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SUMMARY:

I am a highly motivated researcher dedicated to advancing the field of Deep Learning and AI. With a decade of experience in Machine Learning and Data Science, my expertise lies in designing and implementing intelligent solutions across diverse domains. I am passionate about staying at the forefront of AI research, consistently updating my skills to contribute to cutting-edge advancements. I believe it is crucial to elevate machine capabilities to assist humans in constructing a sustainable societal framework for future generations, and I am driven to contribute to this shared objective.

EDUCATION:

Doctor of Philosophy in Electrical and Computer Engineering **August 2024 - Present**

University of Iowa, Iowa City, Iowa, United States of America

Master of Computer Science **May 2021**

University of Iowa, Iowa City, Iowa, United States of America

Bachelor of Technology, Civil Engineering **May 2013**

*Sardar Vallabhbhai National Institute of Technology (**NIT Surat**), Surat, India*

- Ranks among the top 100 engineering colleges in India among ~4000.
- The acceptance rate of NITs is 3 to 5% from ~1.1 million applicants.

Certifications:

- **Certificate Program in Engineering Excellence- Big Data Analytics & Optimization / Data Science,** *International School of Engineering, Hyderabad, India, Feb 2015 – Aug 2015*

PAPER PUBLICATIONS:

1. **Using a physics-based hydrological model and storm transposition to investigate machine-learning algorithms for streamflow prediction:**
   https://doi.org/10.1016/j.jhydrol.2023.130504
   Summary: Investigated machine-learning algorithms for streamflow prediction, surpassing traditional hydrological models. Proposed a methodology for testing and benchmarking ML algorithms using artificial data. Concluded that deep learning can identify the transformation function but may not significantly outperform temporal persistence in Forecast Mode.
2. **Novel Machine Learning Approach to Predict and Personalize Length of Stay for Patients Admitted with Syncope from the Emergency Department:**
   https://doi.org/10.3390/jpm13010007
   Summary: Developed a machine learning model to predict the Length of Stay (LoS) for syncope patients in the Emergency Department. Addressed the lack of models predicting admission and LoS for syncope cases. Aimed to provide an effective, exploratory tool for personalized prediction of LoS.
3. **Can Artificial Intelligence Enhance Syncope Management?: A JACC: Advances Multidisciplinary Collaborative Statement:**
   https://doi.org/10.1016/j.jacadv.2023.100323
   Summary: Explored the potential of AI in managing syncope, a complex medical condition. Addressed challenges, including medicolegal and ethical concerns. A collaborative statement advocating for AI-derived clinical decision support tools to improve patient outcomes, streamline diagnostics, and reduce healthcare costs.
4. **Predicting Nephrotoxic Acute Kidney Injury in Hospitalized Adults: A Machine Learning Algorithm:**
   https://doi.org/10.1016/j.xkme.2024.100918
   Summary: This paper presents a machine-learning model that improves the prediction of nephrotoxic acute kidney injury (AKI) in hospitalized adults, reducing false alerts from 2.5 to

0.7 per AKI case. Integrating medication data with clinical variables, helps healthcare providers more accurately identify high-risk patients, enabling timely interventions to prevent AKI. This approach improves patient outcomes and optimizes re- source use by allowing for more efficient monitoring and focused care. It supports adapting the NINJA pro- gram from pediatric to adult settings, enhancing the overall efficiency of AKI prevention in hospitals.

5. **Comparing machine learning techniques for neonatal mortality prediction: insights from a modeling competition**
   https://doi.org/10.1038/s41390-024-03773-5
   Summary: This study delves into the challenging task of predicting mortality risk in NICUs using machine learning. Conducted as a team-based modeling competition, five neonatologist-led teams applied diverse ML techniques—logistic regression, CatBoost, neural networks, random forest, and XGBoost—on data from over 6,000 NICU admissions. The findings revealed that while complex models like convolutional neural networks (CNNs) were favored by the audience for real-world application, logistic regression achieved the highest predictive accuracy (AUC-0.818). This research presented at a national conference underscores the importance of aligning modeling approaches with data characteristics and interpretability, rather than de- faulting to complexity, to optimize clinical outcomes.

SKILLS:

Industry Knowledge: Statistics, Data Analytics, Machine Learning, Deep Learning, Computer Vision, Large Language Models, Generative models, Optical Character Recognition, Image processing, Big Data - Hadoop ecosystem components, Agile methodology.

Tools & Technology: TensorFlow, Keras, SQL and NoSQL databases, Cloudera Distribution Hadoop, Microsoft Azure, Apache NiFi, Luigi, Dockers, Singularity, Linux, Django rest framework, GIT, PyCharm, and JIRA.

Programming Languages: Python, R, Haskell

EMPLOYMENT:

@ University of Iowa

Lead Artificial Intelligence and Machine Learning Specialist **June 2021 – Present**

Research at Artificial Intelligence Development Laboratory – University of Iowa

- Participate in externally or internally funded research with an emphasis on the development and performance assessment of approaches, tools, and methodologies related to data management, machine learning, and artificial intelligence (AI).
- In collaboration with research-field-specific faculty and staff, lead machine learning/AI aspects of research projects planned or considered for external funding proposal submission. Prepare and write research grant components describing machine learning/AI methods and approaches proposed and describe pilot studies and their results to demonstrate the feasibility of proposed approaches.
- Develop well-documented cross-platform software packages for machine learning and artificial intelligence (AI).
- Manage all or part of a research project including hiring staff and assigning them to projects, scheduling experiments and meetings, coordination of data generation and analysis.
- Make recommendations to support decisions regarding the acquisition of equipment and the use of the facilities based on project requirements and equipment upgrades within the parameters of the allotted budgets.

Graduate Research Assistant **Jan 2020 – May 2021**

Research at Artificial Intelligence Development Laboratory – University of Iowa

- In charge of improving and extending the software environment for AI and machine learning projects affecting students from the Colleges of Engineering and Business, and researchers from the entire university research community joining forces in and using computational resources of the IIAI.
- Develop and improve deep learning models in multiple projects in Civil Engineering, Biochemistry, and Neurology.

- Organize training sessions for students and researchers on the usage of computational resources in AI labs and provide extended support on configuration/access issues.

@ Quadratic Insights Pvt. Ltd. (Quadratyx), Hyderabad, India [AI-company of the year, 2016. Best AI employer, 2018]

Data Scientist – Lead **May 2017 - July 2019**

- Manage teams, Sprint planning, Requirements Gathering, and Solution Designing.
- Recruit potential data scientists and Big data engineers
- Graded as "Outstanding Performer A+" for two years in a row (2016 -17 and 2017-18)

Data Scientist **Sep 2015 - April 2017**

- Built scalable applications using Machine learning, Computer Vision, and Hadoop
- Provided business insights using Data Analysis and Visualization

@ International School of Engineering (INSOFE), Hyderabad, India

Data Science Research Assistant - Intern **Feb 2015 - Aug 2015**

- Assisted in building logistics-price optimization solution for a retail customer
- Assisted in analyzing transactional data to detect the trend in sales. Forecasted the weekly sales using techniques like time series, market basket analysis, and regression models.
- Was awarded a merit-based **full scholarship and Internship** by *INSOFE* for the CPEE program.

TEACHING EXPERIENCE:

University training programs **Aug 2024 – Present**

- Serving on the committee at the Iowa Initiative for Artificial Intelligence (IIAI), designing the HawkAI short courses to enhance AI education and impact interdisciplinary researchers.
- As part of the curriculum in the AI Experiential Learning course (ECE:5995:0003) at the University of Iowa, I taught students about using High-Performance Computing (HPC) resources, Microsoft Azure, and Large Language Models (LLMs).

Graduate Teaching Assistant **Aug 2019 – Dec 2019**

- Taught students to code in Python as a part of the course "Introduction to CS".

Corporate Training **Dec 2017 – Feb 2018**

- As a representative of my current Organization, I conducted Big Data training for working professionals at the **National Payments Corporation of India**, Hyderabad. As a part of the curriculum, I taught Apache Kafka, Luigi, Apache NiFi, HBase, Neo4J, MongoDB, and other related technologies.
- NPCI is the central organization for online retail payment and settlements in India. It's a government body with 1000+ employees. The organization implements use cases like near real-time fraud detection and analytics on transactions.

PROJECTS AS RESEARCH SPECIALIST AT U. IOWA:

- **Understanding the role of Genetics in Acquired Hearing Loss and Tinnitus using Artificial Intelligence.**

Objective: This project addresses the global issue of acquired hearing loss and tinnitus, affecting over 430 million people worldwide. The aim is to leverage Artificial Intelligence (AI) to explore the genetic and environmental factors contributing to these conditions. The specific aim is to investigate the efficacy of standard and AI-powered PRS for acquired hearing loss and tinnitus using the UK Biobank database.

- **Gene expression-driven brain parcellation via manifold convolutional neural networks.**

Objective: Identifying the transcriptomic architecture of the human cortex by deep learning. The Allen Human Brain Atlas provides gene expression in ca. 3,700 samples across the human brain. However, inter-individual differences between donors have made it challenging to identify regional transcriptomic patterns. Built a modified U-NET convolutional network with a 92% accuracy to identify regional gene expression patterns that are shared across

donors in the cortex. Similar coloring of the sampled MNI-registered tissue loci indicates similar gene expression patterns. Based on these identified patterns, we predict gene expression across the cortical surface.

- **Reducing nephrotoxic medication-associated Acute Kidney Injury in Adults.**
- **A self-supervised Machine Learning framework for Automating Heart Failure Identification.**
- **Discovering the rules that govern the response of organisms to stress using Self-organizing Maps.**
- **Reinforcement Learning based Adaptive Treatment Planning for Prostate Cancer.**
- **Machine learning classification of two-dimensional infrared spectra for High Throughput Screening.**
- **Prediction of Volatile Organic Compound disease biomarkers in complex mixtures utilizing Gated Recurrent Neural Networks.**
- **Protein Structure Prediction by combining deep learning with physics-based simulations using the Force Field X software.**
- **ANN-based prediction of the energy component associated with the high-level (CCSD) algorithm in metals for drug discovery and semiconductor physics.**
- **Distance Reading Patent Law- (analyzing uniformity and predictability in patent law using Natural language processing).**
- **Improving data-based individualization in Primary School Education through Artificial Intelligence: The IDEA Project.**
- **Using machine learning to develop symptom prediction models in patients with cancer and multimorbidity.**
- **Deep Digital Twins: A framework to make cities more sustainable and resilient using Generative Adversarial Networks.**
- **Autoencoder-based clustering methods to risk stratify patients with Syncope presenting to the Emergency Department.**
- **Analysis of Structural Inequity and Intersectional Suicide deaths in the United States using AI.**
- **Using Machine Learning to predict Extubation success in Neonates.**
- **Using Artificial Intelligence to analyze discourse from the Adult Attachment Interview.**
- **Natural Language Processing to Improve provider-patient relationships through improved empathy, knowledge, attitudes, and behaviors around Whole-Person Care in Oncology.**
- **Quantitative Behavioral Coding in a partially nested randomized control trial with racially diverse older adults.**
- **Attention-based GRU networks for Flood Forecasting and Control.**
- **Visualizing Extremity: Detecting Extremist Symbols in News Coverage of January 6 Capitol Attack**
- **Artificial Intelligence And Construction Of Machine Learning Techniques To Predict The Risk Of Miscarriages Following In-Vitro Fertilization Treatment In The United States: An Analysis Of >150,000 Treatment Cycle Outcomes From The National SARTCORS Database**
- **Development of Artificial Intelligence Chatbot as Expert System for Antibiotic Resistance Interpretation and Stewardship**
- **Who gets to be a team leader?**
- **Experimental Studies Demonstrating the Application of Asymptotic Equipartition Properties to Generative AI Models**
- **Predicting Deterioration Trajectories in Patients with Lung Cancer Using Machine Learning and Natural Language Processing**

- **Leveraging Artificial Intelligence to Unravel the Radio genomic Architecture of Hearing Traits**

PROJECTS AS DATA SCIENTIST:

Smart Scan Solution for one of India's biggest financial services companies **Mar 2016 – July 2019**

Objective: To extract tabular data from photocopied documents and consolidate them to provide analytical reports. The application uses concepts of computer vision, deep learning, and OCR. Built the multi-user application with micro-services-based architecture on a multi-node cluster to handle large volumes of data and process documents in parallel and near real-time. The product is used by thousands of employees simultaneously.

Role: Team member in Version 0, Project Lead in Version 1 and Version 2.

Tools: OpenCV, Keras, Python, Django rest, Nginx, MongoDB, Luigi, Dockers

Delivery and Sales journey plan optimization **July 2018 - Dec 2018**

Objective: Optimally plan the journey routes of delivery trucks/ sales agents based on business, physical, temporal, and spatial constraints. Concepts include clustering and optimization techniques. The multi-tenant application is developed using the Hadoop ecosystem components.

Role: Core member in solution design and Team lead.

Tools: Python, HBase, Apache Phoenix, Apache Kafka, Django rest.

Product recommendation/ Sales prediction solution **Jan 2018 - May 2018**

Objective: To develop a machine-learning-based solution that recommends products as well as the quantity to be sold to a particular outlet/store on a given day using the historical purchase patterns of the outlet. The consumer goods company, based on recommendations, makes a sales pitch to retail outlets.

Role: Team lead and developer. *Tools:* Python, Scikit-learn, Tableau, MySQL, Django rest.

Likelihood estimates of employee churn rate **Dec 2015 - Feb 2016**

Objective: To predict the likelihood of an employee leaving an organization early, we used multivariate analysis, principal component analysis, and ensemble models. We achieved an accuracy of 96.7%.

Role: Direct Responsible Individual (DRI). *Tools:* R, MySQL.

Sentiment Analysis on Tweet feed **Oct 2015 – Nov 2015**

Objective: To train analyst teams on Natural Language Processing via live tweets of Bihar state assembly elections (India).

Role: Direct Responsible Individual (DRI). *Tools:* Python.

***Furthermore**, been a part of numerous **POCs** (proof of concept) projects in Image processing and Deep Learning.*

OTHER INTERESTS:

- Trekker: Conquered Bhuranghati Peak(15075 ft) & Kunzum Pass – Chandratal Lake (14800 ft).
- Diver: Certified PADI Open Water Diver.
- Active Lifestyle: Solo Travel, 10K Runs, Hiking, River Rafting, Kayaking.