Ysael Desage

PhD Student, Scientific Developer

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Montreal (QC),
Canada

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

SCHOLARSHIPS

- Industrial fellowship (2019-2020) — **65 000 $**

PROFILE

Application-oriented scientific Python developer 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, sequential decision-making 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 development of adaptive self-healing and robust systems, including real-time missing data management for operations stabilization.
- 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**
- Julia
- LaTeX
- Git
- Docker
- MongoDB
- Bash
- TensorFlow TFX
- SQL
- Microsoft Office
- VBA
- Asana

Main Python Modules

- Numpy
- Pandas
- TensorFlow
- Multithreading
- Multiprocessing
- NetworkX
- PandaPower
- SKLearn
- PyTest
- Flask
- Streamlit
- Pyomo
- ORTools
- Jax
- Tigramite
- PySurvival
- Imbalanced-Learn
- SciPy
- Statsmodels
- FastAPI
- Plotly / Seaborn
- PyMongo
- Datetime
- Requests
- Logging
- …

HOBBIES AND INTERESTS

- Sailing
- Lifesaving
- Martial arts
- Electronics
- Various sports
- Movies
- Nature & Outdoor
- 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.

2021 **UNISSU | Sponsored panelist**
AI-driven HVAC optimization: the next disruptive innovation in real estate.

2020 **IGEE | Invited conference speaker**
Applied introduction to machine learning and deep learning for electrical engineers.

2019 **JOPT | Conference speaker**
Intelligent decision-making algorithms for energy storage systems.

ASSOCIATIONS & GROUPS

Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

CIRRELT

LIFESAVING SOCIETY
The Lifeguarding Experts

GERAD
GROUP FOR RESEARCH IN DECISION ANALYSIS

CORS · SCRO

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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