HIMANSHU CHOUDHARY

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RESEARCH INTEREST

My research interests primarily focus on developing Machine Learning and Soft Computing techniques, with a particular emphasis on their applications in Finance and Portfolio Optimization. This includes exploring advanced computational methods, reinforcement learning, and AI-driven financial models to enhance decision-making, optimize asset allocation, and improve risk management strategies in dynamic financial environments.

EDUCATION

Indian Institute of Technology, Mandi **August 2021 - Present**
Ph.D.

Indian Institute of Technology, Mandi **August 2018 - 2020**
Master of Science in Applied Mathematics ***CGPA: 8.6/10***

Gurukula Kangri University, Haridwar **August 2015 - 2018**
Bachelor of Science ***CGPA: 8.9/10***

PROJECTS

First Order Gradient Based Optimization Algorithms **August 2019 - 2020**
Advisor: Dr. Manoj Thakur, Associate Professor, SMSS, IIT Mandi *Master's Thesis*

- Studied, Implemented, and Development of the first-order gradient-based optimization algorithms to solve different problems that arise in Machine Learning, Deep Learning, Image Processing.

De-Duplication Using Locality Sensitive Hashing **Spring – 2019**
Instructor: Dr. Rameshwar Pratap, Assistant Professor, SCEE, IIT Mandi

- The aim is to implement de duplication model to find the duplicate documents from the large collection of documents via clustering using locality sensitive hashing and prune the duplicate documents.

Wind Farm Layout Optimization using Genetic Algorithms **Spring – 2022**
Instructor: Dr. Mohammad Talha, Associate Professor, SMME, IIT Mandi

- The task to find the location of wind turbines in wind farm such that the total output energy is maximum.

Portfolio Management using Deep Reinforcement Learning **Spring – 2023**
Instructor: Dr. Aditya Nigam, Associate Professor, SCEE, IIT Mandi

- The task is to develop an automated trading strategy that can learn from historical data and adapt to changing market conditions to maximize investment returns by using the deep reinforcement learning algorithms.

RELEVANT COURSES

- Applied Mathematical Programming
- Computational Financial Modelling
- Optimization Techniques
- Matrix Theory
- Pattern Recognition
- Deep Learning
- Soft Computing
- Probability and Random Process
- Programming Practicum
- Modelling and Simulations
- Linear Algebra
- Numerical Analysis
- Function Analysis and Topology
- The Complete Python Course for Machine Learning

TECHNICAL STRENGTHS

Computer Languages: C/C++, PYTHON, MATLAB, R
Software & Tools: LATEX, MS-Office, Mathematica

ACHIEVEMENTS

- GATE - 2021 – Mathematics (MA)
- IIT JAM - 2018 – Mathematics (MA) & Mathematics (MS)
- Received MCM Scholarship for excellence academics record in M.Sc. (2018-2020)

PUBLICATIONS

- "Machine learning based hybrid models for trend forecasting in financial instruments" by Arishi Orra, Kartik Sahoo, and **Himanshu Choudhary**. Accepted for publication at "$11th$ International Conference on Soft Computing for Problem Solving - SocProS 2022".
- "Modified Iterative Shrinkage-Thresholding Algorithm for Image De-blurring in Medical Imaging" by **Himanshu Choudhary**, Kartik Shaoo, and Arishi Orra. Accepted for publication at "$3rd$ Congress on Intelligent Systems - CIS 2022".
- "Deep Reinforcement Learning for Investor-Specific Portfolio Optimization: A Volatility-Guided Asset Selection Approach" by Arishi Orra, Aryan Bhambu, **Himanshu Choudhary**, and Manoj Thakur. accepted at "ICLR 2025 Workshop Advances in Financial AI".
- "Dynamic Reinforced Ensemble using Bayesian Optimization for Stock Trading" by Arishi Orra, Aryan Bhambu, **Himanshu Choudhary**, and Manoj Thakur. "ICAF 2024"
- "FinXplore: An Adaptive Deep Reinforcement Learning Framework for Balancing and Discovering Investment Opportunities" by **Himanshu Choudhary**, Arishi Orra, and Manoj Thakur. "Accepted at IJCNN 2025".
- "Risk-Adjusted Deep Reinforcement Learning for Portfolio Optimization" by **Himanshu Choudhary**, Arishi Orra, and Manoj Thakur. Review Submitted "International Journal of Computational Intelligence Systems".
- "Multi-Label Multi-Agent Deep Reinforcement Framework for Multi-period Portfolio Optimization with Dynamic Re-balancing" by **Himanshu Choudhary**, Arishi Orra, and Manoj Thakur. Under Review "Applied Soft Computing"

- "Enhancing Deep Reinforcement Learning for Stock Trading: A Reward Shaping Approach via Expert Feedback" by Arishi Orra, **Himanshu Choudhary**, Ankit Sharma, and Manoj Thakur. Under Review "Knowledge and Information Systems"

WORKSHOP & CONFERENCES

- Online Elementary FDP on "Machine Learning and Optimization Techniques: Application to Financial Markets", July 2021
- SPARC sponsored Indo-Australian lecture series in Econophysics, entitled "Introduction to Stochastic Calculus and Financial Mathematics", organized by IIT Ropar, November 24-27, 2021.
- "Summer School on Econometrics and Machine Learning" from June 7-11, 2022 at IGIDR, Mumbai.
- "6th Summer School on AI" from July 18 - August 19, 2022 organised by IIIT Hyderabad.
- "IEEE CIS Summer School on Deep Learning and Computational Intelligence: Theory and Applications" from December $12 - 16$, 2022 at IIT Indore, India.
- GIAN Course on "Risky Asset Models with Dependence" from Feb 27 – March 03, 2023 organized by IIT Ropar.
- ACM India Summer School 2024 on "Responsible and Safe AI" hosted by Centre for Responsible AI (CeRAI), IIT Madras from June 3 - 14, 2024.
- "13th International Conference on Soft Computing for Problem Solving - SocProS 2025" hosted by, IIT Roorkee from Feb 24 - 26, 2025.

REFERENCES

Dr. Manoj Thakur
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Dr. Tanmay Kayal
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