SURAJ KOTHAWADE

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EDUCATION

University of Texas at Dallas *(Aug'19 - Aug'23)*
Ph.D, Computer Science, GPA: 3.8/4.0
Advisor: Prof. Rishabh Iyer

University of Southern California *(Jan'19 - Aug'19)*
MS, Computer Science, GPA: 3.7/4.0

SGGS Institute of Engineering & Technology *(July'14 - June'18)*
B.Tech, Computer Science & Engineering, GPA: 8.93/10.0

FIELDS OF INTEREST

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

WORK EXPERIENCE

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

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 Summarizartion 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 architechture.
- Implemented person search, face search, face recognition and text search.
- Solved engineering problems like scheduling tasks efficiently to GPUs, storage and retrieval of hugemetadata 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 algortihm 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

- A Framework towards Domain Specific Video Summarization, Winter Conference on Applications of Computer Vision (**WACV 2019**) — arXiv-preprint
- Learning From Less Data: A Unified Data Subset Selection and Active Learning Framework for Computer Vision, Winter Conference on Applications of Computer Vision (**WACV 2019**) — arXiv-preprint
- Demystifying Multi-Faceted Video Summarization: Tradeoff Between Diversity,Representation, Coverage and Importance, Winter Conference on Applications of Computer Vision (**WACV 2019**) — arXiv-preprint
- 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 International Conference on Computational Intelligence and Computing Research (**ICCIC 2017**).
- Effective Water Management For Greenland Using Soil Humidity Sensor, IEEE International Conference on Power Electronics, Intelligent Control and Energy Systems (**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

IMPORTANT COURSES UNDERTAKEN

- **UT Dallas:** Machine Learning, Algorithm 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 Banglore: 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 **1**st**/160** in Computer science & Engineering department in Junior year & Cumulatively ranked **2**nd**/160**.