Ankur Sikarwar

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Education

Birla Institute of Technology, Mesra — Ranchi, India
Bachelor of Engineering | Electronics & Communication — *Grad. June 2021 (Expected)*

Chinmaya Vidyalaya — Bokaro Steel City, India
Intermediate/+2 | CBSE — *Grad. May 2016*

St. Xavier's School — Bokaro Steel City, India
Matriculation | ICSE — *Grad. May 2014*

Experience

Kreiman Lab, Harvard Medical School — January 2021 – Present
Remote Research Student | Advisor: Prof. Gabriel Kreiman — *Boston, USA*

- Working on biologically inspired computational models of visual attention

Birla Institute of Technology, Mesra — July 2020 – Present
Undergraduate Research Student | Advisor: Prof. Swati Prasad — *Ranchi, India*

- Working on Neuro-symbolic models to incorporate compositional reasoning in Visual Question Answering tasks
- Exploring different techniques to disentangle object attributes for better physical scene understanding
- Developing more efficient techniques to predict programs from natural-language questions in VQA models
- Working on synthetic datasets that can be used as a testbed for visual reasoning models

IIIT Hyderabad – Centre for Visual Information Technology — May 2019 – July 2019
Summer Research Intern | Advisor: Prof. Avinash Sharma — *Hyderabad, India*

- Developed and tested an end-to-end pipeline for reconstructing textured 3D model of a human from few RGB frames of a video
- Worked with MANO model to generate 3D models of hand by random sampling of pose and shape parameters
- Developed a GUI toolkit for pre-processing and generation of 3D human data
- Contributed to 3D human body models dataset using state of the art scanning facility

Science Canvas — April 2018 – May 2018
Data Science Intern | Mentor: Neha Jaiswal — *Remote Work*

- Worked on different outlier detection algorithms like Z-Score, Dbscan, and Isolation Forests
- Carried out Exploratory Data Analysis and Visualization on NASA Lab Facilities dataset and Abalone dataset
- Developed a GUI application for live Forex data analysis and visualization

Research Projects

Neuro-Symbolic Visual Reasoning — July 2020 – Present

- Developing interpretable models for visual question answering via disentangled representation of visual scenes
- Exploring beam search algorithm for accurate generation of structured programs from natural-language questions
- Working on techniques to incorporate knowledge bases in VQA models for better reasoning
- Using Blender Python API to generate realistic scenes for evaluating different visual reasoning models

Real-Time Biometric Verification System Using Face Embeddings — February 2020 – July 2020

- Worked on an interactive biometric verification application based on facial recognition
- Implemented and trained Inception-Resnet v1 model for predicting 512 dimensional face embeddings
- Integrated Zero-DCE model in the pipeline for low-light image enhancement
- Developed a cross-platform interactive UI for the system

3D Reconstruction of Human Bodies Using Deep Learning — May 2019 – July 2019

- Worked on a deep learning-based model to infer 3D shape of people from a monocular video
- Integrated CMU's OpenPose in the 3D Reconstruction pipeline for predicting joint locations of humans
- Integrated PGN semantic segmentation pre-processing step in the pipeline
- Worked on texture stitching and mapping for the reconstructed 3D models

Personal Projects

TetraChrome Lenses October 2018 – December 2018

- Developed a portable device that used computer vision algorithms to assist visually impaired people via audio and haptic feedback
- Implemented face recognition feature based on Google's paper "FaceNet: A Unified Embedding for Face Recognition and Clustering"
- Worked on an online triplet mining algorithm to train the model on VGGFace2 dataset using Triplet Loss function
- Project won the 1st Place at Siemens MakeIT Real Hackathon 2018

FOCUS November 2018 – January 2019

- Developed a smart glass with gaze controlled interface for assisting people suffering from ALS
- Developed and trained a CNN model for real-time gaze region estimation
- Implemented MQTT protocol for communication between different modules of the device
- Project was shortlisted among 41 teams internationally to be presented at Bengaluru Tech Summit 2019

Moon Dust: Now We Can See You October 2019 – November 2019

- Worked on a multi-node network of sensors for detection and monitoring of lunar dust density in spacecrafts
- Improved the system using an adaptive algorithm for implementing sleep-wake cycles in nodes for efficient power consumption
- Developed a smart data collection architecture based on MQTT protocol
- One of the 20 projects that were nominated to the global round of judging for the 2019 NASA International Space Apps Challenge (Virtual Participation)

Publications

Real-Time Biometric Verification and Management System using Face Embeddings
Ankur Sikarwar, Himanchal Chandra, Indradeo Ram
Accepted at 17th IEEE India Council International Conference

Technical Skills

Languages: Python, C/C++, MATLAB, GNU Octave
Frameworks: PyTorch, Tensorflow
Libraries: NumPy, OpenCV, Matplotlib, fastai, pandas
Technologies: Git, LaTeX, Shell Utilities, React, Blender, Google Cloud Platform, Microsoft Azure
Hardware: Raspberry Pi, Odroid, Arduino, NodeMCU

Awards

iHack Alpha: AI-Enabled Solutions	Among Top 8 Finalists (globally)
2019 NASA International Space Apps Challenge	Global Nominee
Siemens MakeIT Real Hackathon	1st Place
Bengaluru Tech Summit Humane Code (total 2700 teams)	Among Top 41 teams globally
2019 Microsoft Codefundo++ (BIT Mesra)	3rd Place
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Eureka - Technical Project Presentation	1st Place
Robotics Quiz - Pantheon	1st Place

Relevant Coursework

Fundamentals of Data Structure, Data Structure Lab, Control Theory, Engineering Mathematics, Digital Signal Processing, Neural Networks and Fuzzy System, Intelligent Instrumentation, Computer Networking, Machine Learning*, Neural Networks and Deep Learning*, Improving Deep Neural Networks*, Stanford's CS231n: Convolutional Neural Networks for Visual Recognition*, MIT's 18.06 Linear Algebra*, Information Theory and Coding, Probability Models and Stochastic Processes (* = Online)