Jon Menard

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Education

Carleton University — Ottawa, ON
Master of Applied Science - Electrical and Computer Engineering; Standing: A+ — *Sep. 2021 – Sep. 2023*
Bachelor of Engineering - Software Engineering; Standing: A- — *Sep. 2017 – May. 2021*

Work Experience

- **Red Rabbit** — Ottawa, ON
  Full-Stack Development for Customized Web Solutions — *Feb. 2023 - Present*
  - **Custom Web Solutions**: Full-stack development of completely customized websites using Drupal and Laravel frameworks. Tailored solutions including registration systems, e-commerce platforms, contest sites, and data aggregation and analytics portals.
  - **Web Development Lifecycle**: Managed multiple production websites with a full deployment system across development, staging, and production environments. Utilized Docker Images, DDEV Environments, and orchestrated workflows via GitLab CI/CD through multiple projects, deploying with Dokku or Docker Compose
  - **Continuous Integration and Deployment**: Implemented CI/CD pipelines for automatic image deployment across multi-project builds, from development through production, in a collaborative team environment. Integrated built-in automated testing and linting.
  - **Technical Skills and Tools**: PHP, SQL, Drupal, Laravel, ORM, Laravel Nova, Python, Docker, Postman, OpenAPI, Gitlab CI, API Consumption, Composer, Vuetify, Unix Shell, Microsoft Azure OCR, OpenAI LLMs
- **Government of Canada: Statistics Canada** — Ottawa, ON
  Database Management — *Jul. 2020 - Dec. 2021*
  - **SQL**: Student intern for the database application development support team. Prepared and stressed tested data aggregation queries used during the 2021 Census. Provided departmental support to optimize existing SQL queries.

Applied Projects

- **Master's Thesis Project (Multi-Agent Reinforcement Learning)**
  Carleton University — *May 2021 - Sep. 2023*
  - Sponsored by Ericsson, the thesis research focused on the novel use of multi-agent reinforcement learning by both Base Stations and User Equipment to optimize resource allocation in 5G networks. The work is patent pending.
  - Developed a 5G network simulator to model mobile network transmission characteristics, focusing on complex resource allocation challenges such as Resource Blocks, Transmission Frequency/Power, Beamforming, and Beamcombining. Addressed these challenges using advanced Neural Network-based MARL algorithms, including QTRAN, MADDPG, and IQL
  - Python: Keras, TensorFlow, PyTorch, NumPy, Pandas
- **Directed Studies - Real-Time Simulation on Embedded Systems**
  Carleton University — *May. 2022 - Sep. 2022*
  - Contributed to advancing the Discrete Event System Specification (DEVS) by porting Carleton's first generation Cadmium simulator to an object-oriented second generation in C++. The four-month directed study involved dissecting and redesigning the simulator to support real-time execution for embedded systems. The redevelopment enabled V2 to run fully object-oriented code for virtual simulations or direct deployment on microcontrollers.
- **Personal Portfolio**
  Jon Menard's Portfolio — *Jan. 2019 - Present*
  - Created a personalized playground showcasing a portfolio of projects developed from scratch, featuring various interactive games such as Snake, Flappy Bird, Minesweeper, and Tetris. Further expanded the portfolio's complexity by integrating AI and machine learning technologies, including algorithms to solve Minesweeper and Tetris autonomously. https://jonmenard.github.io/
  - Worked in Unity to simulate a self-parking car amid obstacles. Trained a custom NN using RL to control the car's gas, brake, and steering. Live at: https://jonmenard.github.io/machineLearning.html (Desktop only)

Publications

- **Decentralized Resource Allocation in 5G Networks with Heterogeneous Multi-Agent Reinforcement Learning**: https://doi.org/10.22215/etd/2023-15915