Russel Shawn Dsouza

Contact Information

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Research Interests

Computer vision, Neuroscience of vision and motor control, Cybernetics, 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
Segmentation of nuclei in histopathology images of kidney tissues
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 the 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

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).

Identifying Melanoma in images of skin lesions *Jun 2020 – Present*

– Working on building an ensemble network of detection models to accurately detect skin cancer, specifically Melanoma, in images of skin lesions as a part of the SIIM-ISC Melanoma classification challenge on Kaggle.

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 tumour 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 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 (STAP) 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

Digital Signal Processing, Machine Learning for Neuroimaging
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.