Harshvardhan **Srivastava**

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Education

Indian Institute of Technology , Kharagpur *July 2017 – May 2021*
B.Tech with Major in Electrical Engineering and Minor in Computer Science CGPA 9.03/10

Publications

MMER: Multimodal Multi-task learning for Emotion Recognition in Spoken Utterances [Code] [Preprint]
Harshvardhan Srivastava*,Sreyan Ghosh*, S.Umesh* (* - Equal contribution)
Under Review* *Submitted to InterSpeech 2022*

A Discourse Aware Sequence Learning Approach for Emotion Recognition in Conversations [Code] [Preprint]
Harshvardhan Srivastava*,Sreyan Ghosh*, S.Umesh* (* - Equal contribution)
Under Review* *Submitted to InterSpeech 2022*

Misogynistic Meme Detection using Early Fusion Model with Graph Network [Code] [Preprint]
Harshvardhan Srivastava
In *Proceedings of the 16th International Workshop on Semantic Evaluation (SemEval) @ NAACL 2022*

Zero Shot Crosslingual Eye-Tracking Data Prediction using Multilingual Transformer Models [Code] [PDF]
Harshvardhan Srivastava
In Proceedings of *Cognitive Modeling and Computational Linguistics (CMCL) @ ACL 2022*

Causality Detection using Sentence Embeddings in Financial Reports [Code] [PDF]
Arka Mitra, **Harshvardhan Srivastava***, *Yugam Tiwari** (* - Equal contribution)
In Proceedings of the *1st Joint Workshop on Financial Narrative Processing and MultiLing Financial Summarisation*

Research Experience

Graph Enhanced Zero Shot Learning *Sept 2021 - Present*
Supervised by **Prof. Aruna Tiwari** *Research Collaborator* IIT Indore

- Working on creating graph enabled visual networks for object classification task on datasets NUS-Wide,MS-COCO
- Improving generalised and conventional zero shot performance performance of dataset agnostic convolutional networks

Dynamic and Robust Server Allocation [Report] *May 2019 - July 2019*
Supervised by **Prof. Parimal Parag and Prof. Vikram Srinivasan** *Summer Research Fellow,* IISc, Bengaluru

- Created a multi-node multi partition Kafka Cluster to store the data from live streams to verify the robustness of the created cluster in case of failure ,channeled data from Twitter real time streams to the created cluster
- Collected , analysed native Kafka performance metrics with custom metrics devised
- Worked on tweaking parameters to improve Kafka scalability and the information throughput management
- Learnt ZAB (Zookeeper Atomic Broadcast Protocol) - the current implemented follower and leader management system and its similarities and improvements over Paxos Algorithm or Raft Consensus Algorithm.

Autonomous Ground Vehicle Research Group [Link] *May 2018 - March 2020*
Supervised by **Prof. Debashish Chakravarty** *Undergraduate Researcher*

- Member of Controls team: Responsible for analyzing and enhancing the stability , path prediction and lane detection
- Model predictive control for an autonomous vehicle and detection of rollover of a vehicle
- Worked on prediction of position of a bot using Kalman Filter technique
- Worked on Road Segmentation using unsupervised K-Means Clustering and Mean Shift algorithm
- Designed mounts for various sensors to be integrated in Mahindra E2O for Mahindra Driverless Car Challenge

Work Experience

Member Technical Staff *July 2021 - Present*
Oracle Corporation

- Working on creating robust and efficient automation frameworks for easy loading of transactional data in the data pipelines
- Designing Backend Services for CX, HCM and OCI for efficient handling of data at scale in Fusion Analytics Warehouse

Machine Learning Intern *April 2021 - July 2021*
[Certificate] **SearchUnify @ Grazitti Interactive**

- Developed an end-to-end NLP engine for Topic-Modelling and Question-Answering of sentence, paragraph, and document level texts and create relevant efficient search query extractions.
- Designed custom weighted word vectors to include context specific words using FastText and GloVe embeddings.
- Deployed testing of the model on a live project and created REST APIs for the above functionalities.
- Implemented effecient query searching to get the fastest response from REST and improved it from 5 seconds to 0.4 seconds.

Visual Intelligence Intern *May 2020 - July 2020*
[Certificate] **Samsung R&D Institute, Bengaluru**

- **Burst Image Denoising**
  - Refined an algorithm for deep burst denoising of image dataset and by extending the CNN with parallel recurrent networks that integrate information of all frames in the burst set. Used Attention enhanced Kernel Prediction networks.
  - Evaluated and compared results with SFD (PSNR = 32.78) and MFD (PSNR = 34.32) to process temporal data with RNN.
  - Stabilized the image dataset using Lucas Kanade Optical Flow method to find correspondence with the successive frames.
- **Super Low Light Video Denoising**
  - Used images in the bayer domain instead of RGB to enhance the quality of the output video
  - Modified the loss function to enable temporal consistency in the output and to annihilate framal deflickering
  - Achieved SOTA with PSNR (Peak Signal to Noise Ratio) matching 29.8 and SSIM (Structural Similarity Index) to be 0.87.

Selected Projects

Lexical Complexity Prediction using Multi-Head Attention Enhanced BiLSTMs [PDF] [Code] *Jan 2021 - April 2021*
Supervised by **Prof. Pawan Goyal** *Task 1,* SemEval 2021

- Designed a novel architecture to tackle single and multi word complexity prediction . Predicting lexical complexity accurately can enable a system to better guide a user to an appropriate text, or tailor a text to their needs
- Extracted many features such as POS tag, no. of hypernyms, hyponymns in order to treat multi word tokens as compositional
- Obtained Pearson scores of 0.742 on single token performance and scores of 0.832 for multi token performance which fetched us *14th* position from a total of 186 teams worldwide.

Study of privacy hazards in user reviews on Amazon Marketplace [Code] *July 2021 - Dec 2022*
Supervised by **Prof. Mainack Mondal** *Research Assistant,* IIT Kharagpur

- **PII Detection and qualitative analysis of Amazon Reviews**
  - Processed >100GB data of user reviews from amazon.com & detected critical PII revelations in 14k cases
  - Analyzed the reviews to obtain qualitative code and then, examined a random set of 200 reviews with PII revelations, assigned qualitative codes to reviews & calculated Krippendorff's alpha (for 3 raters)
- **Re-identification Attack and Privacy Sensitive Information (PSI) Detection**
  - Formulated a cross-platform re-identification attack using data obtained from Amazon reviews
  - Modified the loss function to enable temporal consistency in the output and to annihilate framal deflickering
  - Defined PSI for Amazon reviews & worked on PSI detection from the reviews of products of various categories

Operationalising Individual Fairness with Pairwise Fair Representations [Presentation] [Code] *Jan 2020 - April 2020*
Supervised by **Prof. Animesh Mukherjee** *AI & Ethics* IIT Kharagpur

- Designed a fairness graph and PFR model to address unfairness in the outcome of decisions involving individuals like race, gender , income group etc. Tuned parameters for kth quantile and nearest neighbours for maximum value of AUC score
- Evaluated the influence of outcomes of individuals with metrics like Consistency , and group effects like Disparate mistreatment and Disparate Impact to quantify the fairness level in the surveying metric and equality measures in community
- Utilized well known datasets like COMPAS , Crimes and Communities and used race as a protected attribute.
- Obtained accuracy scores of 66.1% improvement over original 69.56% and reduced the positive prediction rate

Honors & Awards

IGVC 2019	Runner Up in 27th Intelligent Ground Vehicle Competition AutoNav Challenge
FB HackerCup 2020	Ranked among the top 1500 people internationally in HackerCup Round 2 by Facebook
SRFP Recipient	Selected for the prestigious SRFP conducted by the Indian Academy of Sciences, 2018-19
Academic Excellence, 2018	Amongst top 5% of undergraduate students admitted batch of 2017 at IITKGP
KVPY Scholar	Selected for the prestigious KVPY fellowship offered by IISc, in the year 2015-2016
State Representative, NSSC	Represented my home state of MP at National Children's Science Congress 2014
INMO Qualified	Selected amongst 900 students nationwide