Athul Chakkithara Dharmarajan

224-804-1965 – athulcd@gmail.com – athulcd.github.io – linkedin.com/in/athulcd/ – West Lafayette, IN

EDUCATION

Purdue University — West Lafayette, IN
PhD, Mechanical Engineering — Aug 2022–Present

Indian Institute of Technology Bombay (IITB) — Mumbai, India
Master of Technology, Mechanical Engineering — Jul 2021–Jun 2022
Bachelor of Technology, Mechanical Engineering — Jul 2017–Jun 2021

RESEARCH EXPERIENCE

Research Assistant, Design Engineering Lab Purdue — **West Lafayette, IN**

Systems Engineering Research Center (SERC) Trusted Artificial Intelligence Challenge — May 2024–Present

- Led a seven membered student team from Purdue University in the competition among SERC partner universities
- Conceptualized decision-making architectures for navigating terrain with mines using unmanned aerial vehicles (UAVs) and unmanned ground vehicles (UGVs) with Artificial Intelligence (AI) based mine detection system

Quantitative Model for Design Performance — May 2023–Present

- Developed a cognitive psychology-based explanatory model for predicting design performance
- Modeled relationship between factors responsible for expertise of designers and the performance of designs created

Theory Grounded Guidelines for Solver-aware System Architecting — Aug 2022–Present

- Constructed a probabilistic generative model for estimating the performance of solvers with varying expertise
- Demonstrated working of model for design of the Astrobee robotic arm in the International Space Station (ISS)

Research Assistant, Control and Coordination lab IITB — **Mumbai, India**

Multi-Agent Paradigm for Disaster Management — May 2021–Jun 2022

- Created a novel scheme to assign area equitably among agents in coverage of a nonlinear environment
- Developed a collaborative path planning scheme to achieve the optimal coverage configuration without a central coordinator

TECHNICAL PROJECTS

Generating Designs using Denoising Diffusion Probabilistic Models (DDPM) in JAX — Jan 2024–May 2024

- Built a JAX implementation of the DDPM for generating parametric ship hull designs under constraints
- Leveraged different neural network architectures like U-net, ResNet for the DDPM

Classification of Mushrooms using Data Mining — Aug 2022–Nov 2022

- Compared different classifying algorithms for binary classification on a dataset of American mushrooms
- Utilized techniques like support vector machines (SVM), k-nearest neighbors, naïve bayes and decision trees

Predicting Sales Using Machine Learning based Time Series Forecasting — Jan 2021–May 2021

- Predicted sales of products in Walmart Stores across the USA using time series forecasting techniques
- Compared the performance of ARIMA, a Statistical model, and LGBM, a modern gradient boosting based method

SKILLS

Programming languages and tools: JAX, PyTorch, Matlab, C++, R
Software: AutoCAD, Fusion 360, Abaqus

SELECTED PUBLICATION

Dharmarajan, A. C., Topcu, T.G., Szajnfarber, Z., and Panchal, J.H., "Valuing Outliers: A Modeling Framework to Consider Non-Traditional Solutions from Non-Traditional Solvers", *ASME 2024 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2024), Washington, D.C., USA. August 25-28, 2024. Paper Number: IDETC2024-143509.*

LEADERSHIP EXPERIENCE

Outreach Chair, Official Mechanical Engineering Graduate Association, Purdue University — May 2024–Present

- Organized events to engage with the graduate student community and the broader community in the Lafayette area

Global Ambassador, Graduate School, Purdue University — Nov 2023–Present

- Represented the graduate school in events and assisted in the recruitment of international students

Editorial Board Member, Insight IIT Bombay — Apr 2019–Apr 2020

- Managed a team of 7 responsible for preparing online articles and printed newsletters for the university student media body

AWARDS AND HONORS

- ASME Computers and Information in Engineering Division (CIE) Graduate Student Travel Award — Aug 2024
- Innovative Presentation Award, ASME CIE SciTechBuzz Summit, Washington D.C. — Aug 2024
- Top 2 in the Systems Engineering Research Center (SERC) Trusted AI Challenge — Aug 2024
- National Science Foundation Frontiers in Design Representation Travel Fellowship — Jun 2023, Jun 2024
- Engineering Excellence Scholarship, School of Mechanical Engineering, Purdue University — Aug 2022