Russel Shawn Dsouza

Contact Information

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Research Interests

Computer vision, Cybernetics, Neuroscience of vision and motor control, Mixed Reality

Education

National Institute of Technology Karnataka (NIT Karnataka)
Bachelor of Technology, Electronics and Communications Engineering *Jul 2017 – May 2021*

Publications

Lal, S., **Dsouza, R.**, Maneesh, M., Kanfade, 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

Winter Research Intern, Deep learning lab, NIT Karnataka
Segmentation of nuclei in histopathology images of kidney, liver and bladder tissues
Mentored by Dr. Shyam Lal *Dec 2019 – Feb 2020*

- Implemented state of the art models and designed data pipelines for nuclear segmentation in histopathology images of kidney and liver tissues.
- Worked on the detection of Urothelial Carcinoma from whole slide images (average dimensions of 80000×50000) of bladder tissues.
- Built an open-source repository 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
Mentored by Dr. Shyam Lal *May 2019 – Jun 2019*

- Designed and debugged efficient implementations of classical image processing algorithms on large datasets.
- Developed and maintained data pipelines for deep learning based image segmentation and classification models.
- Worked on reproducing results from seminal papers in the field of automated histopathology.

Work Experience

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

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

Python Developer
Pinnacle Media, Manipal *May 2018 – Jun 2018*

- 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.

Skills

Languages: Python, C++, MATLAB, Javascript, C, Verilog, ngSPICE
Frameworks and packages: PyTorch, Keras, OpenCV, scikit-learn, Numerical Python
Web Development: React, Express, Node, MongoDB, GraphQL
Tools: git, bash, Docker, TravisCI, Linux, vim, PyCharm
Hardware: Raspberry Pi, Arduino, Xilinx Artix 7 FPGA
Natural languages: English, Hindi, Kannada

Notable Projects

Low-light image enhancement on low power devices *Aug 2020 – Present*

– Working on the design of hardware and software-optimized algorithms to enable people to capture virant and detailed low-light photos with inexpensive camera sensors.

Satellite detection in images from low-cost telescopes *Jul 2020 – Present*

– Working on the design and development of a model to detect orbiting objects in the geostationary ring, from sequences of consecutive frames imaging unknown portions of the sky, as a part of the 'spotGEO' competition by the European Space Agency (ESA).

Image Denoising *Jul 2020*

– Reproduced a very deep persistent memory network to perform image restoration by removing noise and predicting uncorrupted images and achieved results comparable to the original paper.
– The model was trained on images from the Berkeley Segmentation Dataset (BSDS300) and tested on a modified version of the CIFAR10 dataset.

Muon Physics *Mar 2020 - Jun 2020*

– Designed a custom model to classify muon momenta using a tabular dataset of variables and parameters.
– The model was trained on monte-carlo simulated data from the Cathode Strip Chambers (CSC) 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.
– The model was trained and tested on a part of the Brain Tumour Segmentation (BraTS) dataset.

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.
– 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.
– Developed in under 48h as a part of a coding sprint.

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

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

Space Time Adaptive Processing Radar *Apr 2019*

– Presented a report on the current state of STAP in Radar Signal Processing.
– Simulated a radar implementing STAP in Matlab.

Relevant Coursework

Neural Networks & Deep learning, Application of Machine Learning in Medical Imaging,
Digital Signal Processing, Digital System Design
Statistical Analysis, Numerical Analysis
Embedded System Design, Microprocessors, VLSI Design, Control Systems
Data Structures & Algorithms, Digital Electronics & Computer Architecture

Achievements

Selected as a **full-time research intern** at the ML Lab, RBCCPS, IISc, Bangalore *Jul 2020*
to work on "Simultaneous localization and mapping (SLAM)"

– Rescinded due to schedule conflicts (primarily because of COVID-19).

Selected for a **research internship** at HEPIA-Hesge, Geneva, Switzerland *Mar 2020*
to work on "NavTrack: A portable obstacle tracker for the rehabilitation of spatial neglect"

– Received a grant of 4200CHF to conduct research under Prof. Florent Gluck, HEPIA.
– Rescinded (Internship & grant) due to COVID-19.