

# RAHUL SANDIP DESHMUKH

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## EDUCATION

### Master of Science, Computer Science

Arizona State University, Tempe, AZ

Graduating May 2025

3.93 GPA

### Bachelor of Technology, Information Technology

K.J. Somaiya Institute of Technology, University of Mumbai, India

May 2023

3.83 GPA

Relevant coursework: Data Structures and Algorithms, Statistical Machine Learning, Planning Learning methods in AI, NLP, Data-Intensive Systems for Machine Learning, Frontier Topics in GenAI, Computing for Data-Driven Optimization, Big Data Analytics, Database Management, Data Mining and Business Intelligence, Engineering Blockchain

## TECHNICAL SKILLS

**Programming Languages & Web Development:** Python, R, Julia, Java, C, C++, JavaScript, HTML, CSS, Flask

**Data Management & Big Data Technologies:** MySQL, MongoDB, SSMS, DBeaver, Google BigQuery, NodeJS, Hadoop

**Cloud Platforms & DevOps Tools:** AWS (S3, SageMaker, EC2), Google Cloud Platform, Azure, Docker, Kubernetes, CI/CD, Agile, Git, CUDA, Unix/Linux

**Machine Learning Libraries & Data Analysis:** Pytorch, Torch Vision, TensorFlow, Keras, Numpy, Pandas, scikit-learn, diffusers, OpenCV, NLTK, Excel, Tableau, Power BI

## EXPERIENCE

### ASU Enterprise Partners, Tempe, AZ: Data Science Assistant

January 2024 – Present

- Leading the development of an **attribution model** for Sun Devil Athletics using **Python**, **Google BigQuery**, and **GA4 data**, integrating marketing data from multiple channels to enhance ticket sales and fan engagement strategies.
- Developed a **K-means clustering model** using **R** with **Mahalanobis distance** to segment alumni into 5 affinity groups and profile the clusters. Delivered detailed reports to stakeholders to enhance engagement strategies.
- Built and optimized a predictive model for donor propensity using **Bayesian optimization**, following **ETL processes** and conducting **EDA** to increase accuracy by **10%**. Shared insights with stakeholders to drive effective fundraising strategies.

### K.J. Somaiya Institute of Technology, Mumbai, India: Internet of Things Intern

December 2021 – January 2022

- Prepared a prototype for an **Air Quality Monitoring System** including an automatic toilet flushing mechanism triggered by turbidity, achieving 40% greater system automation.
- Implemented a gas sensor integration to monitor ammonia and air quality, with **C++** on Arduino microcontroller and displayed real-time data on an **Android** application, enabling tracking and alert notifications.

## ACADEMIC PROJECTS

### 3D VAE Developer – Vermilion: ASU's In-house Text-to-Video Generative Model

Fall 2024

- Optimized the **Variational Autoencoder (VAE)** in the **CogVideoX pipeline**, reducing GPU memory usage by **30%** through **dynamic tiling** and **gradient checkpointing** for high-resolution video generation.
- Developed and validated innovative metrics like **Optical Flow Consistency (OFC)** and **SSIM** to evaluate and enhance temporal coherence and structural fidelity across video sequences.
- Designed and tested **10+ complex prompts**, addressing challenges in **spatial fidelity** and **temporal transitions**, refining model robustness for diverse video generation tasks.

### Harnessing Deep Reinforcement Learning for Autonomous Driving in CARLA

Fall 2023

- Designed an adaptive **autonomous driving agent** using **Deep Reinforcement Learning** in CARLA simulation environment.
- Employed a **Variational Autoencoder (VAE)** for feature extraction and **Proximal Policy Optimization (PPO)** for decision-making, achieving a mean reward of 92.3% in dry conditions and 78.5% in adverse scenarios.
- Optimized model performance by refining reward functions and limiting training to 3 million epochs, demonstrating **lane-keeping**, **obstacle avoidance**, and **precise navigation** across diverse scenarios.

### Identification and Classification of Plant Leaf Diseases

Spring 2023

- Implemented **Generative Adversarial Networks (GANs)** to augment the plant leaf dataset, enhancing model performance by increasing data diversity. Used Labelimg for precise annotation, ensuring accurate **model training**.
- Developed a **YOLO v4-tiny** model for real-time detection of diseased leaves, achieving 77.0% Mean Average Precision (mAP). Created a mobile-based detection app in **Java** and hosted the model on a **Flask** website for instant identification.

## PUBLICATION

- Deshmukh, R., Mayekar, V., Patel, S., & Rathod, M. (2023). Identification and Classification of Plant Leaf Diseases using YOLOv4-tiny Algorithm. 2023 6th International Conference on Advances in Science and Technology (ICAST), 352–357.