Arshiya Aggarwal

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EDUCATION

- **Delhi Technological University** Aug 2015 - May 2019
  B. Tech. in Electrical and Electronics Engineering - **CGPA 9.24/10: Department Rank 2**
  - **Distinction Holder (Dean's Honour List)**: 2015-2019
  - **Relevant Coursework**: Algorithms, Networking, Pattern Recognition, Machine Learning, Computer Vision, Parallel Algorithms, Numerical and Engineering Optimization, Cryptography, Game Theory, Big Data, Web Development
- **Delhi Public School, Rohini:** CBSE - **96.5%** 2013-2015

EXPERIENCE

- **Adobe** Noida, India
  Software Development Engineer June 2019 - Present
  - Responsible for development of Adobe Scan & its image processing library MagicClean serving ~22.7 million monthly active users with over 50 million downloads. Integrated ML model and exposed API for document classification and text region detection.
  - ***Hackweek 2020***: In a team of 5, implemented ML models for Adobe Scan to perform dewarping to remove scan curvature, handwriting stylisation, removal of scan artefacts like thumbs. Also designed an interpretable ML model for **aspect based sentiment analysis** of customer comments on Acrobat using LDA for topic modelling & BERT for sentiment analysis. Won honourable mention for 2 hacks.
  - Collaborated with the Magento team to work on data to text **natural language generation** using seller provided product details. Generated descriptions using the T5 transformer while controlling the linguistic style aspects based on buyer preference.
  - Configured entire staging environment for Adobe's Log Collector Tool and rebuilt front-end in **React, Redux & Axios** in a team of 2.
  - Designed, developed & deployed Tessa to track vulnerabilities in third party components in Adobe softwares in a team of 3. Created **Node.js** services, stored data on **MongoDB**, exposed APIs, wrote cron jobs & developed a dynamic tree UI on **Backbone.js** from scratch.
  - Performed feature development and enhancement in a team of 2 of Hubble, an **open-source** security compliance software written in **Python**. It is used by Adobe servers to collect ~5TB of system data daily for auditing, vulnerability tracking and file integrity monitoring.
  - Created data analysis dashboards & scheduled reports in **Splunk** to track Hubble's memory leaks on cloud instances.
- **MIDAS Lab, IIITD** Remote
  NLP Research Intern April 2020 - Present
  - Researched on fusion of audio-text contextual embeddings from CEOś speeches and used **cross-modal attention fusion** of **Financial BERT text embeddings** and audio contextual features to predict average and single day volatility in a **multi-task setup**.
  - Analysed the importance of leveraging the stock interrelations using graph nodes for stocks and earning calls and edges for wiki-data stock relations. Used **semi-supervised Graph Convolutional Networks** to extract the relational embeddings.
  - Empirically analysed gender bias in volatility prediction from mutli-modal data in CEOś speeches during quarterly Earnings Calls.
- **Nagarro Software** Gurugram, India
  Deep Learning Intern June 2018 - Aug 2018
  - Implemented an image searching algorithm to find the most visually similar clothing items from a catalogue for an e-commerce client.
  - Researched object detection techniques including **MaskRCNN**, Fast and **FasterRCNN**. Used FasterRCNN in **Tensorflow** to detect and crop the item of interest from the query image.
  - Used **Image Deep Ranking** to train image similarity models on different categories of clothing items to understand the fine similarities between items using **Keras**. Achieved a recall at 20 of 45%.
- **Coding Ninjas** Delhi, India
  Teaching Assistant June 2018 - Sept 2018
  - Supported students in interview preparation on data structures & algorithms in **C++**, operating systems and DBMS.
  - Monitored progress and provided regular feedback to a group of 20 students including regular online support for doubts.
- **Indraprastha Institute of Information Technology (IIITD)** Delhi, India
  Undergraduate Research Assistant Dec 2017 - May 2018
  - Proposed a model for surveillance using person re-identification to predict if two given videos are of the same person.
  - Researched on the past methodologies, identified the video setup to be useful in understanding semantically important information like posture and walking style using **LSTMs** on a sequence of image frames.
  - Trained a **Siamese architecture** with LSTM's, **CapsuleNets** and dynamic routing based on agreement in **Pytorch** and plotted the results as cumulative matching curves.

PUBLICATIONS

- R. Sawhney, P. Khanna, **A. Aggarwal**, T. Jain, P Mathur, R.R. Shah. ***VolTAGE: Volatility Forecasting via Text-Audio Fusion with Graph Convolution Networks for Earnings Calls***. Proc. of the 2020 Conference on Empirical Methods in Natural Language Processing (**EMNLP**). (pp. 8001-8013).

  Transcripts of earnings calls and CEO's vocal cues offer investment insight into stock performance. Existing works on earnings calls treat stocks as independent of each other. To this end, we propose a model for stock volatility prediction that accounts for stock interdependence via graph convolutions while fusing verbal, vocal, and financial features in a semi-supervised multi-task risk forecasting formulation.

- R. Sawhney, **A. Aggarwal**, P. Khanna, P. Mathur, T. Jain, R.R. Shah. ***Risk Forecasting from Earnings Calls Acoustics and Network Correlations***. Proc. of **Interspeech** 2020, (pp. 2307-2311).

  We introduce a neural model that employs cross inter-modal attention for deep verbal-vocal coherence and accounts for stock interdependence through multi-layer network embeddings.

- **A. Aggarwal**, N. Das, M. Arora and M.M. Tripathi. ***A Novel Hybrid Architecture for Classification of Power Quality Disturbances***. Proc. of 6th International Conference on Control, Decision and Information Technologies (**IEEE-CoDIT**), 2019 (pp. 1829-1834).

  To ensure reliable quality of power, disturbances need to be detected and classified accurately in voltage signals. We implemented an algorithm to classify disturbance events like voltage sag, swell, transients, harmonics, etc. using features extracted from CNN and Support Vector Classifier getting an accuracy of **97.89%**.

- **A. Aggarwal**, N. Das, S. Indu. ***Attention-Guided Deep Convolutional Neural Networks for Skin Cancer Classification***. Proc. of 9th International Conference on Image Processing Theory, Tools and Applications (**IEEE-IPTA**), 2020 (pp. 1-6).

  We propose an algorithm to detect & classify skin cancer at an early stage using Attention-Guided Deep CNNs that boosts the F1 score to **0.86**.

PATENTS

- **Augmenting differentiability & higher probability of clicks in seller product images [Filed]**: Proposed a method to suggest the differentiable product images from a pool of optimal product images uploaded by the seller against all the existing images for that category on the page. The differentiability score is calculated by weighting the distance between feature vectors by the number of clicks.
- **Identity Obfuscation in User Review Images on E-Commerce Websites [Filed]**: Proposed a method for identity obfuscation in user review images for e-commerce platforms where the image is cropped above the neck. We perform background regeneration using content aware fill and morph the average face of the similar faces on the final image. We generate similar faces using **VGGFace** features.

PROJECTS

- **MousEye**: A utility application that allows differently abled users to interact with interfaces by performing mouse-clicks using eye blinks. It detects facial landmarks using Dlib's landmark detector to calculate the Eye Aspect Ratio. Developed using **OpenCV**.
- **Movie Review Sentiment Analysis**: Implemented text analysis using a combination of **CNNs** and **LSTMs** to classify sentiment in movie reviews trained on the IMDb dataset.
- **Dimensionality Reduction: Linear v/s Deep Learning methods**: A comparison between PCA and deep learning based **Autoencoders** for dimensionality reduction on the MNIST dataset. Autoencoders performed better reconstructions and proved to be effective tools for reducing the dimensions from 784 to 64.
- **Stock Market Prediction using CNNs and LSTMs**: A model that predicts the next day closing price of the Dow Jones Industrial Index using a combination of Dilated Causal Convolutions & LSTMs that achieves an MSE of 0.000164.

EXTRA CURRICULAR

- **Volunteer - EMNLP 2020 Virtual Conference**: Sponsor liaison to help set up virtual booths on the conference website & GatherTown.
- **Mentor - Mentor Together**: Mentoring a girl belonging to a low-income background from a small town of India on topics like vision setting, planning, decision making & job interviews
- **Project Manager - Enactus DTU, Social Entrepreneurship**: Identified sources of biodegradable & paper waste in the Rohini district and strategized ways to collect & recycle it. In a team of 8, built a ML based waste segregation machine that stood Fourth in the Enactus Nationals.
- **Corporate Development Manager - TEDxDTU**: In charge of drafting corporate proposals and pitching them to potential clients and sponsors. Secured sponsorship deals with organizations including Uber and Hero Motocorp. Responsible for speaker hospitality at the event.
- **Public Relations Head and Actor - Pratibimb, The Dramatics Society Of DTU**: Responsible for Script Writing, Direction, Acting and Prop Design for the Award Winning Annual Productions "Meherbani" and "Bharat Mubaraq" that take on issues of national security and social integration. Collaborated with NGO's to perform street plays to raise awareness on hygiene in Indian slums.