PyTorch, Keras, OpenCV, scikit-learn, Numerical Python</p> <p><b>Tools:</b> git, Docker, bash/zsh, vim, Linux</p> <p><b>Hardware:</b> Raspberry Pi, Arduino, Xilinx Artix 7 FPGA</p>
NOTABLE PROJECTS	<p><b>Fashion Discovery for Video Commerce</b> <span style="float: right;"><i>Sep 2021 – Present</i></span></p> <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> <p><b>Change detection in SAR images</b> <span style="float: right;"><i>Feb 2021 – May 2021</i></span></p> <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> <p><b>Multi-lingual speech enhancement</b> <span style="float: right;"><i>Feb 2021 – May 2021</i></span></p> <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> <p><b>Information extraction from PDFs</b> <span style="float: right;"><i>Apr 2021</i></span></p> <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> <p><b>Image Restoration</b> <span style="float: right;"><i>Jul 2020</i></span></p> <ul style="list-style-type: none"> <li>– Reproduced a very deep persistent memory network to perform image restoration by removing noise and predicting uncorrupted images; achieved results comparable to the original paper.</li> </ul> <p><b>Muon Physics</b> <span style="float: right;"><i>Mar 2020 - Jun 2020</i></span></p> <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> <p><b>Segmentation of brain tumours in MRI images</b> <span style="float: right;"><i>Dec 2019</i></span></p> <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> <p><b>Detecting Ponzi schemes in blockchain smart contracts</b> <span style="float: right;"><i>Aug 2019 – Sep 2019</i></span></p> <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> <p><b>Predicting truth level of news articles</b> <span style="float: right;"><i>Jul 2019 – Aug 2019</i></span></p> <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> <p><b>Space Time Adaptive Processing Radar</b> <span style="float: right;"><i>Apr 2019</i></span></p> <ul style="list-style-type: none"> <li>– Simulated a radar implementing STAP in Matlab and presented a report on the current state of STAP in Radar Signal Processing.</li> </ul>
MISC.	<p>Selected as a <b>full-time research intern</b> at the Robert Bosch Center for Cyber-Physical systems, IISc, Bangalore to work on “Simultaneous Localization And Mapping - SLAM”. <span style="float: right;"><i>July 2020</i></span></p> <ul style="list-style-type: none"> <li>– Offer refused due to conflicts with the university’s schedule in 2020.</li> </ul> <p>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” <span style="float: right;"><i>Mar 2020</i></span></p> <ul style="list-style-type: none"> <li>– Offer rescinded due to pandemic-induced travel restrictions.</li> </ul>