Akansh Maurya

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Education

Institute of Engineering and Technology **Sep. 2017 – July 2021**
Bachelor of Technology in Electrical Engineering ***CGPA: 8.7/10*** *Lucknow, India*
Final year thesis: ***Surface type detection for the Robot's indoor navigation using Machine Learning.***

Relevant Coursework

- Signals & Systems
- Control Systems
- Engineering Mathematics (I,II,III)
- Machine Learning
- Programming in C & MATLAB
- Power System Optimization
- Analog & Digital
- Engineering Physics (I, II)

Experience

Robert Bosch Center for Data Science and Artificial Intelligence (RBCDSAI) **Sept 2021 – Present**
Post Baccalaureate Research Assistant (RBCDSAI, IIT Madras) *Chennai, India*

- Currently working under the guidance of **Dr. Ganapathy Krishnamurthi** to make interpretable Deep Learning(DL) **Medical Imaging system**. We aim for making interpretable weakly-supervised DL algorithms to detect and localize multiple abnormalities in Chest X-rays.
- Secured 3rd position in Chest XR COVID-19 detection Grand Challenge among 200 teams.
- Participated in MICCAI's Federated Learning for Brain tumor segmentation (FeTS 2021); publication accepted in MICCAI BrainLes 2021.

Indian Institute of Science (IISc) **October 2020 – May 2021**
Research Intern (Signal Processing Interpretation and REpresentation (SPIRE) Laboratory) *Bangalore, India*

- Worked under the guidance of **Dr. Prashanta Kumar Ghosh** to build an app that can help detect an asthmatic patient based on cough sound and sustained phonation. I pre-processed 285 patient recordings for feature engineering and calculated statistical features on MFCCs and their derivatives to train classifiers like Support Vector Machine, XGB.
- My research finding includes: Wheeze sound best classify Asthmatic patients with 86% Accuracy; Gender classification from breath signal with AUC score of 88.59%; proof of decrease in the quality of sound in Asthamatic Patients.
- Identified that 25% to 75% chunk of whole breath signal is priamarly responsible for detecting Asthmatic patients. Certificate — Presentation

Indian Institute of Technology(IIT), Bombay **May 2020 – July 2020**
Research Intern (Embedded Real Time System(ERTS) Labs) *Mumbai, India*

- Under the supervision of **Prof. Kavi Arya**, I developed a Deep Learning-based web app that automates verifying and validating of ID card images; It reduced the processing time from 14 days to 3 hours. Implemented a ResNet-50 architecture for classification, verifying college ID cards, received 98.8% accuracy.
- Developed a RotateNet model with 91% accuracy that corrected orientated images, improved OCR results on rotated images, implemented text detection and recognition with DBNet and CRNN, and got 27 fps speed to process images.
- I coded a custom fuzzy string matching algorithm to validate text present in the ID card. F1 score of the whole system is 0.90054. Certificate — Report — Video

Publication

- Shambhat V, **Maurya A.**, Krishnamurthi G. et al. (2021). "A study on Criteria for Training Collaborator Selection in Federated Learning." (Accepted in MICCAI BrainLes 2021)
- **Maurya A.**, Krishnamurthi G. (2021). "Weighted average ensemble method for classification of COVID-19 and Pneumonia from Chest X-rays." (Under review in ISBI 2022)
- **Maurya A.**, Manjrekar O., Arya K., et al. (2020). "A system for verifying non-standard personal identity documents using deep learning models." International Journal on Document Analysis and Recognition. (Submitted ICDAR-IJDAR, 2021 journal track).

Technical Skills

Languages: C, Python, MATLAB.
Python Libraries: Pytorch, TensorFlow, OpenCV, Robot Operating System(ROS), Numpy, Matplotlib, Pandas, Librosa
Technologies/Frameworks: Linux, GitHub, Computer vision, Deep Learning, Audio Processing, Time-series Analysis

Leadership / Extracurricular

- Served as Joint Secretary at Electrical Engineering Society(EES), IET Lucknow, organized 5 research talks and 2 technical workshop for students.
- Served as an Volunteer and Academic Assistant of Parmarth- the social club of IET Lucknow; I taught children of slums nearby college, conducted cloth and food distribution to the needy.
- Like to play Chess(ELO 890), badminton and Kho-kho; I also participated in many inter-college events.

Projects

Survey & Rescue Drone | *Control Systems, ROS, Python, OpenCV* **February 2020**

- Designed a prototype to mimic the flood affected region and programmed a drone that can autonomously navigate in the flood-affected region to distribute supplies.
- Used Robot Operating System(ROS) for programming custom path planning algorithm with Drone, used PID controller to control drone movement.
- Implemented Image processing Algorithm using OpenCV to detect regions of flood and points of distress.
- My team secured 5th position among 1050 teams internationally.

Lung Segmentation from Chest X-Rays | *Deep Learning, Python, Pytorch, PyDicom* **October 2021**

- Used Montgomery County X-Ray dataset, which contains only 138 posterior-anterior x-rays. Performed rigorous augmentation techniques to increase the number of data points and generalization.
- Created U-Net, with Resnet 50 as a backbone; Achieved the dice score of 97.67% on test set.

Fovea Localization for AMD & Non-AMD patients | *Python, Pytorch, OpenCV* **April 2021**

- This project is part of ADAM competition. Accomplished localization of Fovea, inside the human eye.
- Attained decent accuracy of 60% on small dataset of 400 images by different custom data augmentation techniques.

Automated measurement of fetal head circumference | *Python, Pytorch, Pandas, Numpy* **March 2021**

- Developed an automatic bot using Python and Google Cloud Console to register myself for a timeslot at my school gym.
- Implemented Selenium to create an instance of Chrome in order to interact with the correct elements of the web page.
- Created a Linux virtual machine to run on Google Cloud so that the program is able to run everyday from the cloud.
- Used Cron to schedule the program to execute automatically at 11 AM every morning so a reservation is made for me.

Genetic Algorithm from scratch using MATLAB | *Optimization, MATLAB* **December 2019**

- This project was guided by Dr. Nitin Anand Shrivastava.
- Coded Genetic Algorithm functions like selection, crossover, mutation and elitism using MATLAB to solve simple load dispatch problem.

Referral

- Dr. Ganapathy Krishnamurthi, Associate Professor at IIT-Madras
- Dr. Nitin Anand Shrivastava, Assistant Professor at IET Lucknow