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MATHIEU DUFOUR

EDUCATION

McGill University — GPA: 3.61/4.00

Montreal (Canada), September 2018 – Present (Expected December 2021)

Software Engineering Major (B.Sc.)

Specialization courses: Applied Machine Learning, Brain-Inspired Artificial Intelligence, Artificial Intelligence, Software Design, Software Delivery, Software Engineering Project

Minor in Entrepreneurship (Desautels Faculty of Management)

Relevant coursework: Technological Entrepreneurship

Natural Language Processing Specialization

Coursera, May 2021 – Present (Expected August 2021)

Courses (to be completed by August 2021):

- NLP with Classification and Vector Spaces (in progress)
- NLP with Probabilistic Models
- NLP with Sequence Models
- NLP with Attention Models

Semester Abroad: Nanyang Technological University — GPA: 4.50/5.00

Singapore, January – May 2020

2nd best university in the world for Computer Science (U.S. News and World Report, 2020)

Computer Science (School of Computer Science and Engineering)

Relevant coursework: Artificial Intelligence, Database Systems, Operating Systems

SKILLS

Spoken & Written Languages

French (native), English (fluent) & Spanish (beginner)

Programming Languages

Experienced: Java, JavaScript, Typescript, HTML, CSS

Proficient: Python, Go, C, C#, OCaml, Dart (using Flutter SDK)

Other Technologies / Frameworks

Git, MySQL, Docker, PyTorch, TensorFlow, Bash, PowerShell, Angular, React, Flutter

INTERNSHIP

Full-Stack Developer — WFHomie

Toronto (remote), January–May 2021 (contract part-time)

- Designed, implemented, and maintained features on WFHomie's React/NodeJS/Firebase platform, often working on tight deadlines to prepare features for clients. Selected projects include: the implementation of a booking system using the Stripe API, and the full design and implementation of a Slack bot that manages user interactions.

Programmer Analyst Trainee — CGI Inc.

Quebec City, May–August 2019

- Office 365 Migration Software: Computer software to automatically migrate the mailboxes of any company from on-premises Exchange servers to Microsoft Office 365

online servers. I wrote the entire program, together with another intern, using Windows PowerShell (back end), C# (front end) and the Microsoft .NET Framework
- I held a workshop in front of other employees to explain the logic behind the Office 365 Migration Software code and the most advanced programming concepts used.
- PowerShell scripts to execute different tasks for several companies, such as SNC Lavalin, Total, CSL and MRC Vaudreuil-Soulanges

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PERSONAL PROJECTS

Full Stack Personal Project: Social Media-Based Travel Planner

May 2020–Present (work in progress)

- Technology used: Angular (TypeScript, HTML, CSS), Go, MySQL
- APIs: Google Maps, Google Sign-In, Facebook Login
- An early version can be found here (work in progress; suggested credentials for testing: {username: “test”, password: “test123”})

HACKATHONS

Winner of McHacks 8 (Top 3 Hacks, Best use of Google Cloud and Best Design)

29-31 January 2021

- Mobile app (IOS/Android) to debate with people of opposing opinions on various topics
- Using Flutter SDK, Firebase (Cloud Firestore, Cloud Storage, Firebase Authentication)
- Devpost
- GitHub repository

Winner of the McGill Physics Hackathon (People’s Choice Award)

7–8 November 2020

- Non-Newtonian and Newtonian web-based fluid simulator
- Using p5.js alongside Vue.js and Chart.js
- Devpost
- GitHub repository

Participation in Hack&Roll 2020 (Hackathon organized by the National University of Singapore)

18–19 January 2020

Development of a mobile app (Android & IOS) that helps students to apply for jobs on their university campus. The app has been written in Dart, using the Flutter SDK, and is connected to Google Firebase.

Participation in McHacks 6

2–3 February 2019

Development of a study manager Android app for students. The app blocks access to the phone during study hours and notifies the user when it is time to take a break. Written in Java and XML.

SCHOOL PROJECTS

Brain-Inspired Artificial Intelligence

January-April 2021

- Implementation from scratch of a Hopfield network (RNN to reproduce the associative memory function of the brain) to store images from the MNIST dataset.
- Implementation from scratch of a temporal difference learning model, and experimentation with an agent in the Morris water-maze task.

One-Year Long Software Engineering Project: Development of a Distributed Multiplayer Game

September 2020-April 2021

- Following a model-driven engineering approach
- Exploration of the software development life cycle: requirements elicitation and specification, architecture design and detailed design, implementation, deployment, and maintenance.
- Technologies: C# (back-end), Unity (front-end) and Azure Virtual Machine (server)

Convolution Neural Network for Multi-Label Classification of Image Data

December 2020

- Classification of images containing 1 to 5 handwritten digits
- Top 5 out of 247 competitors (private Kaggle Competition)
- Test accuracy of 99.821% on unseen dataset of 14,000 images
- Use of both TensorFlow and PyTorch

Prediction of the Number of COVID-19 Hospitalizations Based on Symptom Search Trends

October 2020

- Comparison of the prediction accuracy of K-nearest neighbours (KNN) and decision trees
- Using publicly available datasets provided by Google Research
- Visualization of data using Principal Component Analysis
- k-means clustering to find groups in the search trends dataset (unsupervised learning)

Implementation from Scratch of Multi-Class Logistic Regression (SoftMax Regression)

November 2020

- Only using general Python utilities from SciPy (NumPy, pandas, Matplotlib)
- Implementation of a gradient descent mini-batch optimizer

Implementation of a GitHub Actions Release Pipeline for an Open-Source Software

November-December 2020

- Golang-based OSS (https://github.com/denverquane/automuteus)
- GitHub Actions implemented: automated testing, unit test coverage, build trigger on push and code linting (GolangCI) added to workflow

OTHER

Publication of a Book on How the Universe Works

January–May 2018

I wrote, using LaTeX, a 40 pages scientific essay that explains how the Universe works, from the Big Bang to the theories about how it will end. The essay has been officially published at the library of the Cégep de Sainte-Foy.

Design of a Scientific Website

September–March 2016

Design, using Jimdo, of a scientific website where I answered numerous scientific questions, as part of the final personal project of the International Baccalaureate.

https://sciensationnelle.jimdo.com/

Participation in the Provincial AQJM Final

May 2010

I got 100% at the 2010 provincial final of the Association Québécoise des Jeux Mathématiques.

REFERENCES AVAILABLE UPON REQUEST