Rishab **Khincha**

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Education

May 2021 | **Birla Institute of Technology and Science (BITS) Pilani** — **Goa, India**
Aug 2016 | Bachelor of Engineering, Computer Science — CGPA: 9.24/10, Core: 9.81/10
Master of Science, Physics — CGPA: 9.24/10, Core: 9.61/10

Experience

Present | **Massachusetts Institute of Technology | Fluid Interfaces, MIT Media Lab** [🌐] — **Cambridge, USA**
June 2020 | *Research Affiliate (Senior Thesis) | Advisor: Prof. Pattie Maes*
Working on building robust algorithms for severity prediction of Alzheimer's Dementia. Project dementAI

June 2020 | **Goldman Sachs** — **Bangalore, India**
May 2020 | *Software Engineer Intern | Manager: Raghavendra Rao - Vice President*
Worked in the Loans Servicing team to build a loan reconciliation app using Java, BPMN and eTasks.

Present | **APP Center for AI Research** [🌐] **& TCS Research** [🌐] — **Goa, India**
January 2020 | *Student Researcher | Advisors: Prof. Ashwin Srinivasan, Dr. Lovekesh Vig and Prof. Tirtharaj Dash*
Building robust and interpretable models for medical imaging tasks.

August 2019 | **Western University | Nearby-Galaxies Group** [🌐] — **London, Canada**
May 2019 | *MITACS Globalink Research Intern | Advisor: Prof. Pauline Barmby*
Built an open-source image processing tool ImageCube to processes multi-wavelength astronomy datasets.

July 2018 | **Myra Medicine | Data Science Team** — **Bangalore, India**
May 2018 | *Summer Intern | Manager: Manik Singhal*
Analysed order data and profiled customers based on various purchasing patterns.

July 2017 | **Volvo CE** — **Bangalore, India**
May 2017 | *Summer Intern | Manager: Sundara Murthy*
Developed an Android application for inventory handling used internally in the warehouses.

Publications & Talks

Constructing and Evaluating an Explainable Model for COVID-19 Diagnosis from Chest X-rays
Rishab Khincha, Soundarya Krishnan, Krishnan Guru-Murthy, Tirtharaj Dash, Lovekesh Vig, Ashwin Srinivasan
[Under Review]

Why have a Unified Predictive Uncertainty? Disentangling it using Deep Split Ensembles [🔗]
Utkarsh Sarawgi, Wazeer Zulfikar, Rishab Khincha, Pattie Maes
[Under Review]

Robustness to Missing Features using Hierarchical Clustering with Split Neural Networks [🔗]
Rishab Khincha, Utkarsh Sarawgi, Wazeer Zulfikar, Pattie Maes
AAAI Conference on Artificial Intelligence, Honolulu, Hawaii, USA [Student Abstract] [AAAI'21]

Uncertainty-Aware Multi-Modal Ensembling for Severity Prediction of Alzheimer's Dementia [🔗] [Poster]
Utkarsh Sarawgi, Wazeer Zulfikar, Rishab Khincha, Pattie Maes
Machine Learning for Health Workshop, NeurIPS, Vancouver, Canada [NeurIPS'20]

A Case Study of Transfer of Lesion-Knowledge [🔗] [Slides]
Soundarya Krishnan, Rishab Khincha, Lovekesh Vig, Tirtharaj Dash, Ashwin Srinivasan
Second Workshop on Medical Image Learning with Less Labels and Imperfect Data, MICCAI, Lima, Peru [MICCAI'20]

CovidDiagnosis: Deep Diagnosis of COVID-19 Patients using Chest X-rays [🔗]
Kushagra Mahajan, Monika Sharma, Lovekesh Vig, Rishab Khincha, Soundarya Krishnan, Adithya Niranjan, Tirtharaj Dash, Ashwin Srinivasan, Gautam Shroff
Second Workshop on Thoracic Image Analysis, MICCAI, Lima, Peru [MICCAI'20]

Online Learning Assistant with Network Community Analysis
Soundarya Krishnan, Rishab Khincha, Neena Goveas
Young Researcher's Sympsoium, CODS-COMAD, Bangalore, India [CODS-COMAD'21]

ECG Signal Analysis on an Embedded Device for Sleep Apnea Detection [🔗]
Rishab Khincha, Soundarya Krishnan, Rizwan Parveen, Neena Goveas
9th International Conference on Image and Signal Processing, Morocco [ICISP'20]

How to do science with ImageCube [Invited Talk] [🔗]
Rishab Khincha, Pauline Barmby
Python in Astronomy 2020, Trinity College Dublin. Canceled due to COVID-19 [PyAstro'20]

Select Research Projects

Risk Stratification of Alzheimer's Dementia - dementAI [🌐] June'20 - Present
Advisor: Prof. Pattie Maes
- Building an open-source platform for modeling risk stratification of Alzheimer's Dementia using spontaneous speech.
- Proposed 'Deep Split Ensembles' to disentangle the predictive uncertainties in the data. [🔗] [] [Under Review]
- Novel ensembling technique using predictive uncertainties, showing good performance on the benchmark Dementia Bank dataset and potential for other multi-modal ensembling. [🔗] [] [ML4H@NeurIPS'20]

Deep Diagnosis of COVID-19 from Chest X-rays March'20 - Present
Advisors: Prof. Ashwin Srinivasan, Dr. Lovekesh Vig, Prof. Tirtharaj Dash
- Built a pipeline comprising of models for lung isolation followed by classification into different disease classes, achieving state-of-the-art results on the COVIDx dataset. [🔗] [MIL3D@MICCAI'20]
- Worked with a radiologist to build a new COVIDr dataset with important radiological annotations to be publicly released.
- Constructed a neuro-symbolic model and worked with radiologists to evaluate the clinical efficacy of visual and textual explanations from the models. [Under Review]

Robustness to Missing Features using Split NNs August'20 - Present
Advisor: Prof. Pattie Maes
- Proposed an effective approach to cluster similar input features using hierarchical clustering and then train proportionately split neural networks with a joint loss. [🔗] [] [AAAI'21]
- Evaluated this approach on a series of benchmark datasets and show promising improvements even with simple imputation techniques.

Portable Holter Monitor with Real-Time Threat Detection Add - Add
Advisor: Prof. Neena Goveas
- Developed a pipeline combining data extraction, segmentation, signal cleaning and filtering to detect sleep apnea.
- Tested the pipeline on the MIT-Physionet dataset and found it to be well suited for deployment on resource-constrained embedded devices. [🔗] [ICISP'20]

Honours and Awards

RIKEN Cluster for Pioneering Research IPA, 2020 | Awarded [🌐] ¥1.3M funds for a visit to Dr. Franco Nori's lab in Japan.

Goldman Sachs Intern Coding Challenge, 2020 | Runner-up Annual coding contest held amongst interns.

MITACS Globalink Research Internship, 2019 | Awarded [🌐] $8000 grant to do research at Western University, Canada.

Ingenuity Challenge, 2020 | Winner [🌐] Optimisation challenge (travelling-thief) organized by the University of Adelaide.

Shell AI Hackathon, 2020 | Bronze Category [🌐] Windmill optimisation challenge organized by Shell

Teaching Assistant

Object Oriented Programming, Fall'19 **Prof. Neena Goveas** Prepared, invigilated and evaluated weekly lab sessions.

Competitive Programming, Summer'19 **QSTP, Quark'19** Co-instructor – prepared course material and exams.

Computer Programming, Spring'18 & Spring'20 **Prof. Bharat Deshpande** Evaluated weekly lab sessions.

Electromagnetic Theory, Fall'18 **Prof. Kinjal Banerjee** Doubt solving in tutorial sessions, graded quiz papers.

Service

New in ML Workshop | NeurIPS 2020 [🌐] Reviewer

Machine Learning for Health Workshop | NeurIPS 2020 [🌐] Mentor

Department of CSIS | BITS Goa [🌐] Mentor