Kushagra Mahajan

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EDUCATION

Carnegie Mellon University, School of Computer Science   **Dec. 2022**
Master of Computational Data Science   *Pittsburgh, PA*
  - Coursework: Machine Learning, Machine Learning for Large Datasets (*current*), NLP (*current*)

Indraprastha Institute of Information Technology Delhi (IIIT Delhi)   **Dec. 2018**
Bachelor of Technology in Computer Science — GPA: 8.78/10.00   *Delhi, India*
  - Coursework: Computer Vision, Probabilistic Graphical Models, Data Mining, Collaborative Filtering, Machine Learning (Teaching Assistant - Fall '18), Data Structures and Algorithms, Compiler Design, Database Systems, Operating Systems.

EXPERIENCE

TCS Research and Innovation Labs   **Feb. 2019 – April 2021**
Researcher — Computer Vision Team | Advisors: Dr. Lovekesh Vig & Dr. Gautam Shroff   *Delhi, India*
  - Worked on cellular image analysis, distributed learning, meta-learning, Covid-19 diagnosis, skin lesion detection and chest x-ray region localization in collaboration with **ILBS, Delhi**. Published **3 papers** in CVPR 2020 Workshops, MICCAI 2020 Workshop, and ESANN 2021, pitched and built **2 products**.
  - Worked on alignment and information extraction from document images. Product sold to **Landmark Group**. Published **1 paper** in ICDAR Workshop 2019 and filed **1 US patent**.

Intel Corporation   **Aug. 2017 – Dec. 2017**
Undergraduate Technical Intern | Advisor: Mr. Tigi Thomas   *Bangalore, India*
  - **2M dollar IP project** on sensor based gesture detection and recognition.
  - Main task was data preprocessing, building machine learning models considering memory constraints and output latency.

CVML Lab, IIIT Delhi   **Aug. 2016 – Dec. 2018**
Undergraduate Researcher | Advisor: Prof. Chetan Arora   *Delhi, India*
  - Exploited the pose structure to enhance FGVC performance on standard datasets. Also used texture descriptors to improve clothing segmentation in a two-stream architecture.
  - Published **2 papers** in ICIP 2018. Work was in collaboration with **Staqu Technologies**.

Indian Institute of Technology Delhi   **Dec. 2015 – July 2016**
Research Intern | Advisor: Prof. Smruti Sarangi   *Delhi, India*
  - Built the ARM Emulator for assembly programs with both ARM and THUMB ISA. Created a DRAM memory controller module for CPU Simulator Tejas. Currently deployed in **IIT Delhi, IIT Madras, IIT Patna, University of Adelaide**, and other institutions.

PROJECTS

Dynamic Traffic Light System   **IIIT Delhi | Spring 2017**
  - Involves traffic density estimation at the junction, lane isolation, vehicle speed detection, KLT tracking to create a deployable system.

Customer Churn Analysis to Improve Customer Retention   **IIIT Delhi | Fall 2018**
  - Derived insights from data to help businesses, particularly telecom companies, retain their customer base using IBM's Telco Customer Churn dataset.

Matrix completion based imputation for sc-RNA-seq data   **IIIT Delhi | Fall 2018**
  - Showed that graph regularized outperforms nuclear-norm minimization based matrix completion on many real world single-cell RNA sequencing datasets.

SKILLS & ACHIEVEMENTS

Programming Languages: *Proficient:* Python, *Intermediate:* C, C++, Java, SQL, Latex
Frameworks & Tools: Tensorflow, Pytorch, Keras, PySpark, Caffe, OpenCV, Scikit, NumPy, Pandas, SciPy
Achievements: *Travel Grant*: AICTE-INAE for ICIP 2018, *Dean's List*: 2017-2018, Teaching Fellow and Mentor at Vivekananda Kendra, Delhi.

PATENTS AND PUBLICATIONS

- **K. Mahajan**, M. Sharma, L. Vig, Tata Consultancy Services Limited. "Method and System for Keypoint Extraction from Images of Documents". Filed at the Indian Patent Office. Number: 201921035983 (PCT filed. Number: WO2021044447A2)
- A. Pandit, **K. Mahajan**, S. Kunde. et. al. "Distributed Training of High-Resolution Images in Medical Domain". 29th European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN) 2021.
- **K. Mahajan**, M. Sharma, L. Vig. et. al. "CovidDiagnosis: Deep Diagnosis of COVID-19 Patients Using Chest X-Rays". IEEE International Workshop on Thoracic Image Analysis, MICCAI 2020.
- **K. Mahajan**, M. Sharma, L. Vig. "Meta-DermDiagnosis: Few-Shot Skin Disease Identification using Meta-Learning". IEEE International Conference on Computer Vision and Pattern Recognition 2020 Workshops (CVPRW).
- **K. Mahajan**, M. Sharma, L. Vig. "Character Keypoint-based Homography Estimation in Scanned Documents for Efficient Information Extraction". CBDAR workshop at the 15th IEEE International Conference on Document Analysis and Recognition (ICDAR) 2019.
- **K. Mahajan**, T. Khurana, A. Chopra, I. Gupta, C. Arora, A. Rai. "Pose Aware Fine-Grained Visual Classification Using Pose Experts". 25th IEEE International Conference on Image Processing (ICIP) 2018.
- T. Khurana, **K. Mahajan**, C. Arora, A. Rai. "Exploiting Texture Cues for Clothing Parsing in Fashion Images". 25th IEEE International Conference on Image Processing (ICIP) 2018.