Kushagra Mahajan

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EDUCATION

Carnegie Mellon University, School of Computer Science   Aug. 2021 – Present
Master of Computational Data Science — GPA: 4.06/4.00   *Pittsburgh, PA*
- *Coursework*: Machine Learning, Machine Learning for Large Datasets, Interactive Data Science, NLP, Cloud Computing, Visual Learning and Recognition, Multilingual NLP, Multimodal ML
- ***Capstone Project*** (*Advisor: Prof. Yonatan Bisk*): **Amazon Alexa Prize Simbot Challenge** – Building state-of-the-art systems and pipelines 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**.

Indraprastha Institute of Information Technology Delhi (IIIT Delhi)   Aug. 2014 – 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

Amazon   May 2022 – Aug 2022
Software Engineering Intern — Installments Team   *Seattle, WA*
- Analyzed payment failure data and 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%.

TCS Research and Innovation Labs   Feb. 2019 – April 2021
Machine Learning Engineer — Computer Vision Team | Advisors: Dr. Lovekesh Vig & Dr. Gautam Shroff   *Delhi, India*
- 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** 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** and filed **1 US patent**.

Intel Corporation   Aug. 2017 – Dec. 2017
Machine Learning Intern | Advisor: Mr. Tigi Thomas   *Bangalore, India*
- 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.

CVML Lab, IIIT Delhi   Aug. 2016 – Dec. 2018
Machine Learning Intern | Advisor: Prof. Chetan Arora   *Delhi, India*
- 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**. Work was in collaboration with **Staqu Technologies**.

PROJECTS

Twitter Cloud Native Web Service with Microservices   Spring 2022
Course Project: Cloud Computing | Advisor: Prof. Majd Sakr
- 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.

Multimodal Image to Recipe Generation   Fall 2022
Course Project: Multimodal ML | Advisor: Prof. Louis-Philippe Morency
- Recipe generation from food images using a novel approach comprising multimodal alignment before fusion (ALBEF), CLIP for improved image encoding and transformer for recipe generation.

Natural Language Inference for Code-Switched Hinglish   Spring 2022
Course Project: Multilingual NLP | Advisor: Prof. Alan Black
- 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]

SKILLS & ACHIEVEMENTS

Programming Languages, FrameWorks and Tools: Python, C, C++, Java, SQL, Matlab, R, Tensorflow, Pytorch, Keras, PySpark, Caffe, OpenCV, Scikit, NumPy, Pandas, SciPy, 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.