




Tanay Dixit

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EDUCATION

University of Illinois Urbana-Champaign

Incoming (Aug 2023 - 2025)

MS in Computer Science

Indian Institute of Technology (IIT), Madras, India

May 2023

B.Tech in Electrical Engineering, *Minor*: Computing

9.21/10 CGPA

PUBLICATIONS

- **Tanay Dixit**, Fei Wang, Muhao Chen, Improving Factuality of Abstractive Summarization without Sacrificing Summary Quality, *Association for Computational Linguistics ACL 2023* [Paper][Code]
- Ananya B. Sai, **Tanay Dixit**, Vignesh Nagarajan, Mitesh Khapra, et. al. IndicMT Eval: A Dataset to Meta-Evaluate Machine Translation metrics for Indian Languages, *Assoc. for Computational Linguistics ACL 2023* [Paper][Code]
- **Tanay Dixit**, Bhargavi Paranjape, Hannaneh Hajishirzi, Luke Zettlemoyer, CORE: A Retrieve-then-Edit Framework for Counterfactual Data Generation, *Emp. Methods in Natural Language Proc. Findings EMNLP 2022* [Paper][Code]
- Yizhong Wang, ... **Tanay Dixit**, ... Daniel Khashabi. Super-NaturalInstructions: Generalization via Declarative Instructions on 1600+ NLP Tasks, *Empirical Methods in Natural Language Processing. EMNLP 2022* [Paper][Code]
- Ananya B. Sai, **Tanay Dixit**, Dev Sheth, Sreyas Mohan and Mitesh M. Khapra Perturbation CheckLists for Evaluating NLG Evaluation Metrics, *Empirical Methods in Natural Language Processing EMNLP 2021* [Paper][Code]

RESEARCH EXPERIENCE

Microsoft Research | Research Intern

Bangalore, India

Code Generation (Mentors: Pratyush Kumar, Sriram Rajamani)

March - July 2023

- Leveraging in-context learning capabilities of large language models for code generation.
- Introduced chain-of-thought style prompting for text-to-SQL generation - work under review at ASE 2023
- Implemented a user study-based web application to assess the efficacy of our approach.

Indian Institute of Technology Madras | Bachelor Thesis

Chennai, India

Towards Improving the effectiveness of NLG evaluation metrics (Guide: Prof. Mitesh Khapra)

Jan 2023 - May 2023

- Designed a Multidimensional Quality Metrics (MQM) framework for collecting annotations for Indian languages.
- Analyzed machine translation evaluation metrics on curated MQM dataset and optimized the COMET evaluation metric for machine translation in 5 Indian languages - published at ACL 2023.

University of Southern California | Research Intern

Los Angeles, CA

Improving factual consistency in text summarization models (Guide: Prof. Muhao Chen)

June - Oct 2022

- Experimented with **contrastive** and **reinforcement** learning strategies to improve models' faithfulness.
- Proposed a **ranking strategy** by combining factuality and n-gram based metrics for fine-tuning summarization models using a contrastive loss, which significantly improved faithfulness over prior works.
- Demonstrated that our approach had no tradeoffs on summary quality - short paper published at ACL 2023.

University of Washington | Research Intern

Seattle, WA

Counterfactual data generation for model interpretability (Guide: Prof. Hannaneh Hajishirzi)

Jan-May 2022

- Proposed a **retrieval-augmented** generation framework for generating diverse counterfactuals.
- Demonstrated the ability of **few-shot** large language models like GPT-3 to generate counterfactuals.
- Conducted extensive evaluations to prove the effectiveness of our approach in improving the model's **robustness** on natural language inference and sentiment analysis tasks, published at Findings EMNLP 2022.

Indian Institute of Technology Madras | Research Assistant

Chennai, India

Meta-evaluation framework for NLG evaluation metrics (Guide: Prof. Mitesh Khapra)

Jan - May 2021

- Analyzed the correlation of **25** evaluation metrics with **18** human evaluation criteria across **6** NLG tasks.
- Designed *CheckList* style perturbations to highlight some pitfalls in current NLG metrics.
- Proposed a novel **framework** for better design of evaluation metrics - paper published at EMNLP 2021.

RELEVANT COURSEWORK

- **Artificial Intelligence:** Fundamentals of Deep Learning, Natural Language Processing, Reinforcement Learning, Modern Computer Vision, Information Theory, Detection Theory
- **Computing:** Numerical Methods, Digital System & Lab, Programming and Data Structures, Design and Analysis of Algorithms, Applied Programming Lab, Microprocessors Lab, Database Management Systems
- **Mathematics:** Probability, Statistics and Stochastic Processes, Linear Algebra for Engineers

PROFESSIONAL EXPERIENCE

Subex AI Labs | Machine Learning Intern

Bangalore, India

Automating the invoice verification process

Jun - Aug 2021

- * Curated an in-house invoice dataset to benchmark model performance and quantify improvements.
- * Designed an OCR pipeline using *Tesseract* to extract text from structured and unstructured invoices.
- * Implemented a **document layout recognition** model by leveraging jointly trained vision & language models.

BlueBarrel Solutions Pvt Ltd | Data Analyst Intern

Houston, TX

Analyzing and estimating energy usage

Nov - Dec 2021

- * Analyzed 10 million+ energy consumption data points and mined patterns to recommend power suppliers.
- * Developed an interactive dashboard using **flask** & **plotly** to **reduce** exploratory analysis time by 40%.
- * Worked on hypothesis tests to model customers' HVAC (**H**eating, **V**entilation & **C**ooling) usage.

SKILLS

- **Languages:** Python, C++, C, SQL, Matlab, Verilog, \LaTeX
- **Libraries/Tools:** PyTorch, Tensorflow, Transformers, NumPy, Pandas, Git, MySQL, matplotlib/seaborn

AWARDS & ACHIEVEMENTS

- Successfully completed a Himalayan high altitude trek of 12,500ft in 3 days. 2023
- Awarded the **NSF REU** scholarship to pursue a research internship at Information Science Institute, USC. 2022
- Represented IIT Madras twice at the Inter IIT Tech Meets and won **gold & bronze medals** in the ML events. 2021
- Secured **All India Rank 341** (Top 0.02%) in JEE Advanced 2019 conducted by IITs. 2019

LEADERSHIP EXPERIENCE

Head, Analytics Club | Center for Innovation, IIT Madras

2021-2022

- * Headed a team of 8 coordinators & 100+ members to operate one of the institute's most **prestigious** clubs.
- * Initiated paper reading sessions to increase interaction during the online mode due to the pandemic.
- * Conducted **tutorials** during summer school for undergrad students on topics related to data science.

KEY PROJECTS

OpenAI Gym Environment Solvers | CS6700 Course Project



- * Developed a softmax **policy gradient** algorithm from scratch using NumPy for *Acrobot-v3 env*. Jan - May 2021
- * Implemented **Q-Learning**, **SARSA**, **policy gradients** to solve the *puddle-world* and *Taxi-v2*.
- * Tested the sensitivity of all the algorithms with respect to various parameters.

Multilingual Text Classification and Headline Generation | Inter IIT Tech meet 9 (winning solution)



- * Designed a unique phoneme-based **kim-CNN** architecture for multilingual text classification. March 2021
- * Fine-tuned **mBART** model for improved accuracy on low resource languages like *Hindi*.
- * Reduced inference time by an **order of magnitude** & improved **robustness** by adding latent mixing layers.

Driver Assistance System | Analytics Club, IIT Madras



- * Implemented a driver monitoring system to identify rash driving patterns using **telemetry data**. May - June 2020
- * Trained an event detection model using **XGBoost** and achieved an accuracy of 89%, a 5% gain over prior works.
- * Developed a dashboard using Streamlit to analyze our results on online telemetry data.

Analysis of Recommendation System | vRhythms Software Pvt Ltd



- * Optimized the performance of **matrix factorization** on ranking metrics like MAP, nDCG by 22% June - July 2020
- * Analyzed models' performance against popularity bias and cold start issues using coverage metrics.
- * Used novelty metrics to analyze the ability of systems to recommend items from the long tail.