Mukul Bhutani

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Education

2011–2015 **Bachelor of Engineering (Hons) in Computer Science**
Birla Institute of Technology and Science, Pilani Campus, India
CGPA - 9.70/10

2011 **CBSE Central Board Exams (Class XII)**
Somerville School, Vasundhara Enclave, Delhi India
94.4%

Experience

25^{th} April 2018 – Present **Project Assistant**
Machine and Language Learning Lab
Indian Institute of Science, Bangalore, India
- Working under Dr. Partha Talukdar in temporal relation classification and extraction from text.

October 2017– 24^{th} April 2018 **Software Development Engineer - II**
Core Machine Learning Team
Amazon.com, Bangalore, India
- Am involved in development of scalable and easy to use algorithms and platforms for solving machine learning related problems. These products are used by both scientists as well as engineers. The challenges involve applying machine learning algorithms to big data and at the same time providing low latency guarantees.

July 2015–October 2017 **Software Development Engineer**
Core Machine Learning Team
Amazon.com, Bangalore, India
- Developed EntityPredictionService (EPS), Amazon's internal tool for automatically generating end to end machine learning pipelines. The service takes care of gathering the data, applying proper pre-processors, feature selection, forming a Spark pipeline, hyperparameter tuning, scheduling training on clusters and finally doing thresholding. Technologies/frameworks/services: Apache Spark, AWS's Elastic Map Reduce (EMR), DynamoDB, S3.

Publications and Patents

2017 **MRNet-Product2Vec: A Multi-task Recurrent Neural Network for Product Embeddings**
Arijit Biswas, **Mukul Bhutani**, Subhajit Sanyal
European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases **(ECML-PKDD)**
Oral as well as poster presentation
US Patent Application Number: 15/710,750

2017 **A two-dimensional decomposition approach for matrix completion through gossip**
Mukul Bhutani, Bamdev Mishra
Emergent Communication Workshop at
Neural Information Processing Systems **(NIPS)**
Spotlight talk and poster presentation
Filed for US patent as well

Academic Achievements

- Awarded merit scholarship for 3 consecutive years for being in top 1% of the whole batch (~ 850 students).
- Awarded certificate of distinction for completing under graduate education with 9+ CGPA.
- Finished bachelor's degree with a department rank of 3 out of 95 students enrolled in Computer Science program.

Internships

Jan – June 2015 Software Development Engineer - Intern, **Amazon.com** , Bangalore
Core Machine Learning Team

- Was involved in development of ASIN Classification Service, a platform for doing multiclass classification on ASINs (products). Also, did bench marking and assessment for an in house developed module for hyperparameter tuning based on Bayesian optimization for machine learning algorithms.

May – July 2014 Summer Intern, **Edge Verve Systems**, Bangalore

- Developed a generic content-filtering based recommendation engine using Apache Lucene and java.

May – July 2013 Summer Intern, **Bhabha Atomic Research Centre (BARC)**, Mumbai, India

- Worked in the Super Computing Facility, Computer Division on BARC's Computational Fluid Dynamics (CFD) solver for partitioning of unstructured meshes enabling them to be processed in parallel.

Projects

- As a side research project, worked on developing a novel two-dimensional decomposition approach for matrix completion. It uses gossip paradigm for communication between various processing units. The resultant setup is a lot more secure and potentially highly parallelizable compared to traditional approaches. We used MATLAB for coding. The work got accepted in Emergent Communication Workshop at NIPS 2017 and a US patent was also filed.
- As a side research project, worked on developing a dense and low-dimensional product embedding where a diverse set of signals related to a product were explicitly injected into its representation. We used a deep learning based architecture where to generate these embeddings Recurrent Neural Network (RNN) with Long Short-Term Memory (LSTM) and multimodal autoencoder were used. The coding was done in TensorFlow.The work got accepted in ECML-PKDD and a US patent was also filed.
- As a part of Advance Data Analytics and Parallel Technologies(ADAPT) lab, worked on a new framework being developed for Data Mining under Prof. Navneet Goyal (then Head of Department, Computer Science department, BITS Pilani). The project required efficient R-Tree construction and hence required R- Trees to be built concurrently with optimal usage of locks. The coding of R-trees was done in C and Pthreads & OpenMp were used.
- As a part of Parallel Computing course, developed a generic framework for solving NP-complete problems on a multi-node cluster. It involved distributing tasks among several node using MPI. Further for intra-node task distribution OpenMp was used. The framework was developed in C++.
- As a part of Compiler Construction course, developed a compiler for a toy language from scratch. The compiler was written entirely in C. The whole project was demonstrated using an x8086 emulator. Our compiler was judged as the best one and was later used as the base for a master's level course on compiler optimization.

Technical Skills

- Common themes: machine learning, large scale distributed systems
- Libraries/Frameworks: Apache Spark, TensorFlow, Apache Pig, Hadoop, Lucene, Spring Framework, Google Guice, MATLAB
- Languages: Java, C/C++, Python, Scala