Rijul Saini

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Languages

English (native), Hindi (mother tongue), and French (beginner)

Functional and Technical Skills

Research Interests and Key skills: Mining and Analyzing Complex Data Sets, Statistical Analytics, Recommendation Systems, Predictive Analytics using Machine Learning, Applied Natural Language Processing, Software Engineering, MLOps, Continuous Integration, Leadership and Training, Project Management, and Team Incubation

Programming: Python, SQL, Core Java, C++, HTML, CSS, JavaScript, and SAP ABAP

Tools, Frameworks, and OS: GIT, TensorFlow, PyTorch, AWS, SciPy, Pandas, NumPy, Django, Flask, Dash, Plotly, Spring Boot, REST APIs, React JS, Travis CI, Kubernetes, Heroku, Docker, SAP-HR, Linux, and Windows

Education

McGill University, Montréal, Canada **Sep 2017 – Dec 2022**

Doctor of Philosophy - Applied Machine Learning in Software Engineering, GPA: 4/4

- Relevant coursework: Natural Language Processing and Machine Learning Techniques for Software Engineering, Applied Machine Learning, Model-Driven Engineering, Advanced Language Software Engineering, Software Analytics, and Model-Based System Design and Simulation

Silver Medalist in the ACM Student Research Competition SRC – 2022
Graduate Research Enhancement and Travel Award (GREAT) – 2020/2022
Masters to Ph.D. Fast-Track Award – 2018, McGill Engineering Doctoral Award (MEDA) – 2019 to 2021

Guru Gobind Singh Indraprastha University, New Delhi, India **Jul 2009 – May 2013**

Bachelor of Technology (Computer Science & Engineering)

- Relevant coursework: Algorithm Analysis and Design, Software Engineering, Object-Oriented Programming, Computer Networks, and Database Management Systems

Work Experience

Student Intern – Machine Learning **Sep 2022 – Dec 2022**

National Research Council Canada, Ottawa, Canada

- Conducted research for applying deep learning to solve the problem of defect localization.
- Developed YOLO and Faster R-CNN models in PyTorch for classifying parts in vehicles (mAP > 0.90).

Student Intern – Data Science and Software Engineering **Jan 2021 – Sep 2022**

Bombardier Aerospace, Montréal, Canada

- Led an initiative to enable predictive analytics where I built a pipeline using Scikit-Learn to process 3D data and predict aero coefficients using classical Machine Learning models (>95% accuracy).
- Solved a business problem of optimizing conceptual designs of aircraft using optimization algorithms.
- Designed the architecture and built a prototypical tool with microservices using Django and React.

Second Place in the Case Competition "Bombardier Leaders of Tomorrow" – 2021

Student Developer – Software Engineering **Summer 2019, 2020**

Google Summer of Code, Eclipse Foundation

- Worked with the Red Hat team to bring the co-editing support in Eclipse Che 7 using Kubernetes.
- Developed a VS Code extension to enable conflict-free collaborative development and modelling.

Software Engineering Analyst – SAP HCM **Dec 2013 – May 2017**

Accenture Solutions Private Limited, Pune, India

- Helped Portal and Finance consultants to solve critical issues using the ABAP debugging technique.
- Enhanced the code of payroll interfaces that reduced the problem tickets to one-third.

Received the Outperform Award - 2016

Projects

End-to End MLOps Pipeline for Time Series Forecasting in Trading **Aug 2022 – Jan 2023**
Technologies Used: Amazon AWS, GitHub Actions, Docker, Python, Neptune.ai, Miniconda

- Developed XGBoost model and integrated it with Optuna for optimizing hyperparameters.
- Deployed the Docker image on Amazon AWS using GitHub actions with defined smoke tests.
- The predictions are generated every one hour while results, charts, and metadata are presented using neptune.ai to monitor model staleness and data drift.

Ph.D. Thesis – Applied Machine Learning in Software Engineering **Jan 2019 – Nov 2022**
Technologies Used: TensorFlow, SpaCy, Pandas, Scikit-Learn, Docker, Neo4j, Django, and RASA

- This research builds a recommendation system for assisting practitioners such as requirements engineers in quickly extracting domain models from informal requirements written in natural language.
- Applied Natural Language Processing techniques and Deep Learning models (BiLSTM neural networks).
- The system constructs queryable trace models in the form of knowledge graphs to explain decisions and facilitates system-user interactions for adapting the extracted models based on users' preferences.

Selected International Publications

Paper Title: Machine Learning-based Incremental Domain Modelling
25th IEEE International Conference on Model-Driven Engineering Languages and Systems **(acceptance rate: 27%)**

Paper Title: Automated Traceability for Domain Modelling Decisions Empowered by Artificial Intelligence
29th IEEE International Requirements Engineering Conference (RE), 2021, Research Paper **(acceptance rate: 29%)**

Paper Title: Towards Queryable and Traceable Domain Models
28th IEEE International Requirements Engineering Conference (RE) - RE@NEXT! 2020 **(acceptance rate: 31%)**

Paper Title: Hitchhiker's Guide to Model-Driven Engineering for Data-Centric Systems
IEEE Software, IEEE, 2020

Paper Title: A Neural Network Based Approach to Domain Modelling Relationships and Patterns Recognition
28th IEEE International Requirements Engineering Conference (RE) - MoDRE Workshop, 2020

Volunteering Activities

Team Mentor **Nov 2021 – May 2022**
Bosch Future Mobility Challenge, 2022

- Mentored undergraduate students in the Bosch Future Mobility challenge (2022) where the team developed autonomous driving and connectivity algorithms using deep learning and computer vision.
- The algorithms are supposed to execute on 1/10 scale vehicles to navigate in a simulated environment.

Team invited for the final competition in Romania in 2022

Peer Mentor
McGill University **Aug 2018 – Aug 2022**

- Assisted international students in making an easy transition to McGill and Montréal since May 2020.
- Provided guidance on academics and life to MasterCard scholars that eases their transition to McGill University and facilitates their success (from August 2018 to April 2019).

Location Volunteer Lead **Apr 2014 – Mar 2017**
Accenture's Corporate Citizenship, India

- Organized more than 20 national volunteering events at Accenture partner NGOs from 2016 to 2017.
- Volunteered for more than 400 hours by conducting Skills to Succeed (S2S) sessions.

Received the Accenture Celebrates Excellence (ACE) award - 2015

Other Roles and Responsibilities

- General Chair of MoDRE'22 workshop at IEEE International Requirements Engineering Conference (RE).
- Program committee member of MODELS'22 IEEE conference, Model-Driven Engineering (MDE) Intelligence Workshop at MODELS'21, and reviewer of SoSyM (AI-enhanced MDE) journal papers in 2021.
- Evaluated the undergraduate research projects with the faculty of engineering in 2019, 2020, and 2021.
- Student volunteer at the flagship conferences – ICSE (2019), RE (2021), and MODELS (2019, 2020, 2021).

Personal Activities and Interests

- Sports – Badminton and soccer.
- Music – Singing and playing flute, guitar, and congo.
- Hobbies – Learning new technologies, writing blogs, developing applications, painting, solving puzzles, yoga, and volunteering for social good.