

# Rohan Dubey

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## EXPERIENCE

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### Associate Data Scientist

June 2023 – Present

*ZEE Entertainment*

*Bangalore, India*

- Led and engineered the development of Dhun.ai, India's pioneering music model, leveraging advanced machine learning techniques to process 3.3 billion features from a diverse 5300-hour music dataset across 14 genres.
- Implemented a robust architecture with 50+ specialized nano models dedicated to individual instruments, optimizing model accuracy, and incorporated the tagging of 48,000 music descriptors for comprehensive dataset coverage.
- Integrated Dhun.ai into the MLOps pipeline, ensuring operational efficiency and compatibility with industry-standard software and hardware, while introducing a unique music generation approach combining textual prompts and reference music inputs.

### Applied Scientist Intern

June 2022 – Nov. 2022

*Amazon*

*Bangalore, India*

- Engineered and designed methodologies to mitigate bias in NLU model performance across different clusters of Alexa NLU data, achieving equitable learning goals and removing language biases using cross-lingual data and data augmentation techniques.
- Monitored the NLU models of Alexa and contributed to the effective deployment of the model.

### Summer Research Intern

June 2020 – July 2020

*Andhra Pradesh Human Resource Development Institute (APHRDI)*

*Bapatla, India*

- Conducted rigorous research on COVID-19 in India using qualitative and quantitative methods and analyzed trends to forecast and strategize the pandemic response.
- Contributed to evidence-based decision making and policy formulation.
- Applied machine learning tools to forecast COVID-19 trends with a modified SEIR model and visualized the results.

### Research Intern

May 2019 – July 2019

*Indian Institute of Technology-BHU*

*Varansai, India*

- Conducted a simulation of a weighted cost-sharing network game in multicast routing networks.
- Utilized modified Nash equilibrium and graph and network theory to design and plan network paths for a hypothetical city, resulting in improved network routing.

## EDUCATION

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### Birla Institute of Technology and Science

Pilani, India

*M.Sc in Mathematics and B.E in Electrical & Electronics Engineering*

*Aug. 2018 – June 2023*

## PUBLICATIONS

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**Prediction of LiFePO<sub>4</sub> battery Remaining Useful Life using Time-series-based Machine-Learning algorithms | 2024 (under review)**, K. Tejus, R. Dubey, A. M. Parimi, S. S. Deshmukh, A. Bhattacharjee, Energy Technology - Wiley.

**Handwritten Image Detection using DCGAN with SIFT and ORB Optical Features | May 2023**, R. Dubey, I. Das, 6th International Conference on Information Systems and Computer Networks, doi: 10.1109/ISCON57294.2023.10112139.

**Coordinated load frequency control of a smart hybrid power system using the DEMA-TD3 algorithm | March 2023**, R. Loka, R. Dubey, A. M. Parimi, Control Engineering Practice, Volume 134, doi: 10.1016/j.conengprac.2023.105480.

**Maintaining the frequency of AI-based power system model using Twin Delayed DDPG(TD3) implementation | March 2022**, R. Dubey, R. Loka, A. M. Parimi, 2nd International Conference on Power Electronics & IoT Applications in Renewable Energy and its Control (PARC), doi: 10.1109/PARC52418.2022.9726615.

## PROJECTS

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**Bias Mitigation for Equitable Learning** | *PyTorch, and BERT* Alexa-NLU, Amazon, Bangalore, India.

- Proposed sequential fine-tuning with continual learning methods (EWC, MAS, and their combinations) to reduce algorithmic bias in NLU models, evaluated on MultiNLI and Alexa NLU datasets, claiming to outperform existing and baseline models.
- Provided extensive reasoning for the use of continual learning as a method to tackle algorithmic bias for unbiased AI development.

**Face Mask Detector** | *YOLOv5, OpenCV, PyTorch, and Tkinter* Govt. of Rajasthan, India.

- Developed an AI solution with a built-in GUI based on the YOLOv5 model, RetinaNet, and OpenCV to detect individuals wearing masks or not. Achieved a MAP score of 54.98.
- This program can run on multiple camera sources and store images without a mask for future identification

**Heart-rate Monitoring System** | *OpenCV, Scipy, and Python* BITS, Pilani, India.

- Developed contactless pulse detection software using OpenCV and signal transformation techniques.
- Tested the software with webcam and network IP camera sources and demonstrated its usefulness for hypersensitive people and COVID-19 situation.

**Object Detection using Homography Techniques** | *OpenCV, Python, Numpy* BITS, Pilani, India.

- Implemented real-time object detection with SIFT, FLANN and KNN algorithms using homography and feature matching.

## RESEARCH INTERESTS

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- Digital Sound Processing
- Natural Language Processing
- Reinforcement Learning
- Generative AI
- Statistics
- Optimization
- Recommendation Systems
- Computer Vision
- Causal Inference

## COURSEWORK

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- Neural Networks and Fuzzy Logic
- Machine Learning
- Probability and Statistics
- Sound Synthesis and Sampling
- Optimization & Operation Research
- Non-Linear Optimization
- Linear Algebra
- Discrete Mathematics
- Graphs and Networks

## SKILLS

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**Programming Languages:** C/C++, Python, SQL, R, and MATLAB

**Cloud Frameworks:** GCP & Azure (Deployment and Mitigation), Kubernetes, Hugging Face and Docker

**ML Frameworks:** Git, OpenCV, Librosa/PyAudio, CUDA, TensorFlow, and PyTorch

## CERTIFICATIONS

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**Azure AI Engineer Associate** | *Microsoft* | February 4, 2024

## EXTRACURRICULAR ACTIVITY

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**National Service Scheme (NSS)** | *Student Volunteer* BITS, Pilani, India.

- Contributed to social service activities such as blood donation, cleanliness drives, and awareness campaigns.

**Esports Club** | *Media Head* BITS, Pilani, India.

- Designed and created posters, flyers, and other media materials for the esports events and activities.

**IEEE Club** | *Machine Learning Lead* BITS, Pilani, India.

- Implemented various machine learning workshops and mentored and supervised junior members in developing their skills.