Arsh Verma

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Work Experience

Wadhwani Institute for Artificial Intelligence

Associate Machine Learning Scientist

📅 Aug 2021 – Present   📍 Delhi, India

- Managers: Dr. Makarand Tapaswi, Dr. Soma Dhavala, Dr. Alpan Raval
- ML lead for two Healthcare projects.
- Led discussions and provided insights regarding the ML feasibility for **establishing new use cases and expanding the current solutions** with Ministry of Health and Family Welfare and the top medical institutions in India.
- Appointed as the direct **reporting manager** for 2 associates and 4 interns.

eHealth Teleradiology (ML Lead)

📅 Jan 2022 – Present

- Developing an ML model for automated feature detection on **Chest X-Rays** for deployment on the eCollabDDS, the national digital diagnosis platform which serves 20 million patients annually across India.
- Responsible for the end-to-end ML cycle: problem formulation, data procurement, annotation processes, model training, deployment, client deliverables.
- Utilized Self Supervised Learning techniques for initializations to pre-train models on unannotated medical imaging data. Our work has been accepted in the **Machine Learning for Health Symposium 2022**, which is co-located with NeurIPS 2022.
- Exploring the possibility of fine-tuning of CLIP pretrained Image-Language models through contrastive training to learn representations directly from radiologist reports instead of explicitly annotated labels, which are expensive and error prone.
- Collaborating with a group at Harvard University to improve the explainability of our ML model.
- Our CNN and transformer based models have achieved an average of 3% absolute mean AUROC gain over the SOTA models on NIH, PadChest, CheXpert and MIMIC CXR datasets.
- Interacted with medical experts to understand the data and choose data processing and augmentations strategies.
- Developed a modular codebase serves as a template for all image classification projects at WadhwaniAI. It has reduced model development time from two months to one week.

eHealth Dermatology (ML Lead)

📅 Jul 2022 – Present

- Developing a model to classify **14 skin conditions** most prevalent in India and a **Monkey Pox** screening solution using open source data for deployment on eSanjeevniOPD, the national tele-consultation platform currently serving 7 million people.
- Overseeing ML modelling, ensuring fair and correct evaluation, reviewing code and coordinating tasks with other associates staffed on the projects.
- Added functionality for out-of-distribution detection and uncertainty quantification of our models.

Tuberculosis - Ultrasonography (TB USG)

📅 Aug 2021 – Dec 2021

- Detected **Pulmonary TB from chest USG** through AI for deployment in areas where skilled radiologists are unavailable.
- Provided regular inputs in the data collection pipeline to improve efficiency of collection and quality of data.
- Implemented an ML algorithm for disease and feature classification on frame, video and patient level.

Education

Indraprastha Institute of Information Technology, Delhi

B.Tech. (Hons.), Computer Science & Engineering

📅 August 2017 – June 2021

- **CGPA:** 9.04/10
- **BTech Project:** Reading Signboards for the Visually Impaired (see Projects section below)
- **Coursework:** Deep Learning, Advanced Machine Learning, Trustworthy AI Systems, Meta Learning, Probabilistic Graphical Models, Data Mining, Natural Language Processing, Data Structures and Algorithms, Operating Systems, Probability & Statistics, Linear Algebra.

Research Interests & Technical Skills

- **Research Interests**: Deep Learning for Computer Vision, AI for Healthcare, Machine Cognition
- **Languages**: Python, Java, JavaScript, C++, C.
- **Tools**: Pytorch, Docker, Torchserve, MySQL, Firebase, React Native, Streamlit.

Projects

🔗 Reading Signboards for the Visually Impaired

Advisor: Dr. Chetan Arora (Associate Professor at Indian Institute of Technology (IIT), Delhi)

📅 Jan 2020 – Jun 2021   📍 IIT Delhi

- Led the Scene Text Recognition task of the Mobility Assistant for the Visually Impaired (MAVI) project.
- Prepared a custom bi-lingual real world dataset of Indian navigation signboards (with English & Hindi texts). Curated dataset splits with challenges like skew, blur and shadow.
- Pre-trained models on large synthetic datasets and fine-tuned on our custom dataset to learn a **domain-invariant representation** for a robust model.
- Achieved 32% improvement in word accuracy and 42% improvement in normalized edit distance score over the baselines on our custom bilingual test set.
- Ported the end-to-end model to a hardware compatible format for deployment on a wearable device for the visually impaired.

🔗 Customer and Sales Management System (CSMS)

Advisor: Dr. Pankaj Jalote (Founding Director and Distinguished Professor at IIIT Delhi)

📅 Jan 2020 – Jun 2020   📍 IIIT Delhi

- Studied **open source software (OSS)** development processes including software development life cycle and licenses.
- Created a mobile app CSMS for small scale companies.
- Features like user login, attendance, leave tracker, location monitoring, appointment scheduling, and document upload.
- Currently being used by 42 employees.
- **Technologies:** React Native, Firebase, Cloud, Expo.

Awards and Achievements

- **[2022]** GRE General Test- Quant: 170/170, Verbal: 161/170.
- **[2018, 2020, 2021] Dean's Award for Excellence in Academics** Awarded to top 5% students each year.
- **[2018] Dean's Award for Excellence in Sports**: Awarded to one individual each year.
- **[2016]** SAT I- 1500/1600. SAT II- Math II: 800/800, Physics: 800/800.

Positions of Responsibility

Subreviewer, Joint International Conference on Data Science and Management of Data 2023

📅 Aug 2022

Head Teaching Assistant

📅 Jan 2021 - May 2021   📍 IIIT Delhi

- Graduate level ML course, by Dr. Saket Anand, taken by 140 undergraduates, postgraduates and PhDs.
- Managed a team of 7 TAs.

Teaching Assistant

📅 Aug 2020 - Dec 2020   📍 IIIT Delhi

- **ML course**, by Dr. Jainendra Shukla, taken by 150 undergraduates.

Teaching Assistant

📅 Aug 2020 - Dec 2020   📍 IIIT Delhi

- **Software Development using Open Source** course, by Dr. Pankaj Jalote, taken by 41 undergraduates and post-graduates.
- First offering of this course - inspired by my team's project work.
- Assisted with **course planning**; **delivered lectures** on open source tools; managed all course logistics and evaluations.

President, The 65th Square (Chess Club)

📅 Sep 2017 - Jul 2020   📍 IIIT Delhi

Coordinator, Evariste (Math Club)

📅 Dec 2018 - Dec 2019   📍 IIIT Delhi

Volunteer Experience

Student Mentor

📅 Aug 2019 - May 2021   📍 IIIT Delhi

- Mentored 8 first year undergraduate students in each academic year.

Coordinator, Summer Camp

📅 May 2018 - June 2019   📍 IIIT Delhi

- Organized the annual Summer Camp for 200 under-privileged school students with 40 volunteers.