

## EDUCATION

**MS**, Electrical and Computer Engineering, **University of California, Los Angeles (UCLA)**, GPA: 3.95/4.00  
**BTech**, Electronics and Telecommunication Engineering, **VIT Pune**, GPA: 9.21/10.00

**Sept 2021 — June 2023**  
**Aug 2016 — Oct 2020**

## SKILLS

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

## EXPERIENCE

### Software Engineering Intern, Camera Image Quality

**Jun 22 — Sept 22**

Rivian Automotive

Palo Alto, CA, USA

- Optimized object detection algorithms through tuning image quality parameters in image signal processor, resulting in 30% reduction in false positives and 5.8% increase in true positives

### Student Researcher

**May 20 — Present**

Visual Machines Group, UCLA

Los Angeles, CA, USA

- Developed Contactless Vital Signs Measurement systems under Prof. Achuta Kadambi's supervision. Designed unbiased algorithms in Computer Vision (Computational Imaging/Photography) domain. Published research in Siggraph22 and presented a poster at ICCP22

### Teaching Assistant

**Sept 21 — Present**

Physics and Astronomy Department, UCLA

Los Angeles, CA, USA

- Conducted physics lab sessions for UCLA students, teaching hypothesis testing, experiment design, and data analysis utilizing Arduino and Python
- Covered topics such as Sound, Circuits, and Geometric/Wave Optics.

### Project Intern

**Jul 19 — Dec 19**

High Energy Materials Research Laboratory

Pune, India

- Built a robot to detect pipe irregularities using Canny Edge Detection
- Created a cost-effective Voltage and Time Measurement System using microchip PIC with a 99.93% cost reduction compared to the previous system

## PROJECTS

### Multi-Class EEG Motor Imagery Classification

- Designed and optimized neural network architectures such as CNNs, RNNs(LSTM, GRU), VAEs, and Transformers for multiclass classification of EEG signals for motor imagery tasks improving the accuracy(74.09%) and identifying the best performing model
- Analyzed the impact of pre-processing and time duration on accuracy and compared results across individual subjects and the entire dataset

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

- Developed and implemented a novel debiasing framework for remote heart-rate monitoring using multi-modal fusion with radar to reduce camera modality bias against darker skin tones
- Analyzed light transport to uncover bias and achieved significant performance gains over tested baselines
- Open-sourced the largest multi-modal dataset of paired camera and radar measurements with focus on skin tone representation, contributing to the field of non-contact vital sign sensing

### Shift Robust Loss Function

- Devised a robust loss function to handle misalignment in input and ground truth signals in multiple regression applications
- Conducted loss estimation at all possible shifts and selected either maximum cross-correlation approach to determine the final loss value

### Heart Rate Estimation from Face Videos

- Formulated a novel physics-driven algorithm for contactless heart rate sensing from facial videos
- Engineered an algorithm to improve performance on darker skin tones, addressing biased performance of existing computer vision methods

## PUBLICATIONS

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- [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 Karınca, Soumyarup Lahiri, Diptav 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

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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, Decision-Making in Stochastic Systems, Physics and Informatics of Medical Imaging, Neural Networks and Deep Learning, Advances in Imaging Informatics, Theoretical Foundation of Reinforcement Learning, Algorithms in Bioinformatics