

# HARDIK PRABHU — CURRICULUM VITAE

Research Associate

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🐙 <https://github.com/HardikPrabhu>

## RESEARCH INTERESTS

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My research interest lies in the intersection of Generative Modeling and Deep Learning techniques, with the goal of advancing fields such as Anomaly Detection and Explainable AI, among various other applications.

## EDUCATION

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**Chennai Mathematical Institute (CMI)**

*Master of Science in Data Science, CGPA : 8.38/10*

**Chennai, India**

*Aug 2019 - May 2021*

**D.G Ruparel College, Mumbai University**

*Bachelor of Science in Mathematics, CGPA : 8.75/10*

**Mumbai, India**

*Aug 2016 - April 2019*

## EXPERIENCE

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**FLAME University**

*Research Associate*

**Pune, India**

*Jan 2023 - Present*

- Engaged in projects involving Explainable AI, Generative Modelling and Genetic Algorithms.
- Teaching Assistant for courses on Computational Modeling and Machine Learning.

**CloudAEye, Inc.**

*Machine Learning Engineer*

**Fremont, CA, USA (remote)**

*July 2021 - Oct 2022*

- Delivered sophisticated Deep learning/ Machine learning-based solutions for anomaly detection in both logs and metrics generated from cloud-native applications.
- Researched and developed a machine learning-based solution for the root cause analysis for cloud-native applications.
- Member of the recruitment panel. Responsible for conducting technical interviews of the candidates.

**CMI Algolabs**

*Research Intern*

**Chennai, India**

*May 2020 - Aug 2020*

- Created a python based tool for a software company for mapping functionality script to software documentation by applying Latent Dirichlet Allocation.

## RESEARCH PUBLICATIONS

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Refereed Journal articles .....

- [J.1] **Prabhu, H.**, Sane, A., Dhadwal, R., Parlikkad, N.R. and Valadi, J.K., 2023. Interpretation of Drop Size Predictions from a Random Forest Model Using Local Interpretable Model-Agnostic Explanations (LIME) in a Rotating Disc Contactor. Industrial & Engineering Chemistry Research. (SCI IF: 4.326, Q1 )

#### **Refereed Conference and Workshop papers** .....

- [C.1] **Prabhu, H.** and Arjunan, P., 2022, November. eptk: energy prediction toolkit. In Proceedings of the 9th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation. (pp. 512-515).(CORE Rank: A)

#### **Accepted for publication** .....

#### **Book Chapters** .....

- [B.1] **Prabhu, H.**, Siarry, P., Valadi, J.K., Sane, A., & Dhadwal, R. (2024, expected). Metaheuristic and Evolutionary Algorithms in Explainable Artificial Intelligence. In J.K. Valdi, M. Ojha, K.P. Singh, & P. Siarry (Eds.), Advanced Machine Learning with Evolutionary and Metaheuristic Techniques (pp. XX-XX). Springer: Computational Intelligence Methods and Applications.

#### **Publications under review** .....

- [C.2] **Prabhu, H.**, Valadi, J.K. and Arjunan, P., 2023, Exploring 1D Wasserstein DCGAN for Effective Anomaly Detection in Smart Building Energy Time Series Data.
- [J.2] **Prabhu, H.**, Ravishankar, C., Ganesan, A., Bhosale, H., Parlikkad, N.R, Siarry, P. and Valadi, J.K., 2023, Enhancing Random Forest Model Prediction of Gas Holdup in Internal Draft Air-Lift Loop Contactors: Leveraging Genetic Algorithms for Hyperparameter Tuning and SHAP for Interpretability.
- [C.3] **Prabhu, H.**, Valadi, J.K. and Arjunan, P., Explainable AI for Energy Prediction and Anomaly Detection in Smart Energy Buildings.

### **RESEARCH AND DEVELOPMENT PROJECTS**

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#### **Energy Prediction Toolkit: An Open-source Python Package**

*Environment: Python*

*May 2021 - Dec 2021*

Energy Prediction Toolkit (eptk) is a Python package for implementing and benchmarking energy use prediction models on a collection of large datasets using standard performance metrics. The package includes a variety of predictive models along with a set of configurations that were picked from the top performers in the ASHRAE - Great Energy Predictor III competition hosted on Kaggle. The package provides methods for engineering additional features (temporal, weather and rolling stats) from the datasets. The package also provides ensembling techniques such as meta-regressors, Bayesian optimization and subsampling to combine multiple models. A custom cross-validator is employed which is used for benchmarking models on Time-series data.

#### **Doc2Script: Mapping Functionality Scripts to Software Documentation**

*Environment: Python*

*May 2020 - Aug 2020*

A Python-based solution, developed for a software company, employing Latent Dirichlet Allocation (LDA), a probabilistic topic modelling approach, to establish connections between functionality scripts and pertinent documentation available on the company website. This tool facilitates the precise mapping of scripts to corresponding HTML documentation, thereby optimizing the process of functionality testing.

## TEACHING EXPERIENCE

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- **Teaching Assistant, FLAME University:** CSIT 331, Machine Learning I (Jan 2023 - May 2023)
- **Teaching Assistant, FLAME University:** CSIT 121, Computational Modeling (Jan 2023 - May 2023)

## PERSONAL PROJECTS

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### Application of Bayesian Optimization for Hyper-parameter Tuning

Executed the application of Gaussian Process methodology to fine-tune the hyperparameters of a Convolutional Neural Network (CNN) that was specifically designed for the task of recognizing hand gestures.

### Reinforcement Learning Algorithms to Solve Gridworld Problems

Trained an agent to travel a  $M \times N$  grid from any arbitrary cell to the terminal cell, and avoid obstacles placed in between by applying various RL algorithms such as Policy Iteration, Monte Carlo Simulations, SARSA, Q learning, Temporal Difference and Semi-gradient Approaches.

## CERTIFICATION AND SKILLS

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### Custom Models, Layers, and Loss Functions with TensorFlow

*Certificate Issued by DeepLearning.AI*

*Jan 2022*

### Custom and Distributed Training with TensorFlow

*Certificate Issued by DeepLearning.AI*

*August 2022*

**Programming Languages:** Python, R and LaTeX

**Python Packages:** Pytorch, Tensorflow, Scikit-learn, Numpy, Pandas, Pymoo and more.