

Aakash Madhav Rao

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Education

Post Graduate Diploma in Advanced Studies and Research

Ashoka University. Sonipat, India.

2023-2024

CGPA -/4.00

Advisor: Prof. Rintu Kutum and Prof. Subhashis Banerjee; Working on a thesis of detailed cell and tissue segmentation in cancer histopathology.

Bachelors of Science (Honours) in Computer Science

Ashoka University. Sonipat, India.

2022-2023

CGPA 3.25/4.00

Advisor: Prof. Debayan Gupta and Prof. Anirban Mondal (late); Worked on the application of classification in cancer pathology; Played varsity cricket for a brief period.

High School Diploma

Ryan International School, Bengaluru, India.

2018-2020

CGPA 9.25/10.0

President of the Student Council and played junior-varsity cricket.

Work

Graduate Research Intern

Trivedi School of Biosciences, Ashoka University.

Jun 2023 - Sep 2023

Sonipat India

Worked on benchmarking Algorithms for Cellular Segmentation and homogenising of large scale histopathology datasets.

Undergraduate Research Intern

Centre for Healthcare Analytics and Research trends, Ashoka University.

Dec 2022 - Mar 2023

Sonipat India

Worked on benchmarking Algorithms for tissue level Segmentation, the CODA-TB DREAM challenge for Auditory Machine Learning.

Undergraduate Research Intern

Mphasis Labs for Machine Learning and Computational Thinking, Ashoka University.

Apr 2022 - May 2023

Sonipat India

Worked on the application of classification and other similar algorithms for estimating segmentation maps in cancer histopathology images.

Teaching

CSL2010: Introduction to Machine Learning

Indian institute of Technology

Jun - Sep 2023

Jodhpur, India

This is an elective requirement offered during the summer semester at IIT Jodhpur that provides students from a wide array of disciplines with the foundations of machine learning.

CS-2378: The New Geography of the Information Age

Department of Computer Science, Political Science, and International Relations, Ashoka University.

Jan - May 2023

Sonipat India

This course was the second iteration the same as offered earlier.

CS-1203: Data Structures I

Department of Computer Science, Ashoka University.

Sep - Dec 2022

Sonipat India

This course is a core computer science requirement that familiarises undergraduate students with the intricacies of the various data structures and their implementations in various programming languages.

CS-2378: The New Geography of the Information Age

Department of Computer Science, Ashoka University.

Jan - May 2022

Sonipat India

This course focussed on socio-technical problems caused by humanity blindly stumbling its way into the Information Age. Our new world has new rules: intellectual property looks different, cyber-crime looms large, cold cyber-warfare persists at a nation-state level, planet-scale surveillance is commonplace, we're all about to lose our jobs to robots, and the list goes on.

Articles

(Under Review) **ORCHID: A Comprehensive Oral Cancer Histology Image Database for Histopathological Analytics and Diagnostics** (August, 2023)

Nisha Chaudhary, Arpita Rai, **Aakash Madhav Rao**, Md Imam Faizan, Jeyaseelan Augustine, Akhilanand Chaurasia, Deepika Mishra, Akhilesh Chandra, Varnit Chauhan, Rintu Kutum, Tanveer Ahmad

DOI: [10.1101/2023.08.14.23294094](https://doi.org/10.1101/2023.08.14.23294094)

(Under Review) **Grade-level classification of oral squamous cell carcinoma (OSCC) from digital pathology using ensemble deep learning algorithms** (April, 2023)

Nisha Chaudhary, **Aakash Madhav Rao**, Md Imam Faizan, Arpita Rai, J. Augustine, Akhilanand Chaurasia, Deepika Mishra, Akhilesh Chandra, Rintu Kutum, Tanveer Ahmad

The Future of China's Minorities with the Growing Power and Breadth of Technology (April 14, 2022) (April, 2022)

Aakash Madhav Rao

Journal of Social and Political Sciences, Asian Institute of Research

URL: <https://www.asianinstituteofresearch.org/RaoFut2022>

Poster and Workshops

(Poster) **Grade-level classification of oral squamous cell carcinoma (OSCC) from digital pathology using ensemble deep learning algorithms** (July, 2023)

Nisha Chaudhary, **Aakash Madhav Rao**, Md Imam Faizan, Arpita Rai, J. Augustine, Akhilanand Chaurasia, Deepika Mishra, Akhilesh Chandra, Rintu Kutum, Tanveer Ahmad

The 31st Annual Intelligent Systems For Molecular Biology and the 22nd Annual European Conference on Computational Biology **ISMB/ECCB 2023** | Lyon, France

(Poster) **Grade-level classification of oral squamous cell carcinoma (OSCC) from digital pathology using ensemble deep learning algorithms** (April, 2023)

Nisha Chaudhary, **Aakash Madhav Rao**, Md Imam Faizan, Arpita Rai, J. Augustine, Akhilanand Chaurasia, Deepika Mishra, Akhilesh Chandra, Rintu Kutum, Tanveer Ahmad

The 27th edition of the **RECOMB** conference and 15th **Satellite Workshop on Computational Cancer Biology** | Istanbul, Turkey

(Poster) **Histopathology Image Analysis using Automated Cell and White Space Classification: A Solution for Improved Digital Pathology** (March, 2023)

Aakash Madhav Rao, Pranit Sinha, Debayan Gupta, Rintu Kutum

The 1st Ashoka Science and Research Fair (**ASRF**) | Haryana, India

Awards and Accomplishments

Student Travel Grant

July 2023

Ashoka University Centre for Supporting Students

I received a travel and conference grant to attend the The 31st Annual Intelligent Systems For Molecular Biology and the 22nd Annual European Conference on Computational Biology **ISMB/ECCB 2023** at Lyon, France

Singapore International Pre-Graduate Award

March 2023

A-Star Laboratories and The Government of Singapore

Advisor: Dr. Bhanu Prakash K.N, Bioinformatics Institute, Singapore

I received this award along with an attachment to Dr. Bhanu Prakash K.N at Bioinformatics Institute in Singapore to work on a project in applying machine learning to cardiac healthcare. This is a coveted award offered to top international students.

6th place in the CODA TB DREAM Challenge DREAM

March 2023

Advisor: Prof. Rintu Kutum, Ashoka University

My team and I built a Mel Spectrogram based method to diagnose Tuberculosis from cough audio samples. We were placed 6th in the entire challenge.

All Round Best Student Award

Ryan International School

May 2020

Advisor: Ms. Vidya Guruprasad

I was awarded the all round best student award for my exceptional contribution to academics and student life as a senior in High School. This is an equivalent to High-School Valedictorian.

Leadership

President of the Computer Science Society

Ashoka University | June 2022 - June 2023

Advisor: Prof. Debayan Gupta and Prof. Manu Awasthi

Led the Computer Science Society and worked with a team of over 50 people, volunteers and members, to build and encourage the spirit of computer science. My role involved the following,

- Spearheaded various community building events to foster the spirit of computer science
- Started peer support groups as well as year-round helpdesks to support students from various backgrounds
- Held various workshops to introduce computer science and programming to the incoming cohorts
- Collaborated with different student bodies to promote and support inclusivity and holistic learning.
- Promoted the idea of the importance of interdisciplinary computer science.

Editorial Board for Healthcare x Computer Science

The Crossting Journal | June 2022 - Present

Advisors: Prof. Debayan Gupta and Prof. Partho Pratim Chakrabarti

Working to build an interdisciplinary computer science journal that looks at the overlap of computer science in various fields.

Projects

(Official Submission) **MFCC based neural network classifier to predict TB status from cough sound**
Official Submission to the CODA TB DREAM Challenge 2023.

Placed 6th In the challenge [\[write-up\]](#) [\[code\]](#)

(Unofficial Implementation) **Deep Spectral Segmentation for Object Detection** | 2023

An unofficial implementation of the 2022 CVPR paper titled 'Deep Spectral Methods: A Surprisingly Strong Baseline for Unsupervised Semantic Segmentation and Localization' [\[paper\]](#) [\[code\]](#)

(Small Works) **Differentiator: a pathology patch usability classifier** | 2023

A decision tree based classifier that predicts the usability of a histopathology patch in the modelling pipeline. Used in the ORCHID data pipeline [\[code\]](#)

(Hardware) **Speak-art: Expansion Art** | 2022

Used a Xiaomi blue-tooth speaker to create an expansion art piece.

Key Skills

Languages: C, Python, Java, R

Libraries: PyTorch, Tensorflow, sklearn, scikit-image, OpenCV, Tensorboard

Tools: Vim, Git, LATEX, VSCode, Inkscape, Adobe, AutoCAD

Membership

ISMB: The International Society for Molecular Biology | *June 2023 - Present*

ACM: The Association for Computing Machinery | *July 2023 - Present*

References

Prof. Rintu Kutum (rintu.kutum@ashoka.edu.in) | I have been working on various research projects with prof. Rintu since 2022

Prof. LS Sashidhara (ls.shashidhara@ashoka.edu.in) | I have been working on the project on breast cancer since 2022

Prof. Subashis Banerjee (suban@ashoka.edu.in) | I have been working on the project on breast cancer since 2022

Dr. Anurag Agarwal (anurag.agrawal@ashoka.edu.in) | I have been working on the project on oral cancer since 2023

Prof. Debayan Gupta (debayan.gupta@ashoka.edu.in) | I have served as a TA for prof. Debayan in various courses.