

KUSHAGRA MAHAJAN

✉ kmahajan@andrew.cmu.edu 📞 +1-412-214-2036 🌐 mahajan-kushagra 📱 Kushagra Mahajan 🌐 kushagramahajan.me

EDUCATION

Carnegie Mellon University, School of Computer Science <i>Master of Computational Data Science — GPA: 4.06/4.00</i> <ul style="list-style-type: none">Coursework: Machine Learning, Machine Learning for Large Datasets, NLP, Cloud Computing, Visual Learning and Recognition, Multilingual NLP, Multimodal MLCapstone Project: Amazon Alexa Prize Simbot Challenge – Working on Navigation and Interaction	Aug. 2021 – Present Pittsburgh, PA
Indraprastha Institute of Information Technology Delhi (IIIT Delhi) <i>Bachelor of Technology in Computer Science — GPA: 8.78/10.00</i> <ul style="list-style-type: none">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.	Aug. 2014 – Dec. 2018 Delhi, India

EXPERIENCE

Amazon <i>Software Engineering Intern — Installments Team</i> <ul style="list-style-type: none">Improved web page notification system for payment failures to be more descriptive and provide rectification steps to customers. Reduced customer tickets regarding payment failures by 72%.	May 2022 – Aug 2022 Seattle, WA
Tata Research and Innovation Labs <i>Machine Learning Research Engineer — Computer Vision Team Advisors: Dr. Lovekesh Vig & Dr. Gautam Shroff</i> <ul style="list-style-type: none">Designed a meta-learning based framework for skin lesion and chest x-ray classification, and segmentation of medical and natural scene images. Published 3 papers [2, 3, 4] and built 2 products for chest x-ray analysis, and skin lesion detection.Explored disentangling biological signals from noise in cellular images and achieved top-5 percentile in NeurIPS 2019 challenge with test accuracy 96.06%. Also worked on distributed training, abnormality detection in X-rays using GANs, visual attention.Built an end-to-end alignment and information extraction system for document images using a novel keypoint extraction algorithm. Product sold to the Landmark Group. Published 1 paper [5] and filed 1 US patent [1].	Feb. 2019 – April 2021 Delhi, India
Intel Corporation <i>Machine Learning Research Intern Advisor: Mr. Tigi Thomas</i> <ul style="list-style-type: none">Created a highly optimized sensor-based gesture detection and recognition model for on-device deployment surpassing benchmarks for memory constraints and output latency. Tested by deploying model on laptop hardware.	Aug. 2017 – Dec. 2017 Bangalore, India
CVML Lab, IIIT Delhi <i>Machine Learning Research Intern Advisor: Prof. Chetan Arora</i> <ul style="list-style-type: none">Used texture descriptors to improve clothing segmentation by 3% for visual fashion image and attribute search systems.Exploited the pose structure to enhance SoA fine-grained classification performance by 2-3% across standard FGVC datasets. Curated an Amazon pose-aware apparel dataset. Published 2 papers [6, 7]. Work was in collaboration with Staqu Technologies.	Aug. 2016 – Dec. 2018 Delhi, India

PROJECTS

Amazon Alexa Prize Simbot Challenge <i>CMU Capstone Project Advisor: Prof. Yonatan Bisk</i> <ul style="list-style-type: none">Building state-of-the-art systems for navigation, localization, mapping and interaction of a virtual assistant bot with the Arena environment based on user-assigned real-world tasks in collaboration with Amazon Alexa AI.	Spring 2022 - Present
Natural Language Inference for Code-Switched Hinglish <i>Course Project: Multilingual NLP Advisor: Prof. Alan Black</i> <ul style="list-style-type: none">Improved state-of-the-art NLI performance on GLUECoS benchmark by 6% for code-switched Hindi-English by translating to matrix or embedded language, and adaptation of language models to the code-switched domain using PyTorch. [Report]	Spring 2022
Twitter Cloud Native Web Service with Microservices <i>Course Project: Cloud Computing Advisor: Prof. Majd Sakr</i> <ul style="list-style-type: none">Created an ETL pipeline using Spark for processing 1.2TB Twitter data, and a microservice based architecture using Kubernetes for data retrieval and running analytic jobs in a cost constrained setting.	Spring 2022

PATENTS AND PUBLICATIONS

[1] **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 \(PCT filed. Number: WO202104447A2\)](#)

[2] A. Pandit, **K. Mahajan**, S. Kunde. et. al. “Data-Efficient Training of High-Resolution Images in Medical Domain”. [29th European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning \(ESANN\) 2021. \[PDF\]](#)

[3] **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. \[PDF\]](#)

[4] **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 \(CVPRW\). \[PDF\]](#)

[5] **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. \[PDF\]](#)

[6] **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. \[PDF\]](#)

[7] 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. \[PDF\]](#)

SKILLS & ACHIEVEMENTS

Programming Languages, Frameworks and Tools: Python, C, C++, Java, SQL, Tensorflow, Pytorch, Keras, PySpark, Caffe, OpenCV, Scikit, NumPy, Pandas, SciPy, EspNet, Kafka, Samza, HBase, MongoDB, AWS, Azure, Kubernetes
Achievements: Travel Grant: AICTE-INAE for ICIP 2018, Dean's List: 2017-2018, Teaching Fellow at Vivekananda Kendra, Delhi.