Rijul Saini

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Skills

- **Interests and Key skills:** Data Mining, Statistical Analytics, Recommendation Systems, Predictive Analytics, Machine Learning, Natural Language Processing, Large Language Models (LLMs), Software Engineering, Microservice Frameworks, Continuous Integration, Leadership and Training, Team Incubation
- **Programming Languages:** Python, SQL, Core Java, C++, HTML, CSS, JavaScript
- **Tools, Frameworks, Technical Concepts, and OS:** GIT, AWS, Kedro, TensorFlow, PyTorch, Spark, Snowflake, SciPy, Pandas, NumPy, Django, Flask, Dash, Plotly, Spring Boot, REST APIs, React JS, Travis CI, Docker, Jupyter Notebooks, Software Design Patterns (OOPs), Software Debugging and Testing, Linux, and Windows

Education

Applied Machine Learning in Software Engineering — *Ph.D.* **Sep 2017 - Dec 2022**
McGill University, Montréal, Canada GPA: 4/4
- **Relevant Coursework:** Natural Language Processing and Machine Learning for Software Engineering, Applied Machine Learning, Model-Driven Engineering, Advanced Language Software Engineering, Software Analytics, and Model-Based 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
Google Summer of Code contributor for 2 consecutive years - 2019 to 2020

Computer Science and Engineering — *Bachelor of Technology* **Jul 2009 - May 2013**
Guru Gobind Singh Indraprastha University, India
- **Relevant Coursework:** Algorithm Analysis and Design, Software Engineering, Object-Oriented Programming, Computer Networks, and Database Management Systems

Work Experience

Data and Applied Scientist — *Bombardier Aerospace, Canada* **Mar 2023 - Current**
- Leading data science team to steer ML-based engine on Azure to provide live recommendations to customers for aircraft parts.
- Developed a high performance computing tool with a graphical user interface (**DataProbe**) using Python to enable data analysis.
- DataProbe saves more than 2 man hours in a day - **received an award in Recognition and Mobilization Program, 2023**.
- Developing multivariate variance-based ML solution (PMx) for anomaly detection using time-series data of aircraft sensors.
- PMx aims to increase the operational efficiency of aircraft and minimize return-to-service times through data-driven decisions.

Completed training on Architecting AWS and obtained certification in Snowflake Data Warehousing

Research Engineer AI (Intern) — *National Research Council (NRC), Canada* **Sep 2022 - Dec 2022**
- Conducted research for applying deep learning techniques to solve the problem of defect localization (authored NRC publication).
- Developed YOLO and Faster R-CNN models in PyTorch for classifying parts in vehicles (mAP $>$ 0.90).

Software Engineer AI (Intern) — *Bombardier Aerospace, Canada* **Jan 2021 - Sep 2022**
- 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).
- Developed optimization algorithms and applied them to optimize conceptual designs of aircraft.
- Designed microservices-based architecture and built a graphical user interface using Django and React.

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

Software Engineer — *Accenture, India* **Dec 2013 - May 2017**
- Helped Portal and Finance consultants to solve critical issues using using ABAP programming.
- Developed payroll interfaces that reduced the problem tickets to one-third.

Received the Outperform Award - 2016 for reducing problem tickets related to interfaces.

Technical Projects

Recommendation System — ***AI-based Domain Modelling Bot*** **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.

User Requirements Notation — ***Domain-Specific Language Engineering*** **Aug 2018 - Sep 2021**
Technologies Used: Xtext, Language Server, Sprotty, Theia, Eclipse, and Kubernetes

- Created a Theia-based IDE and a VS Code extension that supports Textual Goal-oriented Requirement Language and generates corresponding diagrams in Sprotty (web-based graphical user interface).
- Deployed the Theia-based IDE in Eclipse Che workspace server for collaborative modelling.

Selected International Publications

- **Paper Title:** Machine Learning-Based Incremental Learning in Interactive Domain Modelling DOI
  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 DOI
  29th IEEE International Requirements Engineering Conference (RE), 2021, Research Paper **(acceptance rate: 27%)**

- **Paper Title:** Towards Queryable and Traceable Domain Models DOI
  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 DOI
  IEEE Software, IEEE, 2020

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

Mentorship and Leadership Activities

Peer Mentor — ***Mitacs and MasterCard*** **Aug 2018 - Aug 2023**

- Assisted international students in making an easy transition to universities in Canada.
- Provided guidance on academics and life to scholars that eases their transition to universities and facilitates their success.

Team Mentor — ***Bosch Future Mobility Challenge*** **Nov 2021 - May 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

Location Lead — ***Accenture's Corporate Citizenship (CSR), India*** **Apr 2014 - Mar 2017**

- 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

- Hobbies – Learning new technologies, writing blogs, developing applications, painting, solving puzzles, and yoga.
- Music – Singing and playing flute, guitar, and congo.
- Activities and Sports – Skiing, Mountain Hiking, Badminton, and soccer.