MIHIR JAGTAP

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⋄ Madison, Wisconsin, USA

ACADEMIC QUALIFICATION

Bachelor of Science - Computer Science and Data Science — Sep 2020 - May 2024
University of Wisconsin-Madison

- *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.

Computer Vision & AI Research Intern May 2022 - Aug 2022
Cairovision Pvt. Ltd. (*previously* CamfyVision Innovations) *Bangalore, India*

- Worked in development of computer vision software using OpenCV & PyTorch CUDA.
- 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%**)
- Applied deep learning concepts and YOLO models for tasks such as detecting hats in kitchens, recognizing number plates, and identifying container numbers, enhancing safety and efficiency. .

TEACHING & MENTORING EXPERIENCE

Peer Mentor Sept 2023 - Present
Department of Mathematics, UW-Madison *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 Sept 2021 - May 2022
ACTS, Division of Diversity, Equity & Educational Achievement (DDEEA) *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, unpinned 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	Java Programming & Data Structures (COMPSCI 200, 300, 400), Data Sci 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) (*In Spring 2024*)
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