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Radhika Dua
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Education

KAIST, Republic of Korea *2020-2022*
Masters, Graduate School of AI CGPA: **4.0/4.3**
- Supervised by Professor Edward Choi

Panjab University, Chandigarh, India *2015-2019*
Bachelor of Engineering With Honours, Information Technology CGPA: 9.24/10
- **Third position** in B.E. program in Information Technology Department (**120 students**).

Research Experience

Brown University *Summer Intern* *July 2020- September 2020*
- Mentor: Professor Srinath Sridhar (Brown University) and Professor Leonidas Guibas (Stanford University)
- Conducting research in 3D computer vision and machine learning.

Indian Institute of Technology Hyderabad, India *Visiting Researcher* *Jan 2019-June 2020*
- Mentor: Professor Vineeth N Balasubramanian
- Conducting research in Vision and Language applications and introduced a new task, **ViQAR: Visual on Answering and Reasoning**, which focuses on automatic generation of the answer, and of a rationale, given a visual query.

Celestini Project India *Research Intern* *June-August 2018*
- Mentors: Dr. Aakanksha Chowdhery (Google Brain and Tensorflow) and Prof. Brejesh Lall (IIT Delhi).
- Developed a temporal forecasting solution based on the historical data reported by Central Pollution Control board to predict the real-time and fine-grained air quality information in five locations of Delhi.
- Blog post, Indian press and Demo youtube video.

Variance.AI *Summer Intern* *June-August 2017*
- Worked on developing a method to determine the breathing rate and pulse rate of a person using video as a source by making use of **Eulerian Video Magnification Algorithm**.

Publications

- Jeonghoon Park*, Jimin Hong*, **Radhika Dua***, Daehoon Gwak, Yixuan Sharon Li, Jaegul Choo, Edward Choi. **Natural Attribute-based Shift Detection**, *Under Review at an A* conference*. [**paper**]
- **Radhika Dua***, Sai Srinivas*, Vineeth N Balasubramanian. **Beyond VQA: Generating Multi-word Answer and Rationale to Visual Questions**, *MULA Workshop, CVPR 2021*. [**paper**, **video**, **slides**, **poster**]
- Rahul Sajnani, Adrien Poulenard, Jivitesh Jain, **Radhika Dua**, Leonidas Guibas, Srinath Sridhar. **ConDor: Self-Supervised Canonicalization of 3D Pose for Partial Shapes**, *Under Review at an A* conference*. [**website**]
- Taehee Kim, ChaeHun Park, Jimin Hong, **Radhika Dua**, Edward Choi, Jaegul Choo. **Reweighting Strategy based on Synthetic Data Identification for Sentence Similarity Comparison**, *Under Review at an A* conference*.
- Divyam Madaan*, **Radhika Dua***, Prerana Mukherjee, Brejesh Lall. **VayuAnukulani: Adaptive Memory Networks for Air Pollution Forecasting**, *GlobalSIP2019*. [**code**, **paper**, **slides**]

* denotes equal contribution

Achievements

- Recipient of the prestigious **Grace Hopper Celebration India (GHCI)** 2018 Student Scholarship given to 250 deserving women students from computing, engineering, and IT backgrounds.
- Awarded **Second Prize in Celestini Project India** by **Marconi Society and Google** for our project on Air Pollution Prediction. **Celestini Project India 2018** is a very competitive internship program where only 8 out of 100 extremely talented applicants are selected.
- Recognized as **India's 91 Brightest Engineering Student** by Economic Times Campus Stars 2018-19. It was a four-phase program in which 91 students out of total 37,000 students were selected.
- **Hackathons:** Won hackathons like **Hack In The North 2017**-The largest student hackathon in India (Prize: **Second** and Reward: **27000**), **Hack Infinity 2017** (Prize: **Second** and Reward: **25000**) and **India Hacks 2017** by Hacker Earth (Prize: **Sixth** out of 35000 and Reward: **10000**)
- **First Position** in B.E. First Year and Fourth Year in Information Technology Department.

Professional Activities

- Subreviewer for **CVPR 2022**, and **SDM 2020** (SIAM International Conference on Data Mining (SDM20)).
- Volunteer for virtual conferences: **ICML 2020**, **ACL 2020**, and **ICML 2021**.
- **Teaching Assistant** for Scientific Writing (CC500) course and Graduate English Presentations (HSS583) course at KAIST instructed by Prof. Mik Fanguy.
- Poster Mentor at Women in Machine Learning (WiML) workshop, NeurIPS '20.
- **Teaching Assistant** for Deep Learning for Computer Vision offered on **NPTEL** (National Programme on Technology Enhanced Learning) platform.
- **Teaching Assistant** for Deep Learning for Computer Vision (CS5370) course and Advanced Topics in Machine Learning (CS6360) course at IIT Hyderabad instructed by Dr. Vineeth N Balasubramanian.
- Reviewer for **Grace Hopper Celebration (GHC) 2020** Scholarship.
- Speaker at **codechef campus chapter UIET** (2016-17) where I took programming sessions for junior year students.
- Speaker at **Software Freedom Day 2017**, Panjab University, which aims to motivate the youth to contribute to open source software and pursue an education in STEM fields.
- Mentor at **Hacksprint** version2 Hackathon at Panjab University, Chandigarh.
- **Fellow Campus Ambassador** in **Campus Geek Ambassador program by GeeksforGeeks** (2017-18).

Revelant Coursework

- AI602 Advanced Deep Learning
- AI612 Machine Learning for Healthcare
- AI613 Musical Applications of Deep Learning
- AI701 Bayesian Machine Learning
- AI504 Programming of Artificial Intelligence
- AI605 Deep Learning for Natural Language Processing
- Data Structures and Algorithms
- Linear Algebra and Probability

Programming Skills

- **Languages**: Python, C++, C, HTML, SQL
- **Deep Learning Frameworks**: Pytorch
- **Libraries and tools**: LaTeX, Git, Tensorflow, NumPy, Scikit-learn, NLTK, SciPy, Matplotlib, Pandas, OpenCV

Projects

- **Noise Detection in Electrocardiogram Signals.** In an ICU, electrocardiogram (ECG) is one of the most important vital sign alerts. However. they are often severely corrupted by noise and motion artifacts, which can severely impact the diagnosis. Therefore, automated identification of poor-quality ECG signals is necessary. We aim to separate detect the noisy ECG samples from clean samples. [**In Progress**]
- **Natural Attribute-based Shift (NAS) Detection for Musical Instrument Classification.** To enhance the reliability of classifiers, we solve a new task in audio domain, NAS detection, to detect the samples shifted from the training distribution by some attribute (such as time stretch). We introduce datasets for NAS detection and evaluate prior out-of-distribution (OOD) detection methods. Sep '22 - Dec '22
- **ViQAR: Visual Question Answering and Reasoning** We introduced a new task, ViQAR, in which the model generates the complete answer and rationale. We also proposed an **end-to-end, attention-based encoder-decoder architecture** to solve this task, and showed that our model generates strong answers and rationales through qualitative and quantitative evaluation, as well as human Turing Test.
- **Air Pollution Prediction.** A method is proposed to predict the air quality of next 24 hours by **predicting the concentration of different air pollutants** like sulphur dioxide, nitrogen dioxide, particulate matter etc for Delhi region. We also identify the source of pollution at different instants of time by predicting the major pollutant in the air. [**code**]
- **Squeeze-and-Excitation Networks.** Coded and reproduced the results of the SE-Resnet in pytorch. SE-Resnet is made of **Squeeze-and-Excitation (SE)** block that adaptively recalibrates channel-wise feature responses by explicitly modelling interdependencies between channels. [**code**]
- **Breathing and Pulse Rate using Camera.** A mobile phone or web camera based computer vision project which uses the **Eulerian video magnification algorithm** to predict the breathing and pulse rate of the person. [**code**]
- **Automated Irrigation, Pests and Diseases Detection.** This project aims in providing an optimal solution for irrigation. Designed and implemented automated irrigation using **Blaney-Criddle Method** using **Indian Space Research Organization datasets**. Predicted pests and diseases using neural networks with temperature, humidity and rainfall as inputs. Validated pests and diseases detection using Convolution neural networks.
- **Aid For Blind.** This is a simple web app which will **assist a blind** about the view in front of him and accordingly he will be able to take decisions about his motion. This web app will provide a blind person all the conveniences in order to use this app because the communication will be mostly through the speech eliminating the issues of reading or writing. [**code**]