

# 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

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## Skills

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

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## 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).

### APP Center for AI Research | Student Researcher

Goa, India | Jan 2020 – Jun 2021

*Advised by Prof. Ashwin Srinivasan, Dr. Lovekesh Vig*

Built ResNet, DenseNet, and UNet models using Tensorflow for medical imaging tasks, improving the existing SOTA in tumor classification [P5] and lung disease identification [P4] by 3%. Worked with a team of doctors and scientists to understand how AI models and explanations can be trusted by clinicians [P3].

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## 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]

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## Selected Publications [Google Scholar]

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

U Sarawgi\*, R Khincha<sup>2</sup>, 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]

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## Achievements

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