

# Akshay Khare

☎ (+91) 9011298642 • ✉ akshaykhare.1997@gmail.com • 🌐 akshay-d-khare.github.io  
in akshaydkhare

## Education

### Indian Institute of Technology Madras (IIT Madras)

2015-2020

Integrated Masters Degree: M.Tech. in Data Science + B.Tech. in Ocean Engineering

Chennai, IN

GPA: 9.30/10

- Ranked **first** among undergraduate department cohort. Recipient of **three** awards for academic excellence.
- Among top 25 students selected to pursue the interdisciplinary dual degree programme in **Data Science** from a batch of 800+ undergraduates

## Publications

Phil Scarf, **Akshay Khare**, Naif Alotaibi, "[On skill and chance in sport](#)", *IMA Journal of Management Mathematics*, Volume 33, Issue 1, January 2022, Pages 53–73, Oxford University Press

## Experience

### Industry

#### Machine Learning Engineer, Maverick Quantum (mavQ)

Jun 2022 - present

#### Machine Learning Engineer, MTX Group

Aug 2020 - May 2022

Core member of the Innovation Team. mavQ is an independent AI company launched by MTX Group

Hyderabad, IN

- Part of the team that built a **Document AI** system for key-value pair extraction that serves many **U.S. government agencies**. This involved developing a transformer based **NER** model and a novel deep learning architecture for **entity detection and linking**
- Led the development of computer vision use cases in the Sports AI team: Built a robust pipeline of custom-trained, state-of-the-art **object detection and tracking** models and homography analysis to extract player trajectories from sports videos
- Built a virtual jersey try-on application for FC Dallas, a leading **professional soccer club** in the U.S.
- Developed an approach utilizing **pose estimation** to classify the scoring mode in basketball videos with an F1-score of 90.2%

## Research

### Learning Multiple Diverse Classifiers for Adapting to Label-Dependent Distribution Shift

Aug 2019 - May 2020

Masters Thesis — Advisor: [Prof. Harish Guruprasad](#), Computer Science Department, IIT Madras

Chennai, IN

- Designed a novel **domain adaptation** approach that does not require data from test domain, and involves simultaneously training multiple performant, yet diverse classifiers
- Formulated **novel loss functions** to introduce diversity by promoting orthogonality among the trained classifiers, leading to test accuracy uplift of 25% for certain types of biases in the training data
- Experimented with multiple ways of constraining the convolutional filter weights for training multiple diverse CNNs

### Statistical Modelling in Sports

May 2019 - Jul 2019

Research Assistant, University of Salford, UK — Advisor: [Prof. Philip Scarf](#)

Manchester, UK

- Developed multiple statistical models for predicting Australian Football League scores by proposing novel formulations for incorporating team attack and defense strengths, home advantage and score dependence
- Estimated parameters by maximizing discounted log-likelihood; achieved one-month-ahead result forecasting accuracy of 69%
- **Published a paper** that proposes a broad framework to study outcome uncertainty across a wide range of sports

## Internships

### Computer Vision Intern, Oneirix Labs

Dec 2018 - Jan 2019

Winter Internship in Computer Vision

Pune, IN

- Implemented YOLOv3 for detection of vehicles in CCTV video footage and devised an image similarity metric using a combination of color histogram and HOG features for tracking the vehicle of interest
- Developed a framework to obtain the distribution of vehicles idling at traffic signals to design smart traffic management strategies

### Data Science Intern, Cytel Statistical Softwares & Services

May 2018 - Jul. 2018

Summer Internship in Machine Learning

Pune, IN

- Preprocessed customer support email text data using NLP techniques like stop-words removal, lemmatization and POS tagging
- Built a bag-of-words model and utilized the TF-IDF scheme to extract words with high discriminatory power
- Achieved content-based email classification with an F-1 score of 92.2% for improved efficiency of customer support

## Curricular Projects

### Sequence-to-Sequence Modeling for Text Transliteration

Course: *Deep Learning*

Mar 2019

IIT Madras

- Developed a sequence-to-sequence model using encoder-decoder architecture with bi-directional LSTM in Tensorflow
- Implemented multiple regularization measures and achieved 88.65% accuracy in English to Hindi transliteration

### Face Verification Classifier

Course: *Data Analytics Lab*

Oct 2018

IIT Madras

- Performed face detection using Haar Cascades and employed mean thresholding for adapting to varying illumination conditions
- Trained SVM classifier on eigenfaces features to verify if a pair of faces belongs to the same person achieving 94.2% F-1 score

### Product Analytics in Retail Banking

Course: *Decision Models*

Mar 2018

IIT Madras

- Performed customer segmentation by employing cluster analysis on customers' profit score and response probability
- Formulated and solved a constrained integer linear programming problem to maximize profit for segmented customers

## Relevant Academic Coursework

- **Machine Learning:** Deep Learning, Introduction to Data Analytics (Machine Learning), Data Analytics Lab, Big Data Lab
- **Probability and Statistics:** Probability, Statistics and Stochastic Processes, Decision Models, Mathematical Foundations of Data Science, Statistical Design and Analysis of Experiments
- **Mathematics:** Linear Algebra, Optimization, Operations Research, Mathematical Finance, Functions of Several Variables (Multivariate Calculus), Series and Matrices, Differential Equations
- **Online Certifications:** Machine Learning Engineering for Production (MLOps)

## Skills and Tools

- **Programming Languages and Tools:** Python, R, C, Git, Docker,  $\text{\LaTeX}$
- **Machine Learning Frameworks:** PyTorch, Keras, OpenCV, scikit-learn, Flask, KServe, AWS Cloud

## Academic Achievements

### Goodearth Shipbuilding Pvt Ltd Prize

Convocation Ceremony, IIT Madras

Oct 2020

Chennai, IN

Awarded a **medal for the best academic performance** in the academic years 2015-2020 among undergraduate department graduands

### Institute Merit Prize

Institute Day, IIT Madras

Apr 2019

Chennai, IN

Awarded a **medal for securing highest grades** in the academic year 2017-2018 in the undergraduate department batch

### Ms. Latha and Sampath Srinath Prize

Institute Day, IIT Madras

Apr 2018

Chennai, IN

Awarded a **medal for securing highest grades** in the academic year 2016-2017 in the undergraduate department batch

## Services and Extracurricular Activities

### Technical Reviewer

Book: *The Python Workshop*, Packt Publications

Aug 2019 - Sep 2019

- Technically scrutinised and provided feedback on the accuracy, relevance, and clarity of the book's content on Python programming, particularly for machine learning applications

### Technical Content Creator

Book: *The Data Wrangling Workshop*, Packt Publications

Mar 2020 - Apr 2020

- Designed 130 multiple-choice questions intended for specific learning outcomes in a wide range of topics in Python programming

### Academic Mentor

Academic Buddy Programme, IIT Madras

Aug 2017 - Nov 2017

- Conducted doubt resolving sessions and remedial lessons for a student finding it difficult to cope with academics at IIT Madras
- Assisted the struggling student in clearing **2 out of 3** backlog courses by providing counselling and guidance

### Representative for Project Germinate

National Service Scheme, IIT Madras

Aug 2016 - Apr 2017

- Represented an initiative to spread awareness about protecting trees; managed 5 volunteers and assisted in tree plantation efforts