

MIHIR JAGTAP

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◊ Madison, Wisconsin, USA

ACADEMIC QUALIFICATION

Bachelor of Science - Computer Science and Data Science
University of Wisconsin-Madison

Sep 2020 - May 2024

- *CGPA: 3.874/4.000 (till Fall 2023)*
- *Dean's List Award in Fall 2020, Spring 2021, Fall 2021, Spring 2022, Spring 2023*

PUBLICATION

In Preparation:

Jagtap, Mihir, *Applications of GANs in Supervised vs. Unsupervised Learning: A Review*. Manuscript in preparation, expected completion January 2024.

RESEARCH & INDUSTRY EXPERIENCE

Assessing Generative Models for Predicting Materials Structure and Properties Jun 2023 - Present
Informatics Skunkworks, Computational Materials Group, Dept. of Materials Science & Engineering, UW-Madison.
Advised by: Prof. Dane Morgan & Dr. Benjamin Afflerbach

- Assessing the Crystal Diffusion Variational AutoEncoder model with many datasets to generate desired and specific material structure and properties.
- Developed a python script to generate candidate structures and visualize the lattice structure.

Cloud Based Prediction Tools for Materials Properties Jan 2022 - May 2023
Informatics Skunkworks, Computational Materials Group, Dept. of Materials Science & Engineering, UW-Madison.
Advised by: Prof. Dane Morgan

- Train a machine learning model for enthalpy prediction from SMILES strings; retraining the Alfabet Model on QM9 and increasing **accuracy upto 94%**, a promising model from Kaggle was optimized for the specific target property.
- **Achieved comparable results to published papers with the DimeNet model and the Cubic Crystal Space Group** model (runs error-free) on Foundry with enhanced usability through an integrated preprocessor.
- Developed a PyTorch-based neural network for predicting the band gap of organic compounds; proposed solutions include creating a custom preprocessor for Foundry compatibility and converting data processing from PyTorch's DataLoader to DataFrame.

Model-Based Decision Support Software March 2022 - Present
Project Assistant *Madison, WI*
Dept. of Animal and Dairy Sciences
Advised by: Prof. Victor Cabrera
Profile: <https://dairymgt.cals.wisc.edu/people.php#developer-profile-mihir>

- Developed the tool *Optimal Allocation of Nutritional Resources and Crop Planning in a Dairy Herd*. The tool, based on a linear programming model, is designed to facilitate optimal crop planning and feed allocation in order to minimize the total feed costs across a dairy farm. Tool helps in giving an estimated **\$109 ± 96.9 greater net return per cow per year**.
- Responsible for the R&D of web-based tools that are crucial for performing data analysis and visualization with the use of statistical mathematics and linear optimization.
- Other responsibilities include maintenance of the website to ensure smooth User Interaction and User Experience.

- Worked in development of computer vision software using OpenCV & PyTorch CUDA. Image Enhancement: Modified existing Convolutional Neural Network architectures and used image processing to enhance blurred images.
- Developed a hand-raising detection system for classrooms using YOLOv4 model trained on the COCO dataset, focusing on pose estimation accuracy (accuracy **gain upto 5%**) .

TEACHING & MENTORING EXPERIENCE

Peer Mentor

Department of Mathematics, UW-Madison

Sept 2023 - Present
Madison, WI

- I am the In-Class Peer Mentor for the MATH 96 and MATH 112 courses. Responsibilities include planning for the syllabus to be covered for that day, helping students with questions and clearing their doubts.
- I am also a drop-in tutor at the Mathematics Learning Center, UW-Madison. Assisting students in Pre-Calculus and Calculus.

Academic Tutor

ACTS, Division of Diversity, Equity & Educational Achievement (DDEEA)

Sept 2021 - May 2022
Madison, WI

- Peer-to-peer tutoring. Assisted students with Math 221 and CS200.

PROJECTS

Join Algorithm

May 2023

Code: <https://github.com/MihirJagtap/Join-Algorithms>

- In this project, I implemented, tested, and benchmarked a disk-based join algorithm. The goal is to efficiently use memory and disk resources to return the answer to the join query.

SQLite Page Cache

Apr 2023

Code: <https://github.com/MihirJagtap/SQLite-cache>

- The project involves customizing SQLite's pager by implementing two new page replacement algorithms in the page cache component, which handles the memory management of database pages, including dynamic resizing, unpinning page discarding, page ID reassignment, and bulk discarding within ID ranges.

VR-Toolkit

Jan 2023

Code: <https://github.com/MihirJagtap/VR-Toolkit>

Website: <https://sites.google.com/wisc.edu/vr-toolkit/home>

Advised by: Prof. Mohit Gupta

- Created a software stack called "Virtual Reality Toolkit (VR-Toolkit)" designed to assist individuals with low vision. This innovative tool improves their ability to recognize objects, view images, and read more effectively. It enhances the user's visual experience through features like magnification to enlarge text and color contrast adjustments in images.
- Incorporated additional functionalities in VR-Toolkit for an enriched user experience. This includes the generation of captions for images, making content more accessible. To address challenges in reading these captions, the toolkit is equipped with a text-to-speech framework, providing an auditory alternative for users.
- **Tools:** Image Processing, Optical Character Recognition, OpenCV, tesseract

Computer Vision Apps

Dec 2022

Code: <https://github.com/MihirJagtap/Computer-Vision-Apps>

- The project uses statistical methods and mathematical based models to implement computer vision apps mainly object tracking, image mosaicking, detecting straight lines, image refocusing and burning an image. Tools: MATLAB, Python, neural networks

ActionCount Analytics

Oct 2022

Code: <https://github.com/MihirJagtap/ActionCount-Analytics>

- This ML software implementation can be used in large halls to quantify people according to their actions.
Tools: OpenPose, Python, CUDA, and Tensorflow

Country Happiness & HRD Analysis

May 2022

Code: <https://github.com/MihirJagtap/Country-Happiness-HRD-Analysis>

- The report aims to compare Western Europe's mean happiness score with the global average and examine the correlation between a particular country's freedom and its happiness score.. Tools: R, Linear Regression, Statistical Analysis

RELEVANT COURSEWORK

Foundations	Data Structures (COMPSCI 200, 300, 400), Data Programming (COMPSCI 220, 320), Machine Organization and Programming (COMPSCI 252, 354), Algorithms (COMPSCI 577)
ML & Deep Learning	Computer Vision (COMPSCI 639), Deep Learning for Computer Vision (COMPSCI 639), Matrix Methods in Machine Learning (COMPSCI 532)
Systems	Big Data Systems and Databases (COMPSCI 544), Database Management Systems: Design and Implementation (COMPSCI 564), Operating Systems (COMPSCI 537) (<i>In Spring 2024</i>)
Mathematics	Calculus (MATH 221, 222, 234), Linear Algebra (MATH 340), Discrete Mathematics (MATH 240)
Statistics	Statistical Data Modeling (STAT 240, 340), Forecasting and Analysis Theory and Methods of Mathematical Statistics (STAT 311)
Electives	Intro to Human Computer Interaction (COMPSCI 570)

CERTIFICATIONS

Fundamentals of Deep Learning

Jul 2022

NVIDIA Deep Learning Institute

<https://courses.nvidia.com/certificates/417e100242634e05be68be11e91314d6/>

SKILLS

Languages	Java, Python, R, SQL, MATLAB, PHP, HTML, CSS, C, C++, JavaScript, LaTeX
Frameworks	Flask, React, Shiny
Tools/Platforms	Git, OpenCV, PyTorch, Tensorflow, Linux, Windows

EXTRA-CURRICULAR ACTIVITIES

Akanksha Foundation

Jun 2023 - Aug 2023

Vounteer in The Late Anantrao Pawar Memorial English Medium School (LAPMEMS)

Pune, India

- Assisted the school teacher and took initiative in organizing and conducting several experiments over a period of 2 months to demonstrate basic concepts of Science, Nature, Politics and Environment to school going children in a collaborative environment as opposed to the competition driven atmosphere in school.
- For the remaining 1 month volunteered in the Administrative department
Skills : Communication, Speaking, Organising, Management

BadgerFly

April 2022 - Dec 2022

Software Development team member

Madison, WI

- Functionality and software and maneuvering operation on prototype.
Skills : Python, ROS