

SURAJ KOTHAWADE

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EDUCATION

University of Texas at Dallas

M.S, Computer Science, GPA: 3.86/4.0

Advisor: Prof. Rishabh Iyer

University of Southern California

MS, Computer Science, GPA: 3.7/4.0

Advisor: Prof. Stefanos Nikolaidis

SGGS Institute of Engineering & Technology

B.Tech, Computer Science & Engineering, GPA: 8.93/10.0

(Aug'19 - May'21)

(Jan'19 - Aug'19)

(July'14 - June'18)

FIELDS OF INTEREST

Artificial Intelligence, Machine Learning, Deep Learning, Computer Vision, Natural Language Processing

WORK EXPERIENCE

University of Texas at Dallas

Teaching Assistant

(Aug'19 - May'20)

- Fall 2019, Spring 2020: CS 4348 - Operating Systems

University of Southern California, Los Angeles, CA

(Jan'19 - Aug'19)

Research Assistant

- Robotic Lime Picking using Cost-Based APF-RRTs by Modelling Leaves as Penetrable Obstacles, Under review at **ICRA 2021**
- Learning Collaborative Action Plans from YouTube Videos — [ISRR 2019](#)

Aitoe Labs

(Apr'18 - Dec'18)

Machine Learning Engineer

- Implemented algorithms for analyzing big data from 500+ CCTV cameras in Bhopal(IN) to deliver person search, face search, face recognition and text search for the state police department in Madhya Pradesh.

INTERNSHIPS

NVIDIA, Santa Clara, CA

(May'20 - Present)

AI Research Intern

- Devised and implemented a Deep Template Matching algorithm that efficiently mines for semantically similar images based on a region of interest in a query image. (Patent filed and Paper due to be submitted to **CVPR 2021**)

Indian Institute of Technology, Bombay

(Dec'17 - Dec'18)

Research Intern

- Worked with *Prof. Ganesh Ramakrishnan* on developing machine learning models to solve computer vision problems in CCTV videos.
- Delivered Compliance and Quality Monitoring System for the **Ministry of Rural Development**: [video](#)
- Research on Domain Specific Video Summarization: [arXiv-preprint](#)
- Developed an Open Source toolkit for Visual Data Subset Selection and Summarization using Submodular Functions: [arXiv-preprint](#) [GitHub](#)

Indian Institute of Technology, Bombay

(May'17 - July'17)

Research Intern

- Worked with *Prof. Deepak B. Phatak (Fundamental Research Group)* on the project: *Event Logging and Content Version System*
- Developed a module that would facilitate imperative Events to be stored in a Local DB and synchronize back up to cloud servers, maintained versions of DB, Analyze DB to using Machine Learning to make indispensable business decisions and construct visualizations.
- Project Link: [drupal-logger](#)
- Project Report: [Event Logging and CVS](#)

Tata Consultancy Services, Innovation Labs, Mumbai

(Dec'15 - Jan'16)

Research Intern

- Worked on project *Mobile Security For Visually Impaired* based on Human Computer Interaction
- Used research methodologies like Contextual Inquiries and Affinity Diagrams to identify significant challenges faced by the visually impaired.

KEY PROJECTS

Massive scale search and recognition (Bhopal Police, Madhya Pradesh, India) (Aug'18 - Dec'18)

- Designed machine learning pipeline and system architecture.
- Implemented person search, face search, face recognition and text search.
- Solved engineering problems like scheduling tasks efficiently to GPUs, storage and retrieval of huge metadata for quick search.

Compliance and Quality Monitoring System (Ministry of Rural Development) (Dec'17 - July'18)

- Lead a team of four people to deliver the following compliances:
- Predict if a Class has Started or Not. (Implemented Handcrafted features for higher accuracy)
- Classroom Attendance - Person Count. (Used various object detection models and classical ML techniques)
- Uniform Detection. (Used multi-class customized YOLOv2 on edge devices)

CBIR on AWiFS Data from Large Satellite Image Repository (Indian Space Research Organization) (Dec'17 - July'18)

- Devised Dynamic Semantic Segmentation algorithm to identify Water bodies and Burnt Areas from the satellite image based on multiple algorithms.
- Worked extensively on the Analytics including Machine Learning, Feature Engineering and Code Optimization.

Application of DCNN to Prevent ATM Fraud by Facial Disguise Identification (Feb'17 - Nov'17)

- Used Deep Convolutional Neural Network (DCNN) to create a model to classify disguised partially disguised and undisguised faces.
- Used Tensorflow to train DCNN based model on a diverse dataset of faces and analyzed results using activations.
- Optimized accuracy till 90.5% by using stochastic optimization, varying learning rate and momentum.

RESEARCH PAPERS

- Deep Submodular Networks for Extractive Data Summarization, Under review at **SDM 2021** — [arXiv-preprint](#)
- A Unified Framework for Generic, Query-Focused, Privacy Preserving and Update Summarization using Submodular Information Measures, Under review at **AAAI 2021** — [arXiv-preprint](#)
- What Makes a Good Video Summary? Leveraging Fairness for Realistic Video Summarization, Under review at **AAAI 2021** — [arXiv-preprint](#)
- Realistic Video Summarization through VISIOCITY: A New Benchmark and Evaluation Framework — [ACM MM 2020](#)
- A Framework towards Domain Specific Video Summarization — [WACV 2019](#)
- Learning From Less Data: A Unified Data Subset Selection and Active Learning Framework for Computer Vision — [WACV 2019](#)
- Demystifying Multi-Faceted Video Summarization: Tradeoff Between Diversity, Representation, Coverage and Importance — [WACV 2019](#)
- Vis-DSS: An Open-Source toolkit for Visual Data Selection and Summarization — [arXiv-preprint](#)
- Learning Collaborative Action Plans from YouTube Videos — [ISRR 2019](#)
- Content Based Image Retrieval from AWiFS Images Repository of IRS Resourcesat-2 Satellite Based on Water Bodies and Burnt Areas — [arXiv-preprint](#)
- Deployment of Customized Deep Learning based Video Analytics On Surveillance Cameras — [arXiv-preprint](#)
- Application of Deep Convolutional Neural Network to prevent ATM fraud by facial disguise identification — [IEEE ICCIC 2017](#).
- Effective Water Management For Greenland Using Soil Humidity Sensor, IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems — [IEEE ICPEICES 2016](#).
- Contributed to Coping with Accessibility Challenges for Security — A User Study with Blind Smartphone Users, Human-Computer Interaction — **INTERACT 2017**, pp 3-22

PATENTS

- Deep Template Matching, provisional patent filed with NVIDIA

PROFESSIONAL ACTIVITIES

- Program Committee Member for AAAI 2021

IMPORTANT COURSES UNDERTAKEN

- **UT Dallas:** Machine Learning, Optimization in Machine Learning, Algorithm Design, Database Design
- **USC:** Deep Learning, Analysis of Algorithms
- **SGGSIE&T, Nanded:** Artificial Neural Networks, Machine Learning, Data Structures, Design & Analysis of Algorithms, Discrete Mathematics, Distributed Computing, Linear Algebra, Differential Equations.
- **Coursera:** deeplearning.ai Specialization, UMich: Python Programming Specialization(Core Python, Databases, Networking), UCSD: Data Structures and Performance(97.0/100), UCSD: Object Oriented Programming in Java (98.5/100), Rice : Interactive Programming in Python(98.0/100)
- **NPTEL:** IIT Kharagpur: Machine Learning & Neural Networks, IIT Madras: Operating Systems, CMI Chennai : Algorithms, IIT Kanpur: Theory of Computation, IISC Bangalore: Compiler Design & Optimization
- **NVIDIA:** Deep Learning using CUDA (Workshop)

TOOLS & LIBRARIES

- **Languages:** C, C++, Python
- **Frameworks:** PyTorch, Tensorflow, Caffe, Keras, OpenCV

ACHIEVEMENTS & AWARDS

- **Best Student Award** 2018 by Tata Sons. (Awarded to 1 out of 630 students across all engineering departments)
- **Best Student Project Award** 2018 by Tata Sons. (Awarded to 1 out of 30 projects across all engineering departments - Only student to receive both the awards since 1981)
- **Best Paper Award** at 2017 IEEE International Conference on Computational Intelligence and Computing Research (ICCIC).
- Qualified for onsite regionals of **ACM ICPC** for Amritapuri Regionals in 2017.
- Ranked 1st/160 in Computer science & Engineering department in Junior year & Cumulatively ranked 2nd/160.