

Debapriya Tula

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EDUCATION

University of California, Los Angeles

Incoming Fall, 2024

Masters in Electrical and Computer Engineering

Indian Institute of Information Technology, Sri City

2017 - 2021

Bachelor of Technology in Computer Science and Engineering

GPA: **9.35**/10.0

RESEARCH EXPERIENCE

Google Deepmind, India

Aug 2022 - Aug 2024

Pre-Doctoral Researcher

Advisors: Dr. Prateek Jain [✉](#) & Dr. Sujoy Paul [✉](#)

Test-time adaptation of OCR models.

- Formulated the novel problem of test-time adaptation of OCR models to a **single** image of a writer's handwriting.
- Designed a confidence and consistency based self-training method to improve predictions over the single image iteratively.
- Improved CER over **0.4** % across **250+** internal datasets.

Streamlined encoding of text-embedded images for efficient vision-language models.

- Developed a method to embed textual content of an image within the image, for direct processing by vision encoders.
- Achieved **twofold** improvement in exact match scores compared to baseline method without embedded textual content.

Efficiency in video and image generation

- Matryoshka type learning for transformer layers to decrease inference latency using nested models as per compute available.
- Initial efforts show promising results, with performance closer to baseline with significant reduction in FLOPS.

IIT Delhi, India

May 2020 - July 2020

Computer Vision Research Intern

Advisor: Dr. Brejesh Lall [✉](#)

- Designed an efficient pipeline for the problem of motion segmentation of fish in **underwater scenarios** solved as an **unsupervised** learning task.
- Modelled underwater disturbances and designed a temporal autoencoder based pipeline for the problem.
- Implemented over 4 **video object segmentation** papers to assess their transferability to this challenging setting.

Tezpur University, India

May 2019 - June 2019

Research Intern

Advisor: Dr. Siddhartha S. Satapathy [✉](#)

- Developed an algorithm for maximizing stacking regions to estimate most stable secondary structures for RNA sequences.
- Designed a dynamic programming based solution and used graph concepts like maximum independent sets and circle graphs to simplify the problem.
- Awarded the **best paper** at **ICCCIOT, 2020**.

PUBLICATIONS

- **Target Aware Network Architecture Search and Compression for Efficient Knowledge Transfer.** [✉](#)
S Basha, **D Tula**, S Vinakota, S R Dubey.
Multimedia Systems, 2024 (Journal).
- **Is it an i or an l: Test-time Adaptation of Text Line Recognition Models.** [✉](#)
D Tula, S Paul, G Madan, P Garst, R Ingle, G Aggarwal.
Ongoing submission towards TMLR
- **Offense Detection in Dravidian Languages using Code-Mixing Index based Focal Loss and Cosine Normalization.** [✉](#)
D Tula, Shreyas Ms, V Reddy, P Sahu, S Doddapaneni, P Potluri, R Sukumaran, P Patwa.
Springer Nature Computer Science, 2022 (Journal).
- **Ensemble of Multilingual Language Models with Pseudo Labeling for Offense Detection in Dravidian Languages.** [✉](#)
D Tula, P Potluri, Shreyas Ms, S Doddapaneni, P Sahu, R Sukumaran, P Patwa.
DravidianLangTech @ European Association for Computational Linguistics (EACL), 2021
- **Estimating RNA Secondary Structure by Maximizing Stacking Regions.** [✉](#)
P Sen, **D Tula**, S K Ray, S S Satapathy.
International Conference on Computer Communication and Internet of Things (ICCCIOT), 2021.
🏆 **Best Paper Award.**

ENGINEERING EXPERIENCE

Tata Consultancy Services - Innovation Lab, India [↗](#)

Aug 2021 - July 2022

Machine Learning Engineer

- Built ML models for forecasting user health policy renewal on data (~ **20 GB**) provided by General Electric HealthCare.
- Developed a framework to process diverse tabular data using AutoML toolkits and deployed it.
- Developed modules for statistical data analysis of the results for user interpretability using Plotly.

LimeChat, India [↗](#)

Jan 2021 - June 2021

NLP Software Development Intern

- Redesigned the **order tracking** system to make it more seamless and fault-tolerant (**30%** reduction in user dropoffs).
- Redesigned LimeChat's **FAQ** and **Utterance management** systems and deployed them as core features in **5 weeks**.
- Designed an end-to-end chatbot for **Nissan**, LimeChat's biggest client undertaking hitherto.

SELECT PROJECTS

• Content-Based Image Retrieval [↗](#)

Oct 2020 - May 2021

- Developed a curriculum learning method for retrieving images from large datasets.
- Added a global attention module and an angular-based loss based soft to hard example sampler to help the model learn both simple and complex features.

• Speech Emotion Recognition [↗](#)

Sep 2020 - Dec 2020

- Applied augmentation to speech signals, extracted MFCC features and trained a Random Forest Classifier for identifying emotion from speech directly.
- Accuracy obtained on datasets: **RAVDESS: 73.5 %** & **TESS: 98.6 %**.

• Speech Dereverberation [↗](#)

Sep 2018 - Dec 2018

- Implemented a statistical weighted prediction error model with a Gaussian prior over the reverb in a speech signal.
- Similarity with original signal: **65 - 75 %**.

AWARDS AND HONORS

- **Dept Rank 5** among **160** students - Computer Science and Engineering, IIIT Sri City.
- **Best Paper Award** at ICCCIoT, 2020.
- Awarded Innovation in Science Pursuit for Inspired Research (**INSPIRE**) in 2013.
- **State rank 11** in National Science Talent Search Exam (**NSTSE**) in 2012.

TALKS

• Deep Learning - Then, Now and Beyond [↗](#)

- Central University of Odisha, India

Apr 2023

ACADEMIC SERVICE AND VOLUNTEERING

• Volunteer at Google Booth - ICCV, 2023.

• Reviewer - Workshops at EACL 2021, NeurIPS 2022, ICCV 2023.

• AI Student Ambassador - Intel

Oct 2019 - June 2021

- Organized 1 hr long hands-on sessions and paper reading sessions on topics related to AI/ML. Encouraged students to work on AI/ML projects and assisted them.
- Implemented a video frame interpolation method using adaptive separable convolutions for efficient internet data usage. Average interpolation error on Visual Tracker Benchmark(VTB) dataset - **12.6 %**.

• Undergraduate Teaching Assistantship - Computer Science and Engineering, IIIT Sri City

- Advanced Data Structures and Algorithms - *Prof. Shiv Ram Dubey*

Fall 2019

- Data Structures and Algorithms - *Prof. Prerana Mukherjee*

Spring 2020

RELEVANT COURSEWORK

Math - Discrete Mathematics, *Linear Algebra*, Probability Theory, Statistical Data Analysis, Advanced Statistical Methods
Computer Science - Theory of Computation, *Artificial Intelligence*, Digital Image Processing, Computer Graphics and Multimedia, *Deep Learning*, *Computer Vision*, Natural Language Processing

LANGUAGES AND TOOLS

Python, **MATLAB**, **Javascript**, **Git**, **SQL**, **NoSQL**, **Bash**, **Rasa**, **Tensorflow**, **Pytorch**, **Keras**, **JAX**, **FastAI**, **Sklearn**, **Numpy**, **Pandas**, **Seaborn**, **LaTeX**