

# Russel Shawn Dsouza

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CONTACT INFORMATION	National Institute of Technology Karnataka (NITK) NH66, Srinivasnagar, Surathkal, Mangalore Karnataka, India 575025.	russel.171ec143@nitk.edu.in rshwndsz.github.io   in rshwndsz
RESEARCH INTERESTS	Real-time Computer Vision, Augmented Reality, Low Power Computing	
EDUCATION	<b>National Institute of Technology Karnataka (NIT Karnataka)</b> Bachelor of Technology, Electronics and Communications Engineering	8.58 Jul 2017 – May 2021
PUBLICATIONS	Lal, S., <b>Dsouza, R.</b> , Maneesh, M., Kanfode, A., Kumar, A., Perayil, G., Alabhya, K., Chanchal, A.K. and Kini, J. “A Robust Method for Nuclei Segmentation of H&E Stained Histopathology Images.” 2020, 7th International Conference on Signal Processing and Integrated Networks (SPIN) (pp. 453–458). IEEE. DOI: 10.1109/SPIN48934.2020.9070874	
RESEARCH EXPERIENCE	<b>Research Intern, CSRE, IIT-Bombay</b> <b>Multi-modal Land-use Classification</b> <i>Advisor: Prof. Biplab Banerjee</i> Jun 2021 – Aug 2021 <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 using vision transformers &amp; CNNs with Bayesian hyperparameter optimisation.</li></ul> <b>Winter Research Intern, Deep learning lab, NIT Karnataka</b> <b>Computational Histopathology</b> <i>Advisor: Dr. Shyam Lal</i> Dec 2019 – Feb 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>– 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 Karnataka</b> <b>Image Processing and Deep Learning</b> <i>Advisor: Dr. Shyam Lal</i> May 2019 – Jun 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>– Worked on reproducing results from seminal papers in the field of automated histopathology.</li></ul>	
WORK EXPERIENCE	<b>Frontend Developer and UI Designer</b> <b>IRIS, NIT Karnataka</b> 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 of NIT Karnataka.</li><li>– Designed a new UI system from the ground up in Figma.</li><li>– Developed the design system in Vue and worked on an integration with the legacy Rails code.</li></ul> <b>Python Developer</b> <b>Pinnacle Media, Manipal</b> May 2018 – Jun 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>	

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</p>
NOTABLE PROJECTS	<p><b>Fashion Discovery for Video Commerce</b> <i>Sep 2021 – Present</i></p> <ul style="list-style-type: none"> <li>– Working on designing and building the data and model pipelines to solve the “Exact street-to-shop” - cross-domain image-based image retrieval problem.</li> </ul> <p><b>Low-light image enhancement on low power devices</b> <i>Aug 2020 – May 2021</i></p> <ul style="list-style-type: none"> <li>– Working on the design of hardware and software-optimized algorithms to capture vibrant and detailed low-light photos with inexpensive camera sensors.</li> <li>– Working on model compression algorithms to fit memory and speed constraints.</li> <li>– Building tools for better testing, deployment and to prevent model regressions.</li> </ul> <p><b>Change detection in SAR images</b> <i>Feb 2021 – May 2021</i></p> <ul style="list-style-type: none"> <li>– Working on developing a multi-sensor, multi-modal algorithm for change detection in bi-temporal Synthetic Aperture Radar (SAR) images.</li> </ul> <p><b>Multi-lingual speech enhancement</b> <i>Feb 2021 – May 2021</i></p> <ul style="list-style-type: none"> <li>– Working on improving the quality and intelligibility of noisy speech recordings using deep neural networks that generalize over multiple out of sample languages.</li> </ul> <p><b>Information extraction from PDFs</b> <i>Apr 2021</i></p> <ul style="list-style-type: none"> <li>– Designed a system 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> <i>Jul 2020</i></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>Segmentation of brain tumours in MRI images</b> <i>Dec 2019</i></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> </ul> <p><b>Detecting Ponzi schemes in blockchain smart contracts</b> <i>Aug 2019 – Sep 2019</i></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>– The model was trained 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> <i>Jul 2019 – Aug 2019</i></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>– The model was trained on the LIAR-PLUS dataset containing news articles and fact-checking justifications from trusted sources.</li> </ul>
RELEVANT COURSEWORK	<p>Neural Networks &amp; Deep learning, Application of Machine Learning in Medical Imaging, Image and Video Processing, Speech and Audio Processing, Digital Signal Processing</p> <p>Statistical Analysis, Numerical Analysis</p> <p>Embedded Systems, Digital System Design, Microprocessors, VLSI Design, Control Systems</p> <p>Data Structures &amp; Algorithms, Digital Electronics &amp; Computer Architecture</p>
MISCELLANEOUS	<p>Selected as a full-time research intern at the Robert Bosch Center for Cyber-Physical systems, IISc, Bangalore to work on “Simultaneous Localization And Mapping - SLAM”. <i>July 2020</i></p> <ul style="list-style-type: none"> <li>– Had to refuse offer due to conflicts with the university’s schedule for the 6<sup>th</sup> semester.</li> </ul> <p>Selected for a <b>research internship</b> at HEPIA-Hesge, Geneva, Switzerland <i>Mar 2020</i></p> <p>to work on “NavTrack: A portable obstacle tracker for the rehabilitation of spatial neglect”</p> <ul style="list-style-type: none"> <li>– Offer rescinded due to pandemic-induced travel restrictions &amp; lockdowns.</li> </ul>