Jon Menard

https://jonmenard.github.io/

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Objective

Hardworking and tenacious software developer with experience in machine learning and full-stack development, seeking to expand my skills and expertise in innovative solutions. I enjoy tackling complex challenges that require both creative and technical approaches. Having recently graduated with a Master's in Electrical and Computer Engineering, I have crafted customized web solutions using Laravel and Drupal, optimized SQL queries, and developed scalable, high-performance applications. I am passionate about AI, machine learning, and reinforcement learning, and eager to contribute to cutting-edge projects.

Work Experience

- **Red Rabbit** — Ottawa, ON

  Lead Developer for Customized Web Solutions — *Feb. 2023 - Present*

  - **Provincially Backed Registration System**: As the lead developer, oversaw the development of a registration system backed by provincial funding. Designed and built the website from the ground up, managing the full development lifecycle and successfully bringing it to market.
  - **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.
  - **Team Leadership and Training**: Oversaw the training of new employees, ensuring they were brought up to speed on technical workflows, tools, and project requirements. Played a key role in assessing their ongoing performance and making decisions regarding their continued roles within the company.
  - **Key Projects and Technical Contributions**: Custom implementation of JWT token authentication. Developed a custom cart checkout with full integration into SportsPay as a payment gateway. Integrated DocuSign API for digital document management, enabling secure electronic signatures. Utilized Microsoft Azure OCR and Python to match purchased products on receipts for contest entry validation. Managed large-scale data mapping and processing for 100,000+ automotive e-commerce variants.
  - **Technical Skills and Tools**: PHP, SQL, Drupal, Laravel, ORM, Python, Docker, Postman, OpenAPI, Gitlab CI, API Consumption, Composer, Vuetify, Unix Shell, Microsoft Azure OCR, OpenAI LLMs

- **Government of Canada: Statistics Canada (Co-op)** — Ottawa, ON

  Database Management — *Jul. 2020 - Dec. 2021*

  - **SQL**: 18-Month Student intern for the database application development support team. Assisted in preparing and stress-testing data aggregation queries used in the 2021 Census. Designed and implemented new database architectures to support upcoming aggregation and processing needs. Provided support to various departments, troubleshooting and enhancing 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.
  - 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 the challenges using Machine Learning to train advanced Neural Networks to form a collaborative group policy between all User Equipment and Base Stations.
  - Results include the metrics for several 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. The real-time simulator is actively utilized by several PhD and Master's students for their thesis research, demonstrating its value as a core tool for advanced academic studies

- **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. https://jonmenard.github.io/games
  - Integrated AI algorithms to solve Minesweeper and Tetris. Used supervised Machine Learning to train Neural Networks for object localization in images.
  - Worked in Unity to simulate a self-parking car amid obstacles. Trained a custom Neural Network using Reinforcement Learning to control the car's gas, brake, and steering. Live at: https://jonmenard.github.io/machineLearning.html (Desktop only)

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*

Publications

- **Decentralized Resource Allocation in 5G Networks with Heterogeneous Multi-Agent Reinforcement Learning**: https://doi.org/10.22215/etd/2023-15915
- **Distributed Resource Allocation In 5G Networks With Multi-Agent Reinforcement Learning**: https://doi.org/10.23919/ANNSIM55834.2022.9859340
- **A Web Based Modeling and Simulation Environment to Support the DEVS Simulation Lifecycle**: https://doi.org/10.23919/ANNSIM52504.2021.9552123

Interests

- **Machine Learning and Reinforcement Learning**: Deeply interested in leveraging supervised learning models and reinforcement learning to solve complex, real-world problems. I enjoy exploring how AI can enhance automation and decision-making in diverse applications.
- **Optimization**: Passionate about improving computational performance and efficiency. I find great satisfaction in refining complex tasks (such as SQL queries) and system processes to maximize data handling and streamline operations.
- **Solution Architecture**: Enjoy designing robust, scalable solutions that not only meet technical specifications but also align seamlessly with business goals. My focus is on creating architectures that are both innovative and sustainable.
- **Problem-Solving**: Driven by a love for solving intricate technical challenges. Whether it's through algorithm design or system architecture, I am constantly seeking new ways to innovate and improve efficiency.