

# Ananth Kalyanasundaram

Phone number: +49-17682035969 ◇ LinkedIn profile

Address: Pelkovenstr. 92, 80992 Munich

ananth.kalyanasundaram@gmail.com ◇ AnanthK1998.github.io

## RESEARCH INTERESTS

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My research interests broadly lie in the field of Computer Vision and Deep Learning. I am interested in developing novel algorithms that optimize feature representations in a deep neural network. I am also interested in working toward problems in 3D vision, segmentation and super-resolution.

## EDUCATION

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**Technical University of Munich**

*MSc. Informatics*

October 2021 - October 2023 (expected)

*Munich, Germany*

**SRM Institute of Science and Technology**

*B.Tech (Computer Science and Engineering)*

July 2016 - June 2020

*Chennai, India*

Percentage: 87.35/100

## PUBLICATIONS

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- **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

## WORK EXPERIENCE

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**Human Analysis Lab, Michigan State University**

*Research Intern*

September 2020 - Present

*East Lansing, Michigan, USA*

- Currently working on improving the performance of deep neural networks for the purpose of multi task learning under the supervision of Professor Vishnu Boddeti.

**KPMG India**

*Data Analyst Intern*

July 2020 - October 2020

*Mumbai, India*

- Worked on optimizing tax processes after analysis of data for the Tax Technology and Transformation team.
- Created automation software for OTP verification in websites.
- Tested several bots and ensured high quality output was produced.

**SRM Medical College**

*Research Intern*

August 2019 - June 2020

*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 this task which delivered better results and published a paper on the same at the IEEE EMBC 2020 conference.

- 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.

## PROJECTS

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### **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

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### **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
- Deep Learning Specialization by Andrew Ng
- Python for Everybody, Coursera
- Deep Neural Networks with PyTorch by IBM, Coursera
- AI Capstone Project with Deep Learning by IBM, Coursera

## TECHNICAL SKILLS

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**Skills:** Machine Learning, Computer Vision

**Languages:** Python, C++, MATLAB

**Frameworks:** Tensorflow, Pytorch, Keras, OpenCV