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Kimaya Kulkarni

Linkedin
Google Scholar

Education

Master of Science, Electrical and Computer Engineering, **UCLA**, GPA: 4.00/4.00 **Sept 2021 — June 2023**
Bachelor of Technology, Electronics and Telecommunication Engineering, **VIT Pune**, GPA: 9.21/10.00 **Aug 2016 — Oct 2020**

Experience

Software Engineering Intern, Camera Image Quality **June 2022 — Sept 2022**
Rivian Automotive Palo Alto, CA, USA

- Improved Computer Vision Model Performance in terms of reduction in number of false positives by 30% and increase in the number of True positives by 5.8% by tuning image quality parameters in image signal processor.

Student Researcher **May 2020 — Present**
Visual Machines Group, UCLA Los Angeles, CA, USA

- Developing Contactless Vital Signs Measurement systems under the supervision of Prof. Achuta Kadambi. The work consists of designing fair unbiased algorithms in Computer Vision (Computational Imaging) domain.

Teaching Assistant **Sept 2021 — Present**
Physics and Astronomy Department, UCLA Los Angeles, CA, USA

- Physics 180G: Biophysics which is a project based course, where I am leading the EEG group. Analysing the data for eye-tracking, EEG etc. in Matlab and python for the same.
- Physics 4BL: Physics Laboratory for Scientists and Engineers: Electricity and Magnetism. Conducting labs involving python and arduino for sophomores through senior year students at UCLA.

Project Intern **July 2019 — Dec 2019**
High Energy Materials Research Laboratory Pune, India

- Built a prototype robot which would travel inside pipes to detect irregularities using Canny Edge Detection.
- Designed a Voltage and Time Measurement System using microchip PIC which is 99.93 % more economical than the previous system.

Research Trainee **June 2018**
Korea Institute of Science and Technology Seoul, South Korea

- Selected among 20 students from India to complete a month long summer internship at KIST. Worked in the field of 2D Material Devices. As a part of project fabricated a 2D material diode under the supervision of Dr. Do Kyung Hwang.

Projects

Blending camera and 77 GHz radar sensing for equitable, robust plethysmography

- Observed through light transport analysis that the camera modality is fundamentally biased against darker skin tones. We propose to reduce this bias through multi-modal fusion with a complementary and fairer modality - radar.

Shift Robust Loss Function

- Formulated a loss function which is robust to misalignment in input and ground truth signals in various regression applications.

Heart Rate Estimation from Face Videos

- Devised a method to estimate heart rate from face videos, by measuring variance of red, green, blue light reflection changes from skin, which boosts the performance on darker skin tones.

Sign Language Recognition

- Acquired gestures of fingers for digits 0 to 9 in American Sign Language and recognised using Convolutional Neural Network.

Braille Communicator

- The image of document captured was converted into a text file using OCR, and was then sent to microcontroller driven actuators which represented the Braille dots.

Shortest path follower robot

- The robot was programmed to find the shortest path using Dijkstra algorithm on predefined grid avoiding static obstacles.

Skills

Programming Python, C/C++, Matlab, Octave
Frameworks Pytorch, OpenCV, Pandas, Scikit-learn, Pytesseract, NLTK, Numpy, Scipy, Matplotlib
Hardware Arduino, Microchip PIC, Image Signal Processor(ISP)

Publications

[1] Alexander Vilesov, Pradyumna Chari, Adnan Armouti, Anirudh Bindiganavale Harish, **Kimaya Kulkarni**, Ananya Deoghare, Laleh Jalilian, and Achuta Kadambi. "Blending Camera and 77 GHz Radar Sensing for Equitable, Robust Plethysmography". In: 41.4 (2022). ISSN: 0730-0301. DOI: 10.1145/3528223.3530161. URL: https://doi.org/10.1145/3528223.3530161.

[2] Pradyumna Chari, Krish Kabra, Doruk Karinca, Soumyarup Lahiri, Diplav Srivastava, **Kimaya Kulkarni**, Tianyuan Chen, Maxime Cannesson, Laleh Jalilian, and Achuta Kadambi. *Diverse R-PPG: Camera-Based Heart Rate Estimation for Diverse Subject Skin-Tones and Scenes*. 2020. arXiv: 2010.12769 [eess.IV].

[3] **Kimaya Kulkarni**, Apoorva Mahajan, Yash Zambre, Faisal Belwadi, Shreya Killedar, and Ashutosh Marathe. "Text Detection and Communicator Using Braille for Assistance to Visually Impaired". In: *2019 IEEE Pune Section International Conference (PuneCon)*. 2019, pp. 1–5. DOI: 10.1109/PuneCon46936.2019.9105829.

[4] Milind Patwardhan, **Kimaya Kulkarni**, Apoorva Mahajan, Yash Zambre, and Shreya Killedar. "Locomotion by Shortest Path and Obstacles Avoidance". In: *2019 IEEE Pune Section International Conference (PuneCon)*. 2019, pp. 1–4. DOI: 10.1109/PuneCon46936.2019.9105862.

Graduate Courses

Computer Vision, Computational Imaging, Large Scale Data Mining, Large Scale Social and Complex Networks: Design and Algorithms, Machine Learning and Data-Driven Modeling in Bioengineering, Special Topics in Signals and Systems: Decision-Making in Stochastic Systems

Achievements

2022 ICCP 2022 Poster Presentation
2022 Journal Paper accepted to ACM SIGGRAPH 2022
2018 IEEE Student Volunteer of the Year from IEEE Pune Section
2018 Among the top 50 in National Engineering Olympiad