Mudit Dhawan

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EDUCATION

B.Tech. Electronics and Communication Engineering Delhi, India | 2018-Present
IIIT Delhi **CGPA:** 8.99/10
Thesis: Multimodal Fake News Analysis and Detection [pdf]
 Advisors: Prof. Ponnurangam Kumaraguru and Prof. Rajiv Ratn Shah
Selected Coursework: Computer Vision; Machine Learning; Statistical Signal Processing; Machine Learning in Real Time Control; Data Structures and Algorithms; Linear Algebra; Probability and Statistics; Signals and Systems

Senior Secondary Delhi, India | 2017-2018
Delhi Public School Rohini **Percentage:** 95%

WORK EXPERIENCE

SenticNet ⬈ | Research Intern Singapore | Jan 2022-Jun 2022

- **Advisor:** Prof. Erik Cambria
- Work on Conversational Agents in task-oriented dialogue systems and retrieval-based dialogue systems.

Precog Research Group ⬈ | Undergraduate Researcher Hyderabad, India | Aug 2019-Present

- **Advisor:** Prof. Ponnurangam Kumaraguru
- Worked on problems related to Misinformation, NLP, Multi-modal systems, Legal AI and Heterogeneous Graph-based systems.

Oracle NetSuite ⬈ | Summer Intern Hyderabad, India | May 2021-July 2021

- Rewrote legacy **PL/SQL code** in refactored **Java** to make the system to improve scalability along with **UML** diagrams for the implemented **Façade design pattern**. Also, created a suite of Unit test cases using Mockito and PowerMockito for automated testing.

PUBLICATIONS

HLDC: Hindi Legal Documents Corpus
Arnav Kapoor, **Mudit Dhawan**, Anmol Goel, Arjun T H, Akshala Bhatnagar, Vibhu Agrawal, Amul Agrawal, Arnab Bhattacharya, Ponnurangam Kumaraguru, Ashutosh Modi
To appear in the *Findings of ACL 2022* [pdf]

Inter-modality Discordance for Multimodal Fake News Detection
Shivangi Singhal, **Mudit Dhawan**, Rajiv R Shah and Ponnurangam Kumaraguru
In *ACM Multimedia Asia (MMAsia '21)* [code] [pdf]

GAME-ON: Graph Attention Network based Multimodal Fusion for Fake News Detection
Mudit Dhawan*, Shakshi Sharma*, Aditya Kadam, Rajesh Sharma, Ponnurangam Kumaraguru
Under review at *IJCAI-ECAI 2022* [pdf]

ACHIEVEMENTS

- Inter-modality Discordance for Multimodal Fake News Detection selected for **poster presentation** at ARCS 2022, ACM India.
- Selected for the Spring 2022 **Visiting Student Research Programme**, India Connect@NTU

RESEARCH

Disentanglement Perspective to Audio Style Transfer Jan 2022-Present
Advisor: Prof. Rajiv Ratn Shah

- A variational autoencoder (VAE) based approach to learn disentangled representations for specified and unspecified factors of variation for audio signals to help with audio style transfer.

Hate-Speech Based User Characterization
Jun 2021-Present

Advisors: Prof. Ponnurangam Kumaraguru and Prof. Srijan Kumar

- Analyze sentimentally charged tweets to study the effect of the network on the user's posting activity.
- Studying the influence and susceptibility of a user based on their online neighborhood and how this network can be leveraged to determine the magnitude (or impact) of potential spreaders of hate or counter-hate on online social media platforms.

Language Model for Code-Mix Data ⬈
Feb 2021-April 2021

Advisor: Prof. Ponnurangam Kumaraguru

- Proposed changes in the **sampling strategy** and the **Masked Language Modelling** (MLM) Task and trained a modified **XLM (Cross-Lingual Language Model)** from scratch on English-Hindi code-mixed data collected from social media.
- Weighted sampling strategy led to **15 point decrease in perplexity** score on an online social media Hindi-English code mix data, and **2% increase in F1-score** on the downstream POS-Tagging task on LINCE Dataset.

Content Driven User Identity Linkage ⬈
Sep 2019-Dec 2019

Advisor: Prof. Ponnurangam Kumaraguru

- Aimed at classifying whether different profiles on Social-Media-Platforms, belong to the same person or not.
- Created a **heterogeneous graph-embedding** with user-nodes and content-nodes based on **NERTagging, Image-Captioning, and textual-stylometric techniques** on the posted user-content.

PROJECTS

Digital Image Processing Concepts From Scratch ⬈
Sept 2021-Nov 2021

NumPy, SciPy, Scikit-Image, Scikit-Learn, Python

Wrote code from scratch for Geomteric Transformation, Bi-Linear Interpolation, Histogram macthing and equalization, Constrained Least Squares Filtering, and many more.

Computer Vision Concepts From Scratch ⬈
Feb 2021-Apr 2021

NumPy, SciPy, Scikit-Image, Scikit-Learn, OpenCV, PyTorch, Python

Wrote code from scratch using no direct built-in function for 2D Convolution for Edge detection, Spatial Pyramid Pooling, Semantic segmentation, Circular Bounding Boxes, Super-pixel saliency, Interactive saliency, Otsu-Algorithm, Background subtraction from video, and many more.

Machine Learning Concepts From Scratch ⬈
Oct 2020-Jan 2021

NumPy, SciPy, Scikit-Learn, PyTorch, Python

Wrote code from scratch using just NumPy, SciPy for N-layer Neural Network, Grid Search, Bootstrapping, Gaussian Naive Bayes, Linear Regression and Logistic Regression. Experimented with PyTorch and wrote code for transfer learning using AlexNet architecture and experimented with different activation functions.

Anomaly detection in building energy consumption ⬈
May 2020-Aug 2020

Seq2Seq models, Generative Adversarial Networks, Tensorflow, Python

Trained a deep-learning based building load-line prediction/ anomaly detection model. Used data from Smart Buildings equipped with meters and sensors which are periodically collecting time-series data (ASHRAE Dataset – Kaggle).

EEG Based Emotion Classification ⬈
May 2020-Aug 2020

CNN and LSTM based Architectures, Python, Tensorflow, MATLAB, Signal Processing

Human emotion identification, classification, and analysis of EEG signals to various stimuli.

Reddit Flair Detection NLP Based Web Application ⬈
July 2019-Aug 2019

TF-IDF Vectorization, Ensemble Techniques, MongoDB, Heroku, Flask, pushift.io, gensim

Built a NLP based system that given a link, can detect the flair (category) of a Reddit post.

SKILLS

Expertise Area: Machine Learning, Deep Learning, Signal Processing, Data Structures and Algorithms
Languages: Python, Java, MATLAB, C++, SQL, Verilog
Frameworks: Pytorch, Hugging Face, Tensorflow, Keras, NumPy, Pandas, PyTorch Geometric
Technologies: Git, LaTeX, GNU Octave, Raspberry Pi, Arduino