

# SURAJ KOTHAWADE

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## EDUCATION

*Bachelor of Technology - Computer Science & Engineering (8.94/10.0)* (July'14 - June'18)  
Shri Guru Gobind Singhji Institute of Engineering & Technology (SGGSIE&T), Nanded, India

## FIELDS OF INTEREST

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

## WORK EXPERIENCE

**Aitoe Labs** (Apr'18 - Ongoing)  
**Machine Learning Engineer**

- Working on analyzing gargantuan amount of data from 500+ 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 - Ongoing)  
**Research Intern**

- Working 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](#)
- Working on Domain Specific Video Summarization: [arXiv-preprint](#)
- Working on 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 - Ongoing)

- Implementing person search, face search, face recognition and text search.
- Designing machine learning pipeline and system architecture.
- Working on 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 compliance.
- 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

- 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)
- Demystifying Multi-Faceted Video Summarization: Tradeoff Between Diversity, Representation, Coverage and Importance, Winter Conference on Applications of Computer Vision (WACV 2019)
- Vis-DSS: An Open-Source toolkit for Visual Data Selection and Summarization — [arXiv-preprint](#)
- 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

- **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)
- **Udacity:** Google: Introduction to Machine Learning, Deep Learning by Google
- **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(advanced), C++(advanced) Python(advanced), Java(Advanced) PHP(beginner), Javascript(beginner)
- **Frameworks:** Tensorflow, caffe, keras, OpenCV

## ACHIEVEMENTS

- **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<sup>st</sup>/160** in Computer science & Engineering department in Junior year & Cumulatively ranked **2<sup>nd</sup>/160**.
- Awarded **1<sup>st</sup>** runner up prize at APOGEE 2016, BITS Pilani's Apogee Innovation Challenge Competition in collaboration with Schneider Electric, India.
- Won My Green Idea Competition at BITS, Goa and was awarded an opportunity to work with Imagine Panaji, Government of Goa.
- Awarded Best Paper Award at E-Paper, SGGSIE&T, Nanded.
- Awarded **2<sup>nd</sup>** Best Project in Software Development Competition 2016, SGGSIE&T, Nanded.
- Awarded **2<sup>nd</sup>** Prize at Innovative Apps & Appliances, SGGSIE&T, Nanded.
- My team Glock was ranked **549** in 2016 and **551** out of more than 32000 teams in TCS CodeVita 2016 and 2017 respectively.
- Represented University Badminton Team for 4 consecutive years at a National level.