

RAVI GHADIA

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EDUCATION

Indian Institute of Technology, Kharagpur | West Bengal | India

Jul, '17 – Jun, '21

Bachelor of Technology in Electronics and Electrical Comm. Engg | GPA: 9.35/10

Coursework: Probability and Stochastic Processes, Advanced Calculus, Machine Learning, Linear Algebra for ML, Natural Language Processing, Algorithms in C/C++, Information Retrieval, Machine Intelligence and Expert Systems, Accelerated Data Science, Computer Architecture and OS

B.Tech Thesis: *Training Generative Dialog Models using Reinforcement Learning with Learned Reward Systems*

Advisor: Prof. Pawan Goyal, Department of Computer Science and Engg., IIT Kharagpur

EXPERIENCE

GPU Power Architect | NVIDIA Corporation | Bangalore

Jul, '21 - Present

- Responsible for analyzing and modelling power and performance for different **Graphics/Compute** workloads run on a GPU chip
- DLSS Power Scrubbing , modelling **DLSS power and performance** and identifying scopes of improving the GPU/Software Architecture
- Modelling compute workloads across different GPU chip families, analyzing their **power and performance** across different precisions
- Achieving **MaxQ** chip config using **Reinforcement Learning** and scaling it up across different chip families/applications for generalization
- Python Developer responsible for the development, maintenance and updating the **LWPE**, company's in-house **power estimation tool**

Certified Instructor | NVIDIA Deep Learning Institute | NVIDIA Worldwide Field Ops

Mar, '22 - Present

- Instructor for courses on **Fundamentals of Deep Learning** and **Building Transformer based Natural Language Processing applications**
- Responsible for instructing courses during AI workshops as well as assist other instructors during their workshops as a teaching assistant

PUBLICATIONS

CORAL: Contextual Response Retrievability Loss Function for Training Dialog Generation Models

May, '22

- Behavioral Analysis of Several Large-Scale Dialog Generation models showed degeneration in terms of response quality
- Proposed a novel training algorithm using **REINFORCE** that considers the context while assigning a loss value to the response
- Allows training generative dialog models using incorrect responses as well, thus resulting in more diverse outputs during inference

Arxiv Preprint: <https://arxiv.org/abs/2205.10558>

AWARDS AND ACHIEVEMENTS

- Graduated with a GPA of 9.35 being among the **top 2%** of all the students in the Institute graduating in the year 2021
- Received the **Merit Cum Means Scholarship** offering **full tuition waiver and a stipend**, offered to academically consistent students
- Achieved **All India Rank 862** in the **JEE Advanced 2017** Examination among an overall of ~150,000 students taking the examination
- **All India Topper** in Chemistry for Class 12 Central Board of Secondary Education Examination among ~10,00,000 students

INTERNSHIPS

GPU Power Intern | NVIDIA Corporation | Bangalore

Apr, '20 – July, '20

- Worked as a GPU Power Architect, to analyze the power consumption of a GPU chip with respect to different application and optimize it
- Used **Reinforcement Learning** to solve the Combinatorial Optimization of the discrete GPU state parameters to achieve the best config
- Maximized GPU performance at given power budget by finding the most optimal configuration of the given GPU chip family/application

AI Developer | Karomi Technology Pvt. Ltd. | Chennai

May, '19 – July, '19

- Worked as AI Developer, developing a computer vision algorithm for detecting certain symbols on packaging images of food products
- Used OpenCV tools to make **morphological transformations and augmentation** to the images as well as templates for better matching
- Applied Template matching on test set images to detect different symbols such as Vegan, Gluten Free etc. with an accuracy of **85%**

PROJECTS AND COMPETITIONS

Training Generative Dialogue Systems using RL | Prof. Pawan Goyal | CSE, IIT Kharagpur

Jan, '21 – June, '21

- Trained transformer based generative dialogue systems using **Reinforce** with Learned Retrievers (**ESIM, BERT**) as the reward systems
- Distributed reward among the tokens based on attention weights from the retriever allowed better flow of the backpropagation signal
- The final model showed better response quality in terms of diversity due to reduced redundancy compared to conventional models

Nationals Finalist | Maverick 2.0 Hackathon | AbInBev

Apr, '21 – May, '21

- Developed an application to recommend customized discounts basis product data across various sectors, demographics and purchases
- Trained a pipeline of classifier-regressor end-to-end for predicting the discount components; added derived features for better learning
- Achieved an RMSE of **119.54 units** on the total discounts using ensemble of GBMs. Competed against **750+ teams** to reach the finals

- Behavioral Analysis of Generative Dialogue Models | Prof. Pawan Goyal | CSE, IIT Kharagpur****Sept,'20 – Dec,'20**
 - Implemented Transformer baseline: Seq2Seq and LM generative dialogue models referring from *Attention is All you Need, Vaswani et.al*
 - Analyzed and compared **DialoGPT** and **Blender** with the implemented model for architecture / Pretraining effects on generative models
 - Evaluated each model across 2 datasets (DailyDialog / PersonaChat) and metrics: correlating with the expert scoring of the USR dataset
- Imposter Detection | Prof. Sudipta Mukhopadhyay | E&ECE, IIT Kharagpur****Oct,'20 – Nov,'20**
 - Authenticated users on the basis of their mouse activity using features like click time, pause time, velocity of the cursor etc.
 - Used an unsupervised self organizing map for reducing the dimensionality of the data to 2-D for better interpretability of clusters
 - Finally used an **XGBoost classifier** over the lower dimensional data to detect imposter from the usage data of systems with **83%** recall

POSITION OF RESPONSIBILITY

- Alumni Committee Chairman | Patel Hall of Residence | IIT Kharagpur****Jul,'20 – June,'20**
 - Led the Alumni and Web Committee to devise yearly proposals for hall infrastructure development through alumni funds of INR 95,000
 - Incharge of the organization of annual Alumni Meet as well as for the yearly Blood Donation camp on the occasion of Patel Jayanti
- Entertainment Secretary | Patel Hall of Residence | IIT Kharagpur****Sept,'18 – Sept,'19**
 - Responsible for music events of the hall such as Entertainment Night, Rangoli presentation, as well as events of General Championship
 - Handled total budget of INR 45,000 for purchase and maintenance of hall music instruments as well as maintenance of the music room
 - Organized practices and coordinated meetings for preparing for the events of Open IIT and General Championship Social and Cultural

EXTRA CURRICULAR ACTIVITES

- Part of the School Dramatics Contingent for National Science Dramatics; reached the **Nationals** to compete against **20+ teams Pan India**
- Part of the **Gold Winning Short Film team** representing IIT Kharagpur at Hunkaar'21, the annual Cultural Festival of NIT Rourkela
- Part of the **Silver winning Street Play team** representing Patel Hall in the General Championship Social and Cultural '21
- **Vocalist** and **Guitarist** in the Hall Music team participating in the entertainment events of the General Championship Social and Cultural
- Part of the Hall Athletics team, participated and completed a 10Km marathon organized by the Alumni Cell, IIT Kharagpur