Brihi Joshi

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Education

- **University of Southern California** — Los Angeles, CA
  Doctor of Philosophy, Computer Science; CGPA: 9.35/10 — *Aug. 2021 –*
- **Indraprastha Institute of Information Technology** — New Delhi, India
  Bachelor of Technology, Computer Science and Engineering; CGPA: 9.35/10 — *Aug. 2016 – Dec 2020*
- **Sanskriti School** — New Delhi, India
  High School; Percentage: 93.8% — *2014 – 2016*

Skills

- **Relevant Courses (†=Graduate Level Courses)**: Deep Learning†, Machine Learning, Natural Language Processing†, Speech Recognition and Understanding†, Affective Computing†, Statistical Computation†, Semantic Web†, Linear Optimization, Linear Algebra, Data Mining†, Probability and Statistics, Real Analysis
- **Languages**: Python, Java, C, Bash
- **Tools & Technologies**: Git, PyTorch, Keras, MATLAB, scikit-learn, nltk, spaCy, numpy, Spark, SparQL

Publications

- **Brihi Joshi**, Neil Shah, Francesco Barbieri and Leonardo Neves. The Devil is in the Details: Evaluating Limitations of Transformer-based Methods for Granular Tasks. In *The 28th ACM International Conference on Computational Linguistics (COLING 2020).*
- **Brihi Joshi***, Aditya Chetan*, Hridoy Sankar Dutta, Tanmoy Chakraborty. CoReRank: Ranking to Detect Users Involved in Blackmarket-based Collusive Retweeting Activities. In *The 12th ACM International Conference on Web Search and Data Mining (WSDM 2019).* (Acceptance Rate: 16%, CORE2018 A*)
- Udit Arora, Hridoy Sankar Dutta, **Brihi Joshi***, Aditya Chetan*, Tanmoy Chakraborty. Analyzing and Detecting Collusive Users Involved in Blackmarket Retweeting Activities. In *ACM Transactions on Intelligent Systems and Technology (TIST).* (Impact Factor: **3.971**)
- **Brihi Joshi***, Amogh Gulati*, Chirag Jain*, Jainendra Shukla. It's Not What They Play, It's What You Hear: Understanding Perceived vs. Induced Emotions in Hindustani Classical Music. In *22nd ACM International Conference on Multimodal Interaction, Late Breaking Reports (ICMI 2020).*
- **Brihi Joshi***, Shravika Mittal, Aditya Chetan. Did You "Read" the Next Episode? Using Textual Cues for Predicting Podcast Popularity. In *First Workshop on NLP for Music and Audio (NLP4MusA) at International Society for Music Information Retrieval Conference (ISMIR 2020).*
- Hridoy Sankar Dutta, **Brihi Joshi***, Aditya Chetan*, Tanmoy Chakraborty. Retweet Us, We Will Retweet You: Spotting Collusive Retweeters Involved in Blackmarket Services. In *The 2018 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2018).* (Acceptance Rate: 15%)
- Nishtha Madaan, Gautam Singh, Sameep Mehta, Aditya Chetan*, **Brihi Joshi***. Generating Clues for Gender based Occupation De-biasing in Text `arXiv:1804.03839 [cs.CL]`

* Equal Contribution

Research Experience

- **Snap Research** — Los Angeles, CA, USA
  Research Intern — *Sep 2019 - Dec 2019 (Continued remotely)*
  - **Understanding Granular-level Similarity of documents**:
    Advised by - Leonardo Neves, Neil Shah and Francesco Barbieri
    - Curated a dataset of news articles, with ground truth annotations of article pairs that report the same event.
    - Benchmarked contextual embeddings generated from Transformer-based methods against simpler methods like TF-IDF for granular-level textual similarity. Formed the basis of the Happening Now feature in Snapchat.
    - Currently working on understanding task granularity in cross-lingual news data.

  Keywords: *Machine Learning, NLP, Representation Learning, Low-Resource Languages*

- **Laboratory for Computational Social Systems** — New Delhi, India
  Undergraduate Researcher — *Jan 2018 - Present*
  - **Understanding adversarial collusive activities in OSNs [Bachelor's Thesis]**:
    Advised by - Dr. Tanmoy Chakraborty
    - Worked on detecting detecting collusive retweeters via freemium blackmarket services.
    - Curated an open dataset of manually annotated users from various freemium services.
    - Proposed a novel set of features which beat the state-of-the-art supervised models for fake users and spam bot detection on the task of collusive user detection.
    - Extended the approach by developing an unsupervised and semi-supervised approach that takes into account - network features, behavioral features and topical features.

  Keywords: *Unsupervised Learning, OSNs*

- **IBM India Research Laboratory** — New Delhi, India
  Undergraduate Researcher — *Nov 2017 - Sept 2018*
  - **Occupational Debiasing [code][preprint]**:
    Advised by - Dr. Sameep Mehta
    - Developed a system for detecting occupational gender bias in text, by demography and time period.
    - Developed and curated a dataset comprising of various occupation names and occupational evidences.
    - Proposed a pipeline that detects potential gender bias in occupations

  Keywords: *NLP, Machine Learning*

- **Interdisciplinary Lab for Interactive AV Development (ILIAD)** — New Delhi, India
  Undergraduate Researcher — *Jan 2019 - May 2019*
  - **Generating Audio Samples from Images**:
    Advised by - Dr. Timothy Scott Moyers Jr
    - Developed a pipeline for bridging Audio and Visual Engines with real-time modifications.
    - Developed a model to learn non-linear mappings between projected images and audio pieces.
    - Developed linear and non-linear envelopes on data filters along with other common features present in DAWs.

  Keywords: *Computer Music, Machine Learning, Creative AI, MIDI*

Work Experience

- **Goldman Sachs** — Remote
  Analyst (Full-time) — *Dec 2020 - Present*
  - **Regulatory Operations Engineering Team:**:
    - Working on the Analytics platform for Regularity Core Engineering, which includes developing clustering scripts for downstream anomalous ticket grouping.

  Keywords: *Apache Spark, Clustering*

- **Goldman Sachs** — Bangalore, India
  Summer Analyst — *May 2019 - July 2019*
  - **Regulatory Operations Engineering Team:**:
    - Working on the Data Intelligence and Analytics (DIA) module

* Responsible for intelligent join of large amount of data from multiple sources, to be used for downstream clustering tasks

Keywords: *Apache Spark, Hadoop, MLLib*

- **dunnhumby** — New Delhi, India
  Associate Analyst Intern — *May 2017 - July 2017*
  - **North America Data Team:**:
    * Studied the various aspects and applications of Data Science in the Business Dimension.
    * Worked on creating a large-scale implementation demo of `MLLib` in `Apache Spark` to predict user purchase patterns for various clients of dunnhumby focusing on those based in North America
    * Studied the Automation of ETL processes using `Apache Airflow` on `Google Cloud Platform` and worked in transferring data from SAS Archives to Hadoop Datalake.

  Keywords: *Data Analytics, Apache Spark, Hadoop*

- **Rails Girls Summer of Code** — New Delhi, India
  Student Scholar — *May 2017 - July 2017*
  - **Worked on Tessel - an IoT and Robotics development platform**:
    * Part of one of the selected 16 sponsored teams out of 190 teams worldwide.
    * Developed tutorials - Prepared Documentation, code snippets, Fritzing diagrams and a working demonstration.
    * Developed a model for a Humanoid Arm Project - Understood the idea behind product design and development.
    * Studied and worked on Reach - an ESP32 (low power BLE module), that is supposed to be Tessel's new launch in the domain of Low power boards.

  Keywords: *Open Source, IoT, Project Design*

Teaching Experience

- **CSE343: Machine Learning** — IIIT, Delhi
  Teaching Assistant for a class of 150 senior undergraduate students — *Aug 2020 - Dec 2020*
- **CSE632: Semantic Web** — IIIT, Delhi
  Teaching Assistant for a class of 170 senior undergraduate and graduate students — *Jan 2020 - May 2020*
- **MTH201: Probability and Statistics** — IIIT, Delhi
  Teaching Assistant for a freshman class of 300 students — *Jan 2019 - May 2019*

Awards

- **Snap Research Scholarship 2019**: Awarded for research done in the field of Data Mining and Machine Learning. Award includes 10,000 USD and an offer to intern at Snap Research, USA. Only scholar from India!
- **AAAI 2020 Undergraduate Consortium**: Accepted to present my thesis at the AAAI 2020 Undergraduate consortium. Includes scholarship to attend to attend AAAI 2020
- **Microsoft Research India Travel Grant**: Awarded travel support of 50000 INR for visiting WSDM 2019
- **ACM-W Scholarship**: Awarded travel support of 1200 USD for visiting WSDM 2019
- **Google Women Techmakers Scholarship, 2018**: Awarded to students who work for diversity and inclusion in the field of Computer Science.
- **Best Technical Poster Runner-up at GHCI 2018**: Received for the project, "Generating Clues for Gender based Occupation De-biasing in Text"
- **Dean's Award for Innovation R&D**: Awarded to students who work on Research projects beyond coursework. Awarded for the academic years 2016-17 and 2017-18.
- **Dean's List of Academic Affairs**: Awarded to students who demonstrate excellence in an academic year. Awarded for the academic year 2016-17 and 2018-19.
- **Grace Hoppers Celebration India (GHCI) Scholarship, 2018**: Awarded travel grant and scholarship to attend the GHCI conference.

Projects

- **Deep Multitask Piano Transcription** [report][demo]:
  - Implemented the Onsets and Frames baseline by Hawthorne et. al for polyohonic piano transcription.
  - Developed a smaller, efficient model, reaching the baseline performance in less time and with lesser parameters.
  - Developed as a course project for Deep Learning (CSE641) at IIIT Delhi in Winter 2020.
  - **Keywords:** *Deep Learning, Music Information Retrieval*
- **Emotional Speech to Text** [code]:
  - Explored HMM and DL based methods to generate Emotional speech from text, along with system demonstrations.
  - Worked on developing fine-tuning strategies for SOTA methods in Speech like Tacotron and DC-TTS, to elicit emotional speech, using a low-resource dataset (EmovDB).
  - Developed as a course project for Speech Recognition and Understanding (CSE5SRU) at IIIT Delhi in Winter 2020.
  - **Keywords:** *Deep Learning, Speech Generation*
- **img2LaTeX**[demo]:
  - Developed an end-to-end model for converting handwritten mathematical expressions to compilable LaTeXcode.
  - Constructed a pipeline consisting of image segmentation, supervised classifiers such as CNNs, SVM, etc. and heuristics for code formation.
  - Developed as a course project for Machine Learning (CSE343) at IIIT Delhi in Monsoon 2018.
  - **Keywords:** *Machine Learning, Deep Learning, Image Processing*
- **SemEval19 Task 3: EmoContext**:
  - Worked on the task of emotion detection in dialogue. This was a shared task for a workshop at ACL 2019.
  - Designied architechtures based on LSTMs and ConvNets, and explored contextual embeddings like ELMo.
  - Used techniques like Data augmentation, emoji context evaluation using DeepMoji.
  - **Keywords:** *NLP, Deep Learning, Word Embeddings*
- **iDabba** [code][poster]:
  - Built a prototype aimed at improving food storage and large scale handling of food silos in granaries.
  - Uses Computer Vision techniques with SIFT, Haar classifier and Microsoft Vision API in Python and checks the environmental conditions around it using Humidity, Temperature and Weight Sensors.
  - Was amongst the top 10 projects in the first-year batch and received a mention in the Director's blog. [link].
  - **Keywords:** *Computer Vision, IoT, Flask*
- **AirBnb Chatbot**:
  - A flask chatbot developed from a curated Ontology of the AirBnb dataset
  - Developed the Ontology from scratch - incorporated validation, SparQL querying, and N-Triple formation
  - Incorporated human language queries using Rasa NLU API. Developed as a course project for Semantic Web (CSE632) at IIIT Delhi in Winter 2019.
  - **Keywords:** *Flask, Ontology, Semantic Web, NLP, Chatbot*

Leadership

- **Women Who Code** — New Delhi, India
  Director — *Aug 2017 - Present*
  - **Working towards inclusion and diversity in tech**:
    - Establishing relations with corporates to collaborate with WWCode Delhi.
    - Responsible for mentoring new volunteers, their on-boardings, and allotting responsibilities. [testimonial1][testimonial2]
    - Attending meet-ups, conferences and events to expand the WWCode Delhi network and collaborating with network members for organising events and speaking opportunities.
    - Managing the social media activities like managing the Facebook, Twitter and Meetup pages of the chapter.

- **Student Senate** New Delhi, India
  Batch Representative *August 2016 - May 2017*
  - **Academic representative for the Batch of 2020**:
    * Established communication between batch students and the academic body. This includes conveying academic policies like plagiarism policies and course selection criteria with the students.
    * Handled student grievances related to academics and building their solutions.
    * Attended Undergraduate board meetings with other student representatives, Undergraduate Council Chair and Dean of Academic Affairs to discuss problems and their solutions.

Co-curricular Activities

- **Talks**
  - *Practically Machine Learning*: Taught 100 students and industry professionals basics of machine learning [link]
  - *Intro to Computer Vision:* Introductory talk on the self-taught topic, demonstrating basics of Images, colour, processing and basic CV algorithms. Delivered at WWCode Delhi. [slides]
  - *Intro to Mathematics of ML:* Introductory talk on the self-taught topic, demonstrating basic ML algorithms from a mathematical point of view. Delivered at WWCode Delhi. [GitHub]
  - *Intro to Web connectivity with Tessel:* An introductory talk about Tessel development board and its features. Delivered at LinuxChix India. [coverage]
- **Volunteering**
  - *Summer School, IIITD:* Took sessions on Personality Development and Communication Skills for middle-school children from government schools. [coverage]