SASWAT K. NAYAK

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EDUCATION

Master of Science in Chemical and Biological Engineering, University of Wisconsin-Madison   Aug 2024

- Computational Research in design principles of 3D Photonic Crystals.
- Minor in **Computer Science.**

Bachelor in Chemical Engineering(Dual Degree), Indian Institute of Technology Kharagpur   June, 2021

RELEVANT COURSES

Artificial Neural Networks, Software Engineering, Image Processing, Advanced Machine Learning, Deep Learning, Information Retrieval, Fluid Mechanics, Probability and Stochastic Processes, Regression and Time Series Analysis, Machine Learning in Materials, Algorithms and Data Structures, Linear Algrebra, Databases.

SKILLS

Technical Skills	Python, Numerical Optimization, CI/CD, AWS, Docker, Project Management, Gitlab, Pandas, R, Matplotlib, SQL, Tableau, GCP, R, Hive, Pyspark, HIPAA, Snowflake, Databricks. Multi-threading, HTC.
Machine Learning	NLP, Basic Computer Vision, Transformers, Tensorflow, PyTorch, GANs, Language Models. Hugging Face, MLOps, Spacy, Large Language Models(BERT, GPT-2, T5, RoBERTa), Big Data Engineering, ElasticSearch, XGBoost, Random Forest, scikit-learn, regression.
Soft Skills	A good track record in working in teams, Agile Software Development, Scrum Master

EXPERIENCE

Data Analyst(Full Time)   Jun 2021 - Jul 2022
Innovaccer Analytics(Healthcare)   *Noida, India*

- Achieved a 40% improvement in query times for the in-house knowledge base when shifted to a graph architecture(Neo4j) from a relational database(MySQL).
- Led a team of interns to extract patient data from progress notes via computational and statistical methods. Successfully optimized the patient data update process, achieving a 90% reduction in time required and a 50% decrease in associated costs by implementing NLP solutions(NLTK, Spacy, RoBERTa) and using auto-encoders for anomaly detection.
- Designed and implemented RESTful APIs to facilitate CRUD operations, enhancing data interchange and system integration for healthcare analytics platforms.
- Employed DevOps best practices to streamline project workflows, resulting in a 30% increase in deployment efficiency and improved collaboration across development and operations teams.
- Learnt the adoption of containerization with Docker and orchestrated microservices using Kubernetes, achieving high scalability and reliability in data analysis applications.
- Collaborated with cross-functional teams to develop robust data analytics solutions, driving improvements in patient care and operational decision-making.

Graduate Research Assistant: Machine Learning in Materials   Sept 2022 - Present 2023
UW Madison   *Madison, WI*

- Conducted comprehensive computational research on the design principles of 3D Photonic Crystals, filtering candidates on the basis of their ease of self assembly, to be used in semiconductor research. Used Python, Git, WolframAlpha, and other advanced computational libraries.

- Introduced novel explainable descriptors that significantly outperform traditional symmetry-based descriptors in machine learning tasks. These advancements achieved a notable 50% improvement in the effectiveness of identifying and categorizing photonic crystal structures, as substantiated by an F1-score enhancement from 48% to 94%.

Project Experience

- Engineered a high-performance filesystem backed by relational databases, featuring a user-friendly web interface for comprehensive CRUD operations. Spearheaded the development of an intuitive visualization tool, enabling users to effortlessly explore directories and subdirectories through a dynamic tree structure. Depoyed on Vercel.
- Leveraged protein and peptide data from Parkinson's Disease patients to develop predictive models for disease progression severity, enhancing understanding and potential early intervention strategies.
- Molecular Dynamics Simulation: Developed a Molecular Dynamics simulation from the ground up using only NumPy, modeling particle behavior in a confined space with Lennard-Jones potential to analyze interactions and dynamics.

Teaching Experience

- Served as a Teaching Assistant for the Transport Phenomena Lab, guiding undergraduates through practical experiments and equipment usage to enhance their understanding of core concepts.
- Provided in-depth explanations and clarifications on the theoretical foundations of experiments, ensuring students' ability to apply knowledge in practical settings.
- Addressed student inquiries regarding equipment functionality, troubleshooting issues to facilitate seamless lab operations and enhance learning outcomes.

Machine Learning Intern   Nov 2020 - Dec 2020
Ushur   *Bengaluru, India*

- Designed and implemented an advanced algorithm combining Google Tesseract OCR with rule-based techniques to accurately extract customer data from insurance claim documents.
- This innovative approach not only streamlined data processing but also secured victory in an internal hackathon, demonstrating its effectiveness and innovation.

PUBLICATIONS

Computational Fluid Dynamics Published a research [paper] in Chemical Engineering Science.

Currently working on a paper on "Design Principles of 3D Photonic Band Gap Crystals".

EXTRA-CURRICULAR ACTIVITIES

- Actively play Tennis, Pickleball and Counter Strike.