KSHITIJ PARIKH

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Education

Indian Institute of Technology, Jodhpur **July 2019 – May 2024**
B.Tech in Computer Science and Engineering, CGPA ***8.03/10*** *Jodhpur, Rajasthan*

Bright VIP School **June 2017 – May 2019**
Higher Secondary Education, GSEB, Percentage: ***88.77 %*** *Vadodara, Gujarat*

Bright Ambalal School **May 2017**
Secondary Education, GSEB, Percentage: ***89.86 %*** *Vadodara, Gujarat*

Publications

Composite Sketch + Text Queries for Retrieving Objects with Elusive Names and Complex Interactions
Prajwal Gatti, ***Kshitij Parikh****, Dhriti Prasanna Paul, Manish Gupta, Anand Mishra*
In Proceedings of AAAI Conference on Artificial Intelligence 2024

Research Interests

Artificial Intelligence, Computational Cognitive Science, Computational Neuroscience, General Purpose AI Systems

Research Experience

General Purpose AI Systems and Embodiment | ***Independent Research*** **Since Oct 2023**

- Laying out the map for what is missing for developing general-purpose AI systems.
- Exploration of the history of AI and why generalization has eluded us?
- Formulating multiple hypotheses on what intelligence is, and how can general-purpose AI systems be built and tested.

Multi Modal (Sketch + Text) Query Image Retrieval | ***Dr. A Mishra*** — *IIT Jodhpur* **Jan 2022 - Aug 2023**

- Developed methods to deal with multiple modalities and their alignment for image retrieval from large systems.
- Curated a novel database for the Sketch + Text-Based Image Retrieval.
- Gained hands-on experience in creating novel task-specific architectures especially single-encoder early fusion and multi-encoder late fusion models.
- The work led to the **SOTA results** by a significant margin. This led to a publication in **AAAI 2024 (A* Venue).**

Automatic Speaker Verification and Spoofing Counter Measures | ***Dr. R Singh*** — *IIT Jodhpur* **Jun - Jul 2021**

- Analysed the SOTA Machine Learning algorithms for audio forgery detection.
- Implementation of diverse TTS models for audio deepfake generation for adversarial training which led to the classification model improving performance by 23 percent.
- Hands-on experience with NVIDIA DGX2.
- The continuation of the work led to **real life application for Delhi Police.**

Projects

Characterizing Computational Similarity in Task-Trained Recurrent Networks | ***NeuroMatch*** **July 2024**

- Analyzed how dynamics between GRU-RNNs, LSTMs, and Neural ODEs trained for a low complexity task namely 3-bit flip flop differ.
- Analyzed how dynamics between GRU-RNNs, LSTMs, and Neural ODEs trained for more complex tasks namely Random Target.
- Formed an understanding of how different recurrent networks and their dynamics relate to varying task complexity.

Implementation of Predictive Vision Model (PVM) | ***Dr F. Piekniewski*** **May - July 2024**

- Implemented Predictive Vision Model, a hierarchical vision model with extensive feedback and lateral connections that intakes continuous temporal visual data in online form trained in an unsupervised way.
- The work was a step towards understanding and building embodied AI systems that have extensive feedback connections and are inspired by contemporary neuroscience to do real-time critical tasks. The model is trained in a task-agnostic manner and predicts the compression of future expected input.

A SfM and NeRF Pipeline for High Fidelity 3D Scene Understanding | ***Dr. P Mazumder*** **Mar - May 2024**

- Merged SfM and NeRF techniques, leveraging SfM for initial scene reconstruction from sparse images and refining it with NeRF for enhanced realism.

- Overcame limitations such as occlusions, textureless areas, and varying lighting conditions, providing an integrated solution for accurate and detailed 3D scene reconstruction. It was the **best course project.**

Blood Cell Classification and Malaria Detection | ***Dr. Mayank Vatsa*** — *IIT Jodhpur* **Mar - May 2022**

- Explored transfer learning for blood cell classification task and malaria detection using ResNet-50 pre-trained on ImageNet dataset.

Technical Skills

Programming Languages: Python, C, C++, MATLAB, SQL
Libraries: Pytorch, Tensorflow, Numpy
Technologies/Frameworks: GitHub, CUDA, Docker, Kubernetes

Relevant Coursework

- Real Analysis and Multi-Variable Calculus
- Linear Algebra and Ordinary Differential Equation
- Probability, Statistics and Stochastic Process
- Maths for Computing
- Pattern Recognition and Machine Learning
- Optimization for Machine Learning
- Machine Learning for Big Data
- Deep Learning
- Natural Language Processing
- Computer Vision
- Dependable AI
- Speech Processing
- Introduction to Cognitive Neuroscience
- Computational Cognitive Neuroscience

Teaching Experience

- I was the Teaching Assistant for the Computer Network course, which had a class size of 180+ and was taught to 3rd—and 4th-year Bachelor students. My responsibilities included conducting quizzes/class tests, checking papers, and conducting lab sessions.

Academic Achievements

- Completed **NeuroAI 2024 course, the first batch** from Neuromatch academy. It covered topics such as generalization, methods to compare ANNs and Biological Networks, Micro and Macro circuits, Micro and Macro learning, and consciousness.
- 5th Rank in Computer Vision hackathon conducted by Prithvi.AI for object localization of defects in silk clothes.
- Secured Global Rank 62 among 30,000 others in Codeforces April 2021 Long Challenge
- Secured **AIR-2998** in JEE Advanced 2019 out of 2 lakh students and **AIR-1777** in JEE Mains 2019 out of 10 lakh students
- Qualified for **Regional Mathematics Olympiad Gujarat 2017 and 2018**.
- Secured **492 rank** in **Gujarat for Science Stream in mathematics in 2019 for 12th standard - Higher Secondary Education**.
- Acheived **99.26 percentile** in 2019 in **Gujarat for 12th standard - Higher Secondary Education**
- Acheived **99.45 percentile** in 2017 in **Gujarat for 10th standard - Secondary Education**
- Qualified first round of **Indian National Chemistry Olympiad(INChO) 2018** and **Indian National Astronomy Olympiad(INAO) 2018**.
- Excellent performance at **East Africa Round 2014** in **Nairobi, Kenya**, and **Global Junior Round 2014** in **Singapore**.
- Qualified for **the final round** of **World Scholar's Cup Tournament of Championship 2014** at **Yale University, Connecticut**. I was one of the only two teams to qualify from my school that year.
- Pursued **French** as a second language during secondary school from Grade 6 to Grade 9

Leadership / Extracurricular

Ignus, Marketing Team **Jan 2020 – Feb 2020**

Core Team Member *Indian Institute of Technology, Jodhpur*

- As a two-member brought **highest sponsorship** of the net amount of **Rs.1,15,000** for the college's cultural fest which was more than 11 times the team average of Rs.10,000.
- As a two-member made **cold calls** to more than **50 possible sponsors** for the college's cultural fest and **visited personally** more than 20 possible sponsors in multiple visits all of whom were located **30+ kms away.**

Alumni and Industry Day **Jan 2020 – Jan 2020**

Personal Attendant *Indian Institute of Technology, Jodhpur*

- Performed my duty as the **personal attendant** for a whole day to Commander Pradeep Prasad, who served the Indian Navy for 21 years and was the Governing Council Member IIT Alumni Centre at that time. I was acknowledged by Commander Pradeep Prasad that it was **one of the most pleasant experiences** in his **more than 3 decade long career**.