

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

EXPERIENCE

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

- Created Automated pipeline for training and evaluation of 2 machine learning models to detect malicious software on MacOS and Windows.
- Developed efficient, multi-threaded algorithms for processing of more than 2 Million large files.

ICAROS Lab, USC **May 2022 - Dec 2022**
Volunteer 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 8 different RL environments.
- Co-Authorred "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

- **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

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

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 Gymkhana

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

Languages	Python, Javascript, C/C++, Java, C#, HTML, CSS, Angular.js, Node.js, React.js
Libraries & Frameworks	TensorFlow, Pytorch, Keras, OpenCV, matplotlib, Flask, Django
Databases	MySQL, MongoDB, DynamoDB, AWS S3
Tools	AWS SageMaker, AirFlow, MLFlow, Prefect, AWS Batch, AWS EC2, Google Cloud Platform, JIRA
Others	Computer Vision, Natural Language Processing, Data Visualization, Game Development

HONORS AND AWARDS

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