

Md Salman Refayet

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Summary — Economics M.A. (Thesis) candidate with a strong background in Software Engineering, Causal Econometrics and Machine Learning. Working on Empirical techniques by integrating Natural Language Processing Algorithms and Causal Econometric models for Economic Policy Analysis.

Technical Skills

Programming Languages: Java, C#, Python, SQL, R, Bash

Frameworks & Libraries: Spring Boot, Spring MVC, REST APIs, Spring Security, JWT, OAuth2, Maven, Gradle, JUnit, Mockito, Postman, Hibernate, JPA

Databases: MySQL, PostgreSQL, Microsoft SQL Server, PL/SQL, JDBC, LINQ

DevOps & Tools: Docker, Git, GitHub, CI/CD Pipelines, Shell Scripting (Bash), Linux

Econometrics & Causal Inference: Randomized Controlled Trials (RCTs), Difference-in-Differences (DiD), Instrumental Variables (IV), Propensity Score Matching (PSM), Double Machine Learning (DML)

Data Analysis: R, Stata, Power BI, SQL, pandas, NumPy, ggplot2

Machine Learning & NLP: scikit-learn, Keras, PyTorch, XLNet, NLTK, Text Preprocessing, Feature Engineering

Education

Memorial University of Newfoundland, Canada

Master of Arts in Economics (Thesis-route)

Sep 2024 – Present

McGill University, Canada

Double Major in Computer Science & Economics

Sep 2016 – Dec 2020

Work Experience

Jarislowsky Research Team, Memorial University of Newfoundland, St. John's NL

Research Assistant

Jan 2025 – Present

- Collaborating with Labour Economist Dr. Tony Fang to develop a real-time labour market supply–demand dashboard using Python, Streamlit, SQL and API integration.
- Conducting online and onsite surveys and immigration research for the Newcomer NL digital hub to support newcomers in Newfoundland and Labrador.
- Performing panel-data econometric analyses (first differences, event-study, DiD) on AI's impact on employment and wages using Python for preprocessing and R (tidyverse) for regression and visualization.
- Authored term paper leveraging BLS, O*NET, and AI exposure data (link in Research section).

FDM Group, Toronto ON

Software Developer (Contract position due to limited open-work permit duration)

Sep 2021 – Dec 2022

- Worked on the backend API Gateway for a top Canadian Bank's Messaging Platform with multiple client-side interfaces.
- Developed and maintained APIs for different clients as well as a health-check monitoring tool processing millions of daily requests and responses.
- Improved efficiency of scheduled health-check reports by optimizing JDBC queries and monitoring task logs in Splunk.
- Packaged application artifacts via Docker containerization and managed builds with Maven.
- Contributed to the backend of an internal Consultant Portal under Scaled Agile Framework using Spring Boot, Spring Security (JWT, OAuth2), servlet filters, business logic, and Hibernate/JPA.
- Participated in Agile Scrum methodology, coordinating with Business Analysts and Project Managers on product specifications.
- Produced data visualizations and reports in Excel and Power BI, and effectively communicated insights to stakeholders.

McGill University, Montreal QC

Research Assistant

Sept 2018 – Dec 2020

- Cleaned and pre-processed Excel datasets, did feature engineering for statistical analysis, and created data visualizations in Power BI.
- Stored Data in SQL database, wrote queries and stored procedures to dynamically pull required datasets for econometric analysis.
- Reproduced Supervised Machine Learning Algorithms results by fine-tuning hyperparameters to compare accuracy against the benchmark results posted.

Shift Supervisor — A&W Restaurants, Ottawa ON

Nov 2023 – Apr 2024

- Worked as a Shift Supervisor ensuring quality service to customers in dine-in and drive-thru; managed overnight shifts as needed.

Private Bass Tutor — Tutoring, Montreal QC

Jan 2017 – Jan 2018

- Designed custom bass lessons to teach students how to play bass and cover basslines of popular rock songs.

Guitar Store Retail — Dhanmondi Music Store, Dhaka

Mar 2015 – Aug 2016

- Greeted customers, provided product knowledge, and ensured excellent hospitality.
- Managed inventory and restocking; operated POS system to process cash and orders.

Research

- **AI Impact on Labour Market (Apr 2025):** Empirical analysis investigating AI's effect on wages and employment using a two-way fixed effects difference-in-differences model on panel data from BLS, O*NET, and AI exposure indices. [Term Paper Link]
Tools: R (fixest, ggplot2), Python (pandas, statsmodels), MySQL
- **Non-Resident Speculation Tax Impact (Dec 2024):** We assess the causal effect of Toronto's Non-Resident Speculation Tax on housing prices by integrating Propensity Score Matching with Double Machine Learning. Our analysis merges Zillow transaction data with Statistics Canada socioeconomic indicators and benchmarks against Calgary as a control market. [Paper Link]
Tools: Python (econml, scikit-learn, pandas), R (MatchIt, tidyverse), Stata
- **Gender Classification & Debiasing (Dec 2020):** This study compares SVM, Decision Tree, and XLNet models for text-based gender prediction, then implements word-embedding debiasing to reduce gender bias. Experiments demonstrate both accuracy and fairness improvements on social media comment datasets. [Paper Link]
Tools: Python (scikit-learn, transformers, PyTorch), Jupyter Notebook, pandas
- **Reproducible Machine Learning (Apr 2020):** We reproduce a published fairness-focused classification model using logistic regression and decision trees, matching original performance metrics despite limited methodological details. Our streamlined implementation achieves equivalent accuracy and bias measures with simpler code. [Paper Link]
Tools: Python (scikit-learn), Jupyter Notebook, Git

Machine Learning Projects

- **Reddit Popularity Score:** Implemented gradient descent and closed-form linear regression from scratch in Python on a Reddit dataset to predict r/AskReddit comment popularity.
- **IMDB Sentiment Analysis:** Built SVM, decision tree, and Naïve Bayes classifiers for IMDB comment sentiment, applying NLP preprocessing (stemming, lemmatization, n-grams).
- **Image Recognition:** Developed CNN and RNN models on a modified MNIST dataset using TensorFlow and Keras for image classification.

Leadership & Volunteering

- **Scrum Master [May - Oct 2021]:** Put on the hat of a Scrum Master while leading our team as a Lead Developer in an experimental Scaled Agile Project internal to FDM Group in order to architect and develop Consultant's Portal application.
- **BSA VP Media and Events [Sept 2017 - 2018]:** Collaborated with McGill's Undergraduate student union SSMU in order to organize, launch and manage Media Events for International Cultural Group, Bangladeshi Students Association (BSA) at McGill.
- **SKF Remote English Tutor [May - Dec 2018]:** As part of McGill's Syrian Students Association (SSA) initiatives, worked as a peer support and Remote English Tutor for Students at Syrian Kids Foundation.
- **Project Leader [Sept - Dec 2019]:** Project Leader of the software development team working on building a full-stack end-to-end RESTful web app on Java Spring Boot and a mobile app on Android. The project "Cooperator" is a co-op system app for McGill Engineering students, using Vue.js, PostgreSQL, and Hibernate, developed in Agile sprints.
- **Hackathon IBM API Award [Jan 2019]:** Selected as one of the top six teams at McHacks6 and awarded IBM's Best API Use for integrating Watson NLP in "Learning in the Cloud," a Flutter-based cross-platform mobile app.
- **Competitive Programming [Sept 2019 - Apr 2020]:** Selected and trained for McGill's Division 2 Competitive Programming team.