

Striving towards improving accessibility by building scalable solutions in the vision-language domain using Deep Learning, Computer Vision and Natural Language Processing.

## RESEARCH INTERESTS

Natural Language Processing, Computer Vision, Quality Diversity, Evolutionary Algorithms, Augmented Reality, Visual Reasoning

## EDUCATION

**Master of Science, Computer Science (Artificial Intelligence)**, University of Southern California **Aug 2021-May 2023**

**GPA: 3.47 / 4.0**

**Bachelor of Technology, Computer Science and Engineering**, Walchand College of Engineering **Aug 2015-May 2019**

**GPA: 8.79 / 10.00**

## EXPERIENCE

**Blackberry Corporation** **Oct 2022 - Present**  
Machine Learning Engineering Intern  
Los Angeles

- Detected and categorized malicious programs by developing machine learning models to identify threats to users.
- Built and maintained the treat analysis data sources by collaborating with the data engineering team.

**ICAROS Lab, USC** **May 2022 - Present**  
Voluntary Researcher  
Los Angeles

- Designed and executed experiments to train 8 different Quality Diversity Algorithms with customized reward signals in 6 reinforcement learning environments like “Slime Volley” and “Car Racing”.
- Analysed effects of learning rates on the optimal score in the RL environments
- Co-Author “Training Diverse High-Dimensional Controllers by Scaling Covariance Matrix Adaptation MAP-Annealing”

**Locomotor Control Lab, USC** **Jan 2022 - Present**  
Voluntary Researcher  
Los Angeles

- Enhanced VR Game developed to improved skilled locomotion for individuals with neurological impairments.
- Enabled enhanced analysis by randomizing all object locations with 0% loss of experiment repeatability.
- Introduced functionality to store additional user action data to analyze user responses at multiple granularities.

**METRANS Transportation Center, USC Sol Price School of Public Policy** **Jan 2022 - Oct 2022**  
Student Worker (Researcher)  
Los Angeles

- Added features to the METRANS student website to increase student engagement on the website by 10%.
- Developed 3 game scenes for a game using Unity to educate kids about public transportation in LA County.

**Textify AI** **Nov 2021- Dec 2021**  
Natural Language Processing Intern  
Remote

- Optimized generative pre-trained (GPT-NEO) NLP model to auto-generate Natural language content for academic research proposals.
- Improved sentence acceptance rate by 14.7% by enhancing synonym suggestions.

**Dassault Systèmes Solutions Lab** **June 2019-Jul 2021**  
Software Engineering Specialist  
Pune, India

- Increased product usage across organization by 63% by revamping the front end for the Lifecycle Management Service in the CI / CD Pipeline.
- Designed a prototype using NLP and Machine Learning to recommend QA testing scenarios using software requirements specification documents.
- Promoted to Software Engineering Specialist from R & D Development Associate position.

**Tata Consultancy Services Research and Innovation** **Dec 2018-Apr 2019**  
Research Intern  
New Delhi, India

- Created Novel Metric to analyze Temporal Coherence of labels placed in videos for AR Applications.
- Introduced optical flow to give upto 50x Temporal Coherence improvement for the labels placed in the videos.
- Co-authored “SmartOverlays” published in WACV 2020.

## PUBLICATIONS

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- **Training Diverse High-Dimensional Controllers by Scaling Covariance Matrix Adaptation MAP-Annealing**  
PrePrint.  
Authors: Bryon Tjanaka, Matthew C. Fontaine, **Aniruddha Kalkar**, Stefanos Nikolaidis
- **SmartOverlays: A Visual Saliency Driven Label Placement for Intelligent Human-Computer Interfaces**  
IEEE Winter Conference on Applications of Computer Vision (WACV).  
Authors: Srinidhi Hegde, Jitendra Maurya, **Aniruddha Kalkar**, Ramya Hebbalaguppe

## PROJECTS

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### Multi-Teacher Knowledge Distillation for Visual Question Answering Systems

- Designed a light-weight model for VQA systems using ALBEF and VisualBERT as teachers in a multi-teacher setup.
- Model size reduction up to 65x and upto 8x inference speed increase as compared to the teacher models.

### UI Template Image to Code Generation

- Constructed a template UI code generating system from input screenshots or photos of GUIs
- Reduced code writing time by average 23.4 mins per web page.

### Face sketch To Photo-Realistic Image Generation

- Spearheaded the creation of system to generate photo-realistic images from hand-drawn face sketches as well as predict age groups of people from sketches
- Achieved 77.65 % similarity with original image and 87.38% accuracy for age group prediction.

### Toxic Comment Classification

- Analysis and Classification of social media comments into 6 different levels of toxicity
- Applied Recurrent Neural Networks to classify Word embedding from social media comments .

### Driver Distraction Detection

- Designed and created a driver distraction recognition and notification program based on a live video capture
- Attained 91.08% accuracy for the 10 pre-determined distractions.

## LEADERSHIP AND INVOLVEMENT

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### Personality Advancement Circle of Engineers, Walchand College of Engineering

May 2018 - Dec 2018

Chief Program Director of Publicity

Sangli, India

- Managed a team of 5 people in-charge of publicity in the engineering colleges in Sangli, India.
- Member of the organizing committee for 3 events with 100+ participants from 5 different colleges across Sangli, India.
- Organized 5+ events in Walchand to improve the communication skills for upcoming engineers.

### New Pune Gymkahana

May 2013 - Jul 2021

Sports Coach

Pune, India

- Managed workload for coaches at the club for 50 kids in the age range of 8 to 16.
- Trained coaches to teach the basics of various Gymnastics, Yoga and Strengthening activities.
- Trained Professional Mallakhamb players from the age groups of 10 to 16.

## TECHNICAL SKILLS

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<b>Languages</b>	Python, javascript, C/C++, Java, C#, HTML, CSS
<b>Libraries &amp; Frameworks</b>	TensorFlow, Pytorch, Keras, OpenCV, matplotlib, Flask, Django
<b>Databases</b>	MySQL, MongoDB
<b>Tools</b>	AWS, Google Cloud Platform, AWS Sagemaker
<b>Others</b>	Computer Vision, Natural Language Processing, Data Visualization, Game Development

## HONORS AND AWARDS

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2018	Smart India Hackathon ( <b>Finalist</b> )
2018	AWS Deep Learning Hackathon IIT Madras ( <b>Finalist</b> )
2017	IIT Bombay's E-yantra ( <b>Semi-Finalist</b> )