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# Palash Chauhan

## Research Interests

Machine Learning, Distributed Systems, Databases, Big Data

## Education

2013–2017 B.Tech in Computer Science & Engineering, IIT Kanpur, CGPA: 8.9/10.0

2013 HSC, Pace Junior Science College, Performance: 91.0%

2011 AISSE, Atomic Energy Central School, CGPA: 10.0/10.0

## Patent

Feb. 2017 P. Chauhan, A. Gupta, N. Jain and S. Biswas. 2017. Application Tool Recommendation. Patent Application Number - P6641-US. (Filed)

## Experience

Jul. 2017 –Ongoing **Adobe Systems India Pvt. Ltd.**, *Member of Technical Staff, Adobe Media Optimizer*.

- Extended the AMO back-end framework for high volume and time sensitive data synchronization between AMO infrastructure and the Pinterest Ad Platform using Python and PostreSQL.
- Developed a POC for a faster and scalable data pipeline used by Data Science team to build ML models. Evaluated and benchmarked frameworks like Druid, Presto and Spark for our use case.
- Currently, working on refactoring the AMO attribution pipeline which deals with high volume advertising data. Involves discussing and implementing design choices affecting scalability, latency and throughput of the pipeline.

May 2016 –Jul. 2016 **Adobe Systems India Pvt. Ltd.**, *Research Intern*.

- Analyzed *topical behaviour* of users when interacting with complicated Adobe apps like Photoshop and Illustrator
- Using a document-word analogy for user sessions and actions, modelled user data using *topic models* like *Latent Dirichlet Allocation* and its extensions.
- Used extracted topics to predict user's intended work-flow and built a recommender system to surface contextual guidance within the app.
- Integrated the model and a prediction pipeline with Adobe Illustrator and presented a live demo. (Slides ,Demo Video )

May 2015 – Jul. 2015 **Monet Networks**, *Web Development Intern*.

- Enhanced Monet's non-verbal cues analytics platform using PHP, MySQL and JavaScript.
- Developed new metrics for non verbal cue analytics and integrated them within Monet.
- Implemented a basic video recommendation system within Monet to improve user experience.

## Conference/Workshop

Feb. 2017 **2nd Singapore Cybersecurity R&D Conference**, *Singapore Cybersecurity Consortium*, NUS Singapore.

- Selected to attend a 4-day conference and workshop covering cutting-edge technologies in Deep Learning for Cyber-Security and gained hands-on experience of adversarial machine learning.

## Key Projects

Feb. 2017 –Apr. 2017 **[ML/CyberSecurity] Malware Detection using Neural Networks**, *Hackathon project at NUS Singapore*.

- Experimented with various deep learning architectures to detect malware in portable executable binaries
- Extracted features like byte-entropy histograms and PE meta-data hashes from the binaries for training neural networks
- Used LSTM Auto-Encoders to avoid the hand-crafting of features and also used CNN Auto- Encoders to learn image features from malwares represented as grey-scale images (report )

Aug. 2016 –Nov. 2016 **[NLP] Automatic Abstract Generation for Research Papers**, *Course project under Dr. Harish Karnick*.

- Used a combination of Extractive and Abstractive summarization techniques to generate summaries for long documents like research papers
- Used Topic Models, TextRank and Latent Semantic Analysis to extract important sentences which were fed into an RNN encoder-decoder network
- The model was trained on a dataset of NIPS research papers and evaluated using the ROUGE metric (report )

Aug. 2016 –Nov. 2016 **[Computer Vision] Dense Image Captioning with NMS Convnet**, *Course project under Dr. Gaurav Sharma*.

- Analyzed the work "DenseCap" by Andrej Karpathy et. al. by experimenting with the parameters and design choices of Fully Convolutional Localization Network on Visual Genome dataset
- To discard the original test-time non-maximum suppression, used trainable spatial suppression layer from the work "A convnet for non-maximum suppression" by Jan Hosang et. al. to enhance the mAP of DenseCap from 5.698 to 5.76 ( report , slides )

Sep 2018 **[NLP] Query Classification**, *Project at Build For India Hackathon at Google India.*
- Worked on the problem of text classification for queries submitted by farmers on a government website portal
- The problem was challenging due to the presence of transliterated English text and incorrect grammar and spellings
- Evaluated word embeddings like tf-idf, word2vec and a fastText like architecture for the classification task

Jan. 2017 –Apr. 2017 **[Bayesian Machine Learning] Poisson Matrix Factorization**, *Course project under Dr. Piyush Rai.*
- Studied various models for Bayesian Recommender Systems including Poisson Matrix Factorization, Hierarchical Poisson Matrix Factorization, Bayesian Non-parametric Poisson Matrix Factorization
- Implemented and compared the performance of the three models on MovieLens 1M dataset
- Analyzed the effect of latent dimension on the models and learnt the use of auxiliary variables in variational inference to make the models locally conjugate and facilitate inference (report )

Jan.2017 –Apr. 2017 **[Computer Architecture] Load Value Prediction**, *Course project under Dr. Mainak Chaudhuri.*
- Analyzed SPEC2006 benchmarks for the presence of Value Locality within instruction using different history depths
- Implemented a Load Value Prediction Unit to enable instruction level parallelism using PIN tool and analyzed its performance on the SPEC2006 benchmarks (report )

Jan.2016 –Apr. 2016 **[Machine Learning] Object Detection and Classification**, *Course project under Dr. Harish Karnick.*
- Worked on the problem of detecting and recognizing objects in the given surveillance video dataset which included pedestrians and vehicles
- Using bags of SIFT features as feature vector and Random Forest and SVMs as classifers, reported Pedestrian vs 2-wheeler vs 4-wheeler accuracy (report )

Jan. 2016 –Apr. 2016 **[Computer Vision] Recognizing Human Actions by Attributes**, *Course project under Dr. Vinay P Namboodiri.*
- Used semantic concepts called attributes to represent actions in videos which in-turn were represented through their motion-context descriptors
- Formulated the problem of action recognition as a latent-SVM problem and evaluated it on the UIUC dataset which contains 532 videos of 14 actions. The method could recognize novel action classes with no training samples (report )

Jan. 2017 –Apr. 2017 **[Machine Learning] Predicting Novel Labels in Extreme Multi-Label Classification**, *Undergraduate Project under Dr. Purushottam Kar.*
- Proposed a method to predict previously unseen labels in extreme multi-label classification
- Evaluated the proposed method on a dataset containing Wikipedia articles and categories
- The method learns latent information from the label set by incorporating the underlying structure in Wikipedia categories and can generate unseen labels using this structure (report )

## Relevant Coursework

ML Bayesian Machine Learning, Natural Language Processing, Recent Advances in Computer Vision, Machine Learning Tools and Techniques, Computer Vision and Image Processing, Deep Learning (Coursera)

Systems Computer Architecture, Operating Systems, Compiler Design, Computer Networks, Computer Security, Computer Organization, Principles of Database Systems, Cloud Computing (Coursera), Hadoop Platform and Application Framework (Coursera), Distributed Database Systems (Coursera)

Theory Advanced Algorithms, Data Structures and Algorithms, Theory of Computation, Linear Algebra, Probability and Statistics, Abstract Algebra, Game Theory, Multivariable Calculus

## Technical Skills

Languages Python, C, C++, Java, R, Go, Rust, Bash

ML Tensorflow, Keras, PyTorch, scikit-learn, OpenCV, RStudio

Big Data Hadoop, Spark, Druid, Presto, Sqoop

Web HTML, CSS, JavaScript, Php, MySQL, PostgreSQL

OS Linux, Windows

## Achievements and Awards

2016 **Third Position**, *Deep Learning and Cybersecurity Hackathon*, National University of Singapore.

2014 **Academic Excellence Award**, *IIT Kanpur (awarded to top 7% students in the institute)* .

2013 **All India Rank 279**, *IIT-JEE Advanced (among 150,000 candidates).*

2013 **All India Rank 635**, *JEE Mains (among 1,400,000 candidates).*

## Extracurriculars

Jan. 2014 –Dec. 2016 **Institute Badminton Team, IIT Kanpur**, *Member.*
- Was an integral part of the Institute Badminton Team and represented IITK in tournaments across the country.
- Secured 1st Position at Inter-IIT Sports Meet 2014 and 2016 in the team event
- Secured 1st Position at inter-college sports fest Sangram'14 and Sangram'16 in the team event.