Ysael Desage

PhD Student, Scientific Engineer



+1 (514) 952-2405



Ysael.Desage@me.com /in/YsaelDesage/



Montreal (QC), Canada



www.ysaeldesage.com



LANGUAGES

English French Spanish





EDUCATION

2023 • MC GILL UNIVERSITY

PhD Electrical & Computer

Engineering (in progress)

2020 • UNIVERSITÉ DE MONTRÉAL

M. Sc. Computer Science

Operations Research

2018 • UNIVERSITÉ DE MONTRÉAL B. Sc. Physics Astrophysics



ATTRIBUTES

- Innovative
- Flexible
- Self-motivated
- Diligent
- Meticulous
- Pedagogist
- Strategist
- Orderly
- Articulate
- Versatile
- Collaborative
- Resourceful



SCHOLARSHIPS

• Industrial fellowship (2019-2020)

65 000 \$



PROFILE

Application-oriented scientific engineer with a significant research background. Highly adaptable, my focus revolves around problem-solving through the deployment of valuable solutions, ranging from fast off-the-shelf based deliverables, to custom cutting-edge approaches and infrastructures.

My background in physics provides me with a solid mathematical understanding and analytical intuition, blending holistically with artificial intelligence, operations research, data science and modeling expertise to deliver innovative, performing and rigorous results.



EXPERIENCE

Communication & Representation

- Preparation and teaching of technical training/lectures for general public and specific internal teams.
- Cooperation and coordination in large company multi-disciplinary projects.
- Representation and promotion of a company at public events and collaborative partnership groups.
- Development of technical internal and general public-facing interactive dashboards.
- Internships supervision and coordination.

Research & Development

- Drive research and development initiatives.
- Coordination of (academic) research partnerships.
- Implementation of complex state-of-the-art research algorithms.
- Design, development and testing of multiple research prototypes.
- Conversion of successful/promising research prototypes to production.

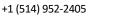
Systems & Production

- Production of maintainable code with complete QA process.
- Development of object-oriented programs, leveraging multithreading, multiprocessing and parallelized/asynchronous computing.
- Planning and creation of various deep/machine learning predictive frameworks with automated model serving, evaluation and retraining.
 Deployed model types include SVMs, KNNs, gaussian processes, decision trees, gradient boosting, random forests and other ensemble methods, MLPs, CNNs, ResNets, RNNs, GRUs, LSTMs, Seq2Seq/Encoder-Decoder, Transformers and other attention-based architectures.
- Design and implementation of custom multi-objective operational control/optimization infrastructures. Deployed control resources include mathematical programs (linear, quadratic, MIP, MILP, non-linear), deep reinforcement learning, dynamic programming, pareto fronts, particle swarm optimization, genetic algorithms, and more.
- Design and rollout of adaptive self-learning and self-healing robust systems.
- Deployment of real-time missing data management for live operations.
- Development of API-led and event-based scalable projects with microservices.

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CERTIFICATIONS

- **CORS Diploma**
- First Aid +
- National Lifeguard Instructor
 - Pool
 - Waterfront
 - Ocean/Surf
- Australian Ocean Bronze Medallion
- **Radio Operator**



IT SKILLS

Programming & DevOps

- Python
- Bash
- Julia
- TensorFlow TFX
- LaTeX
- SQL
- Git
- Microsoft Office
- Docker
- VBA
- MongoDB
- Asana

Main Python Modules

- Numpy
- Jax
- Pandas
- Tigramite
- TensorFlow
- PySurvival
- Multithreading

- Imbalanced-Learn
- Multiprocessing
 - SciPv
- NetworkX
- Statsmodels
- PandaPower
- FastAPI
- SKLearn
- Plotly / Seaborn
- PyTest
- PyMongo
- Flask
- Datetime
- Streamlit
- Requests
- Pyomo
- Logging
- ORTools



HOBBIES AND INTERESTS

- Sailing
- Various sports
- Lifesaving

- Movies
- Martial arts
- Nature & Outdoor
- Electronics
- Dance



TECH. EXPERTISE & KEY WORDS

Artificial Intelligence • Prediction • Optimization • Forecasting • Simulation Problem Solving • Modeling • Neural Networks • Machine Learning • Control Reinforcement Learning • Dynamic Programming • Self-Learning • Automation Operations Research • Mathematical Programming • Sequential Decision-Making



PUBLICATIONS

Autonomous Control in Smart Buildings: a Deep Reinforcement Learning Approach - Cahiers du GERAD.



CONFERENCE ACTIVITIES

- COP26 (United Nations) | Public interactive dashboard developer Multi-agent artificial intelligence applied to smart building clusters interacting with the electric grid.
- **EUROPT | Conference speaker** Leveraging deep reinforcement learning through the framework of operations research.
- IVADO | Invited conference speaker Modern deployment success: blending artificial intelligence and operations research.
- UNISSU | Sponsored panelist

Al-driven HVAC optimization: the next disruptive innovation in real estate.

IGEE | Invited conference speaker

Applied introduction to machine learning and deep learning for electrical engineers.

JOPT | Conference speaker

Intelligent decision-making algorithms for energy storage systems.



ASSOCIATIONS & GROUPS













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CAREER HISTORY

BRAINBOX AI

September 2019 → Now

Applied Artificial Intelligence Researcher



Description

BrainBox AI utilizes self-adapting artificial intelligence technology to proactively optimize commercial buildings. Using deep learning, cloud-based computing, and a proprietary process, their artificial intelligence engine autonomously and granularly optimizes existing HVAC systems in real time for maximum impact on energy consumption, carbon footprint and building operations.

Summary

Outlined and created multiple deep/machine learning predictive frameworks with automated model serving, evaluation and retraining. Designed and developed an in-house multi-objective operational control/optimization infrastructure, resulting in a pending patent application. Lead multiple technical research and innovation initiatives, including a new company market expansion. Implemented and tested multiple custom algorithms involving cross-team expertise and collaboration.

SIGMA ENERGY STORAGE

May 2017 → May 2019 Analyst and Engineering Intern



Description

Sigma Energy Storage develops and designs portable climate-resistant thermomechanical energy storage systems. The company's technology reduces fossil fuel consumption and enables green energy use by firming intermittent renewables such as solar, wind, or tidal power, for maximum economic and environmental impact.

Summary

Created an electrical demand forecast and peak prediction tool; Developed multi-purpose energy storage control algorithms for energy markets arbitraging and industrial customers; Conducted thermodynamic and acoustic modeling.



LIFESAVING HISTORY

SN HAWAII

2018, 2019, 2021 Ocean Lifeguard Instructor



Summary

Ocean rescue instructing, enriched program development and coordinator, group management.

COROLLA BEACH RESCUE

Summer 2019 Ocean Lifeguard



Summary

Ocean rescue and training.



REFERENCES AVAILABLE ON REQUEST