

Rishab Khincha

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Education

The University of Texas at Austin

M.S. Computer Science | Aug 2021 – May 2023

Courses: Advanced Topics in CV, NLP. Teaching: Advanced ML

BITS Pilani

B.E. Computer Science, M.Sc. Physics | Aug '16–Jun '21

GPA 9.35/10, Awarded the Institute Merit Scholarship

Skills

C/C++, Java, Python, MySQL, Tensorflow, Pytorch, Keras

Experience

MIT Media Lab | Research Affiliate (Remote)

Boston, MA | Jun 2020 – April 2021

Advised by Prof. Pattie Maes

Built robust, multi-modal ensemble methods using novel acoustic, pause, and intervention features for severity prediction of Alzheimer's Dementia. Our proposed ensemble methods [P1, P2] beat existing SOTA methods by over 10% on RMSE and NLL while providing more reliable and trustworthy predictions, disentangling the uncertainty estimates from different modalities.

Goldman Sachs | Software Engineering Intern

Bangalore, India | May 2020 – Jun 2020

Wrote REST APIs in Java and created BPMN workflows to build a loan reconciliation app that escalates inconsistencies in the database to the operation team as an eTask, saving over 2 hours of work every day for the team. Worked with multiple technical and operations teams for the successful integration of the app.

RIKEN | International Program Associate (Remote)

Wako, JP | Feb 2021 – July 2021

Advised by Dr. Franco Nori, Dr. Clemens Gneiting

Studied the noise robustness of analog optimization methods for NP-Hard problems and mathematically modeled the behavior scales with increasing problem sizes (up to 10^3 spins).

Western University | Research Engineering Intern

London, Canada | May 2019 – Aug 2021

Advised by Prof. Pauline Barmby

Awarded 8000 CAD grant from MITACS to work with the Nearby Galaxies group and build ImageCube [code], an open-source image processing tool in Python3 to process multi-wavelength astronomical datasets. I was one of the 5 researchers invited to present my work as an hour-long talk at PyAstro 2020.

Selected Projects [Github]

Risk Stratification of Alzheimer's Dementia (AD)

MIT Media Lab | Prof. Pattie Maes

Built an open-source platform for modeling risk stratification of AD using spontaneous speech features. Proposed Deep Split Ensembles [P2] and UA Ensembles [P1] where we beat existing SOTA in 7 of the 10 benchmark datasets while disentangling the predictive uncertainties and reducing the system's entropy.

Constructing and Evaluating an Explainable Model for COVID-19 Diagnosis

TCS Research & BITS Goa | Prof. Ashwin Srinivasan

Worked with a radiologist to build a novel COVIDr dataset with critical radiological annotations and to understand the clinical

efficacy of visual and textual explanations through a web interface. Constructed a neuro-symbolic model to extract domain-specific features from chest X-rays using DNNs, and a decision tree for diagnosing COVID-19 with over 97% accuracy using these features [P3].

Deep Diagnosis of COVID-19 from Chest X-rays

TCS Research | Prof. Ashwin Srinivasan, Dr. Lovekesh Vig

Built a UNet model to isolate the lungs region from the rest of the chest and built a model to detect COVID-19 from the segmented lung. Employed embeddings of disease symptoms produced by the CheXNet network and created an ensemble to assist the model in classification with an accuracy of 92%, beating the existing SOTA [P4]. Prime Minister's office is interested in using this tool for mass screening in airports and railway stations.

Robustness to Missing Features using Split NNs

MIT Media Lab | Prof. Pattie Maes

Used hierarchical clustering to cluster similar features and then trained split neural networks with a joint loss. We showed promising improvements on benchmark regression datasets even with simple imputation techniques like mean imputation [P6].

Social Networks-based Telegram Chatbot

BITS Goa | Prof. Neena Goveas

Built a platform-agnostic Python interface that scrapes chat data, classifies users(experts/users) and suggests experts and timings for various topics extracted from the chat. [P7]

Selected Publications [Google Scholar]

[P1] Uncertainty-Aware Boosted Ensembling in Multi-Modal Settings

U Sarawgi*, R Khincha*, W Zulfikar*, S Ghosh, P Maes
ML4H Workshop NeurIPS 2020, IJCNN 2021 [Paper] [Talk]

[P2] Why have a Unified Predictive Uncertainty? Disentangling it using Deep Split Ensembles

U Sarawgi, W Zulfikar, R Khincha, P Maes [Preprint]

[P3] Constructing and Evaluating an Explainable Model for COVID-19 Diagnosis from Chest X-rays

R Khincha, S Krishnan, K Guru-Murthy, T Dash, L Vig, A Srinivasan [Preprint]

[P4] CovidDiagnosis: Deep Diagnosis of COVID-19 Patients using Chest X-rays

K Mahajan, M Sharma, L Vig, R Khincha, S Krishnan, et al.
MIL3D, MICCAI 2020. Springer LNCS [Paper]

[P5] A Case Study of Transfer of Lesion-Knowledge

S Krishnan, R Khincha, L Vig, T Dash, A Srinivasan
TIA, MICCAI 2020. Springer LNCS [Paper] [Talk]

[P6] Robustness to Missing Features using Hierarchical Clustering with Split Neural Networks

R Khincha, U Sarawgi, W Zulfikar, P Maes
AAAI 2021 (Student Abstract) [Paper] [Poster]

[P7] Network Community Analysis Based Enhancement of Online Discussion Forums

S Krishnan, R Khincha, N Goveas
CODS-COMAD 2021 YRF - Honorable Mention [Paper] [Talk]

Achievements

- Selected, Google Research AI Summer School, Aug 2020
- Winner, Ingenuity Challenge, Oct 2020
- Runner-up, Goldman Sachs Intern Coding Challenge, Jun 2020