Ananth Kalyanasundaram

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RESEARCH INTERESTS

To develop deep learning architectures for Computer Vision tasks such as detection, segmentation and super-resolution.

EDUCATION

SRM Institute of Science and Technology July 2016 - June 2020
B.Tech (Computer Science and Engineering) *Chennai, India*
Percentage: 87.35/100

WORK EXPERIENCE

Dept. of Translational Medicine and Research, SRM Medical College August 2019 - Present
Research Intern *Chennai, India*

- Analyzed and cleaned real-life Knee MRI data. Used image processing techniques to make the data trainable.
- Developed a novel loss function for the same which provided better results and submitted a paper on the same which got accepted at the EMBC 2020 conference.

Healthcare Technology Innovation Centre(HTIC), IIT-Madras May 2018 - July 2019
Research Intern *Chennai, India*

- Implemented several state-of-the-art deep learning architectures for the task of Image Segmentation and Classification.
- Achieved a position in the top 20 of the leaderboard at the time of conclusion of challenges held by ISBI and SPIE Medical Imaging conferences.
- Conducted research using different architectures for the task of Super-resolution on Brain MRI.

PUBLICATIONS

- **MRI Super-resolution using Laplacian Convolutional Neural Networks with Isotropic Undecimated Wavelet Loss.** S.Ramanarayanan, B.Murugesan, **A.Kalyanasundaram**, S.Prabhakaran, S.Patil, M.Sivaprakasam. 42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society 2020 (EMBC 2020).
- **Detection of Pathological Myopia using Convolutional Neural Networks. A.Kalyanasundaram**, S.Prabhakaran, Briskilal.J, Senthil Kumar.D. International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 05, 2020

PROJECTS

MRI Super-resolution using Deep Learning May 2019 - February 2020

Deep learning based super-resolution networks were used to super-resolve MR images. Achieved an SSIM of 0.9887 on the test set.

Pathological Myopia Detection System March 2019 - May 2019

Achieved an overall position of 18 out of 600 teams on the leaderboard of the PALM challenge, held as a part of ISBI 2019, at the time of conclusion of the challenge. The challenge consisted of classification, segmentation and detection tasks. Used deep learning networks for the classification and segmentation tasks. Created a user interface powered by the Kivy framework.

Cancer Cellularity Prediction System December 2018 - March 2019

The challenge was to predict cancer cellularity given an image of a tissue. Achieved a position of 6 out of 100 teams at the time of conclusion, with a prediction probability of 0.88 using an ensemble of ResNet architectures. Developed a user interface for the same using Kivy.

Salt Segmentation for detection of Petroleum under Rocks July 2018 - December 2018

Worked on the project as part of a challenge on Kaggle. The task was to segment salt regions in images of rock surfaces. Achieved a dice score of 0.83 on the dataset using a UNet with ResNet34 encoder and data augmentation techniques.

Histopathic Segmentation of Nuclei using Deep Learning May 2018 - June 2018

This challenge was held as part of the MICCAI 2018 conference. Trained with the UNet architecture after applying extensive data augmentation techniques. Achieved a dice score of 0.82 on the test set.

Cyclone Prediction using Machine Learning March 2018 - April 2018

Worked on the HURDAT dataset released by the NHC for classification of weather phenomena. Cleaned the data and achieved an F1-score of 0.843 on the validation set, using supervised learning techniques.

COURSES

University Courses

- Machine Learning
- Artificial Intelligence
- Probability and Queuing Theory
- Advanced Calculus and Complex Analysis
- Data Science and Big Data Analytics

Online Courses

- Machine Learning by Stanford University, Coursera
- Neural Networks and Deep Learning by deeplearning.ai, Coursera
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization by deeplearning.ai, Coursera
- Python for Everybody, Coursera
- Deep Neural Networks with PyTorch by IBM, Coursera
- AI Capstone Project with Deep Learning by IBM, Coursera

TECHNICAL SKILLS

Skills:	Machine Learning, Computer Vision
Languages:	Python, C++, MATLAB
Frameworks:	Tensorflow, Pytorch, Keras, OpenCV