Keshaw Singh

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Education

- **Indian Institute of Technology, Kanpur** — Kanpur, India
  B.S. in Mathematics and Scientific Computing, with minor in Artificial Intelligence — *2013 - 2017*
  GPA: 8.1/10
- **Jean Paul's Senior Secondary School** — Ara, India
  All India Senior Secondary Certificate Examination — *2013*
  Percentage: 97.4/100

Experience

- **Adobe Inc.** — Bengaluru, India
  Member of Technical Staff II, AI/ML Platform and Solutions (AMPS) — *Jan 2019 - Present*
  - **Image Features for Dynamic Creative Optimization**: Work done on two separate sub-tasks - bounding box detection for click-to-action button and grouping creatives based on lexical/semantic similarity of their texts. Adopted RetinaNet for the box detection task. Compared different text distance measures for similarity, like Levenshtein distance, Jaro-Winkler distance, etc., as well as employed text clustering using LDA.

  Member of Technical Staff, AMPS — *Jul 2017 - Jan 2019*
  - **Recommender Systems**: Implemented neural network-based collaborative filtering for recommender systems. Compared its performance with popular matrix factorization-based approaches, and reported the obtained results on a public, and an internal dataset. Our method was able to outperform traditional ones by about ten percentage points on nDCG.
- **Adobe Inc.** — Bengaluru, India
  Product Intern, Adobe Media Optimizer (AMO) — *May 2016 - Jul 2016*
  - **Twitter-driven Improvement for AMO Click/Intraday Model**: Worked on data collection, and regression modeling on time series data. Analyzed and identified appropriate Twitter handles in different geographical regions, data from which would work as input to our prediction models. Built models and compiled results for the expected number of ad clicks for pairs of specific keywords and regions.

Academic Projects

- **Fine-grained classification into vehicle types from video input** — **[report]**
  Dr. Harish Karnick, Dept. of CSE, IIT Kanpur — *Spring 2016*
  - Classification of objects into pedestrians and vehicles; further classification of vehicles into 2-wheelers, 3-wheelers and other categories. Learned classifier over HOG and SIFT features for cropped objects.
  - Two approaches for generating proposed objects in video frames - foreground-background subtraction, and sliding window approach. Classifier trained over proposal regions used to detect objects.
- **Query-based summarized email extraction** — **[report]**
  Dr. Harish Karnick, Dept. of CSE, IIT Kanpur — *Fall 2016*
  - Devised a multi-stage approach – lexical matching, clustering, LSA – to output topic-wise summaries of emails for given queries, over Enron email dataset.
- **Stochastic Variational Inference (SVI)** — **[code] [report]**
  Dr. Piyush Rai, Dept. of CSE, IIT Kanpur — *Spring 2017*
  - Survey of literature on SVI. Formulated and implemented SVI version of hierarchical Poisson Matrix Factorization.
  - Our method allows for stochastic updates, leading to scalability of original model to larger datasets. Additionally, the model led to improved accuracy for movie rating predictions over Movielens 1M dataset.

Technical Skills

- **Programming Languages**: Python, C++, C
- **Libraries**: PyTorch, TensorFlow, Keras, scikit-learn, pyspark

Relevant Courses

- **Computer Science**: Data Structures and Algorithms, Theory of Computation
- **Machine Learning**: Machine Learning, Bayesian Machine Learning, Natural Language Processing, Deep Reinforcement Learning[1], Recommender Systems[2], Deep Learning[2]
- **Mathematics and Statistics**: Time Series Analysis, Inference, Probability Theory and Statistics, Statistical Simulation and Data Analysis, Matrix Theory and Linear Estimation

Hackathons and Individual Projects

- **Build for India Hackathon at Google India** *Sep 2018*
  - Built text classification models for mixed-code search queries, transliterated to English
  - Evaluated the models on top of distributed word representations, like word2vec, and fastText, as well as tf-idf
- **Microsoft AI Challenge** *Nov 2018 - Dec 2018*
  - Competition for an answer selection task, organized by Microsoft India.
  - Our final model utilized **BiMPM** (Bilateral Multi-Perspective Matching) for Natural Language Sentences, for modeling relation between pairs of sentences. Experimented with several approaches, like bi-LSTM, doc2vec, and hyperqa, while attempting to optimize mean reciprocal rank (MRR).
  - Led a team of three to an expected **final rank under 40** in the second stage (amongst 280 teams). Achieved a rank of 37 in the qualifying stage amongst over **1800** participating teams.
- **Low-Resource Neural Machine Translation** *Sep 2019 - Oct 2019*
  - Implemented the ACL 2019 paper - *Effective Cross-lingual Transfer of Neural Machine Translation Models without Shared Vocabularies* - using fairseq.
  - Keeping German-English as the pivot language pair, used transfer learning and cross-lingual embedding maps (**MUSE**) to replicate in principle results for Basque-English, and extend the method to Gujarati-English.

Scholastic Achievements

- Achieved **A*** (top 2%) grade in the course *Topics in Topology* at IIT Kanpur
- **AIR 1442** in JEE Advanced-2013 amongst **0.13 million** candidates
- **State Rank 5** and **AIR 560** in JEE Main-2013 amongst **1.4 million** candidates
- Scored **99.94** percentile in AISSCE-2013 amongst **1 million** candidates
- Merit in physics for being in **top 0.1** percentile of all candidates in AISSCE-2013
- Invited to witness the **Republic Day Parade**, 2012 from **Prime Minister's Box** at Rajpath, New Delhi for excellent academic performance in the academic year 2010-11

Extra-curricular Achievements

- Qualified **DELE** (Diploma in Spanish as a Foreign Language) for level **B1** (lower intermediate under CEFR) in January 2019
- Won **gold** medal while representing the institute in Messier Marathon in **3rd Inter-IIT Tech Meet** held at IIT Kharagpur, Jan-Feb 2015
- Collaborated with the Astronomy Club at IIT Kanpur to set up **the first student-assembled and student-run observatory** in an institute in India

Volunteering

- **eVidyaloka**: Taught Math via Skype to underprivileged middle-school female students from rural Jharkhand, as well as conducted their periodic assessments. Contributed 23 hours across 3 months for this cause, which in turn also helped raise USD 500 (INR 36000), to be matched 1:1 by Adobe, for donation to nonprofits.

[1] Ongoing at Indian Institute of Science
[2] Coursera specialization