



## EDUCATION

Program	Institution	% / CGPA	Completion
<b>B.Tech (Hons.) Electrical Engineering</b>	Indian Institute of Technology Madras	9.77	2022
XII (CBSE)	Chettinad Vidyashram Sr. Secondary School, Chennai	97.8%	2017
X (CBSE)	Sir Siva Swami Kalalaya Sr. Secondary School, Chennai	10.0	2015

## SCHOLASTIC ACHIEVEMENTS

- **Branch Topper (Class Rank 1)** - B. Tech Electrical Engineering
- Currently interning at **Google Research India** as Research Associate
- Awarded '**Young Achiever-2017**' for all-round excellence by Chettinad Vidyashram Sr. Sec. School
- Secured '**Gold**' in 9<sup>th</sup> Inter IIT Tech Meet organized by IIT Guwahati, representing IIT Madras Analytics team in "**Scalathon: Build an Automatic Headline and Sentiment Generator**"

## PUBLICATIONS

<b>Gesture recognition from swipe keyboard for Indic languages</b>  [JAN 2020-JUN 2020]	Project Guide: Prof. Mitesh Khapra and Prof. Pratyush Kumar Panda - IIT Madras <ul style="list-style-type: none"> <li>• Built a <b>LSTM</b> and <b>Transformer</b> with multi-head attention model trained on <b>CTC Loss</b> function for input gesture recognition</li> <li>• Transliterated the decode gesture input into an Indic word using a <b>LSTM</b> based <b>encoder-decoder</b> model with Bahadanu attention and <b>beam search decoder</b></li> <li>• The transliterated Indic word was then passed into a contrastive spell correction module using <b>position aware embeddings</b> to obtain the spell corrected word</li> </ul> <b>This work has been published at COLING (Computational Linguistics) 2020 Conference</b> <b>Link:</b> <a href="https://tinyurl.com/xt5kc878">https://tinyurl.com/xt5kc878</a> <b>Project Website:</b> <a href="https://tinyurl.com/ryrthfs">https://tinyurl.com/ryrthfs</a>
<b>Transfer learning based LSTM-CNN model for Thermal comfort prediction</b>  [AUG 2020- DEC 2020]	Project Guide : Prof. Krithivasan Ramamritham & Prof. Anupama Kowli – IIT Bombay <ul style="list-style-type: none"> <li>• Built a <b>transductive transfer learning based LSTM-CNN</b> model to predict thermal comfort in buildings with very less or no labeled data</li> <li>• Used <b>SMOTE</b> (Synthetic minority oversampling technique) to handle the inherent imbalance in the source domain thermal comfort data</li> <li>• Carried out <b>feature selection</b> from the source data to arrive at the most significant set features from a list of <b>hundreds</b> of features</li> </ul> <b>This work has been published in Elsevier – Buildings and Environment Journal</b> <b>Link:</b> <a href="https://tinyurl.com/fybn8jv4">https://tinyurl.com/fybn8jv4</a> <b>Project Website:</b> <a href="https://tinyurl.com/jm4ueetz">https://tinyurl.com/jm4ueetz</a>
<b>Input Specific Attention Subnetworks for Adversarial Detection</b>  [JAN 2021- JUL 2021]	Project Guide : Prof. Mitesh Khapra and Prof. Pratyush Kumar Panda - IIT Madras <ul style="list-style-type: none"> <li>• Built an <b>adversarial detection</b> model using novel features formed from the attention heads of a Transformer model</li> <li>• The <b>input specific attention sub-networks</b> were used for extracting the features used to discriminate between authentic and adversarial inputs</li> <li>• The resultant detector significantly improves (<b>by over 10% on average</b>) the state-of-the-art adversarial detection accuracy for the BERT like models on <b>10 NLP datasets across 11 different adversarial attack types</b></li> <li>• We released a benchmark dataset consisting of <b>5,686 adversarial examples</b> across these tasks and attack types</li> </ul> <b>This work has been submitted to ACL Rolling review 2021 (Under Review)</b> <b>Link:</b> <a href="https://tinyurl.com/dzehewbv">https://tinyurl.com/dzehewbv</a> <b>Project Website:</b> <a href="https://tinyurl.com/j3hjkhej">https://tinyurl.com/j3hjkhej</a>

## PROJECTS AND INTERNSHIPS

<b>Evading Simplicity Bias in Neural Networks</b>  [AUG 2021 – PRESENT]	Internship at : <b>Google Research India</b> Role: <b>Research Associate Intern</b> Mentor: <b>Dr. Praneeth Netrapalli</b> and <b>Dr. Prateek Jain</b> <ul style="list-style-type: none"> <li>• Built a <b>sequential setup</b> of Convolutional neural networks trained on <b>Novel redundancy loss</b> (inspired from self-supervised learning methods - <b>Barlow Twins concept</b>) to make the neural network learn complex features and not on <b>spurious correlations</b> present in the data</li> <li>• Verified the existence of <b>Simplicity Bias</b> in <b>Patch-CIFAR</b>, <b>MNIST-CIFAR</b>, and <b>Mini-ImageNet</b> datasets</li> <li>• The usage of this loss improved the Out of distribution (<b>OOD</b>) <b>classification accuracy by 5%</b> and <b>Few-shot accuracy by 12%</b> on average for a RESNET-18 model</li> </ul>
<b>Shared Disk Data Tracking</b>	Summer internship at: <b>Microsoft India (R&amp;D) Pvt. Ltd</b> Team: <b>Cloud &amp; Artificial Intelligence</b> Role: <b>Software Development Engineer Intern</b>

<b>for a failover cluster</b>  [MAY 2021-JUL 2021]	<ul style="list-style-type: none"> <li>Worked on <b>control plane</b> changes to report a shared disk in context of only the owner node and <b>data plane</b> changes to report all IOs in context of one node on the Azure Portal</li> <li>Wrote a script to <b>automatically</b> detach the shared disk from the owner node and reattach the disk in all the nodes which are part of the cluster before <b>failover</b> to the target side</li> <li>Verified the <b>Tag generation</b> and Crash consistent <b>recovery point generation</b> in the context of a single node on the Azure portal</li> </ul>
<b>Neural Embedding and Bi-Partite Graph based Recommender system</b>  [MAY 2020-JUL 2020]	<p>Summer internship at: <b>BRIDGEI2I ANALYTICS SOLUTIONS PVT. LTD.</b></p> <ul style="list-style-type: none"> <li>Built a <b>pipeline of recommender systems</b> for a commercial client comprising of Popularity based, KNN Clustering based, Item-Item association based, Bi-Partite graph-based, and Neural Embedding based recommenders</li> <li>The <b>Neural Embedding based</b> recommender was built for handling <b>sparse input</b> data. The <b>Bi-Partite graph based</b> association recommender was used for considering co-occurrences among items and to consider <b>higher-order proximities</b> among the items. This pipeline improved hits on recommended products by <b>8%</b></li> </ul> <p><b>Project Website:</b> <a href="https://tinyurl.com/3ypyrxs5">https://tinyurl.com/3ypyrxs5</a></p>
<b>Lightweight CNN model for Music Instrument Classification</b>  [JAN 2021- MAY 2021]  <b>(Course Project : Introduction to Machine Learning- EE5180 )</b>	<ul style="list-style-type: none"> <li>Built a <b>Lightweight-CNN</b> model to classify musical instruments. Computes the <b>Mel-spectrogram</b> features from input audio data to use as input features</li> <li>Used the data augmentation technique based on the <b>Cut-mix</b> algorithm to add robustness to the model. We optimize the model parameters using <b>hyperparameter tuning</b> and use <b>Weight pruning</b> to make the model lightweight</li> <li>Analyzed the inputs using <b>Gradient-based Class Activation Maps</b> to identify the important <b>DCT coefficients</b> from the input audio signal</li> </ul> <p><b>Project Website:</b> <a href="https://tinyurl.com/pt2ddb7">https://tinyurl.com/pt2ddb7</a></p>
<b>Green path prediction based on Air quality data</b>  [AUG 2019- JAN 2020]	<p>Research Project at: <b>Electronics Club, Centre for Innovation - IIT Madras</b></p> <ul style="list-style-type: none"> <li>Used <b>Time series analysis</b> to forecast the air quality data of a particular area for a period of one month. Used a LSTM based forecasting model with spline interpolation to handle missing data</li> <li>Analyzed the variation in concentration of pollutants during the day and modeled an algorithm to predict the <b>safest travel path (Green path) between the start and destination in terms of best Air Quality</b></li> </ul>

#### RELEVANT COURSE WORKS

Fundamentals of Deep learning (Audited)	Introduction to Machine Learning	Probability & Statistics for Electrical Engineers	Information theory
Fundamentals of Operations research (FOR)	Introduction to Econometrics	Economic Network Analysis	Linear Algebra for engineers

#### CERTIFICATIONS

- Data Science Essential from Microsoft, EDX
- Introduction to Machine learning from Stanford University, Coursera
- Deep learning Specialization from Deeplearning.ai, Coursera
- Natural Language processing offered by National Research Centre HSE Russia, Coursera
- Practical Reinforcement Learning, Coursera
- The complete Oracle SQL certification Course, Udemy

#### TECHNICAL SKILLS

- Proficient in programming in Python, C, C++, MATLAB, R, and LaTeX
- Familiarity with Keras, Tensorflow, and Pytorch

#### POSITIONS OF RESPONSIBILITY

- Head of Oratory Club** IIT Madras (April 2020-April 2021)
- Coordinator, **Coding & logic team**, Shastra 2020 (May'19 – Jan'20)
- Coordinator in Saathi-Mentorship program. Mentored **ten freshmen** throughout their first year (Jul'19 – May'20)
- Part of Sponsorship & PR team, Shastra 2019 (Jul'18- Jan'19)

#### EXTRACURRICULAR ACTIVITIES

<b>SPORTS</b>	<ul style="list-style-type: none"> <li>Represented <b>Tamil Nadu State</b> Cricket team in U-14 and U-16 levels</li> <li>Part of <b>IITM cricket</b> team and <b>Captain</b> of the hostel cricket team</li> </ul>
<b>QUIZZING</b>	<ul style="list-style-type: none"> <li>Part of finals in three national level quizzes</li> <li>Finalist in <b>TIMES NIE Quiz, TIMES SCIENCE Quiz, Bournvita Quiz Contest</b></li> </ul>