PERSONAL INFORMATION

Keivan Ardam

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EDUCATION

Sep 2017 – June 2020

MSc. in Mechanical Engineering, Area of Energy Systems

Politecnico di Milano

- GPA: 103 / 110
- Thesis title: Application of Machine Learning in Frictional Pressure Drop Estimation of Two-Phase Flow: A Dimensionless Approach; Multiphase Flow Lab and DataOptima Lab

Sep 2011 - Oct 2015

BSc. in Mechanical Engineering

Amirkabir University of Technology

- GPA: 17.30 / 20
- Thesis title: Design, Fabrication, and Analysis of Different Arrays of Impinging Jets for Heat Transfer Coefficients Investigation; Heat Transfer Laboratory

PROFESSIONAL EXPERIENCES

Mar 2021 - Present

BrainBox AI: Building Energy Optimization Company Powered by Artificial Intelligence, Montreal, CA

Role: AI HVAC Service Development Specialist

- Development of Monitoring Tools and Services
  - Development of a real-time data visualization dashboard (VueJs)
  - Development of a real-time automated alarm and notification for critical conditions based on defined thresholds
  - Development of monitoring master tool for mass monitoring (MONSTER)
- Auto Performance Monitoring
  - Implementation and development of UI tools and services for the mass performance check of portfolios (PERFOMETER)
  - Generating auto RTA (runtime analysis) pptx report (ALBERTA)
- Special Monitoring; Client: Walmart, Biolife, SleepCountry
  - Development of a fault detection service to identify the damaged and prone-to-failure equipment
  - Implementation of an automated schedule change for updating the occupied intervals coming from the client (through API, Client Website, Tridium)

Apr 2019 – Mar 2021

DataOptima Lab: Data Analytics and Optimization for Energy Applications Laboratory, Department of Energy, Politecnico di Milano

Role: Research Fellow (Area: R&D in IoT and data science for smart buildings)

- IoT architecture design, automation pipelines implementation, and development of ML-based models for a smart building (medical center); Client: Siram (Veolia Spa - Energy Management Company)
  - Improving the architecture of containerized IoT-based data acquisition system for the indoor environment (temperature, relative humidity) and HVAC system (boiler/chiller status variables, setpoints, fan speeds, etc.) monitoring to enhance the system resilience, speed, and robustness
  - Implementation of an automated pipeline for error identification and creation of fault reports for post-processing
  - Proposing and implementing offline data acquisition in the local storage to accelerate the computations and minimize the data gap to improve the system resilience
  - Creation of a real-time data visualization dashboard for both the HVAC plant and consumption sides (demo (anonymized data))
  - Development of a real-time automated alarm and notification in critical conditions for building operators
  - Energy auditing and implementing various automated procedures for control strategy improvement and energy consumption minimization
  - Training ML models (including ramp-up time estimation and temperature prediction) to predict the indoor environment and HVAC systems behavior aiming at improving the performance of the utilized strategies

- ML-based modeling of two-phase flows, thermal behavior of the boilers, and district heating systems
  - Optimization of data-driven pipelines (feature selection and algorithm optimization) employed for the estimation of heat transfer and pressure drop in two-phase flows
  - Implementation of data-driven models with different prediction horizons for dynamic modeling of fire-tube boilers utilized in a district heating system

2016 – 2017

ASTA Engineering Company

Role: Inspector of Boiler & Pressure Vessels (*Quality control and standard check)*

- Project area: Standardization and analysis of heat transfer coefficients in an innovative copper-based residential complex's boiler

PERSONAL SKILLS

- Python:
  - ✓ Data exploration: Numpy and Pandas
  - ✓ Data visualization: Matplotlib and Seaborn
  - ✓ Development of ML and DL pipelines: Scikit-learn, Keras
- VueJs
- Database and Cloud Services:
  - ✓ Proficient in SQL
  - ✓ Google Cloud Platform; BigQuery
  - ✓ Real-time Data Visualization: GC Data Studio
- Building behavior simulation tools: Carrier HAP, Open Studio, Energy Plus
- Proficient in ANSYS (FLUENT, Thermal, Static Structural)
- Proficient in MS Office, LATEX

THESIS SUPERVISION

2020 - 2021

M.Sc. Thesis Co-Supervision, Politecnico di Milano, Supervisor: Prof. Najafi (Area: data science for energy systems)

- Investigation of the Most Promising Set of Sensors for Machine Learning based Occupancy Estimation in Buildings
- Optimization of Machine Learning based Pipelines for Indoor Temperature Forecasting in a Smart Building's Cooling Management System
- Optimization of ML-based Pipelines for Weather-Normalized Intervention Assessment and Ramp-Up Time Estimation in a Smart Building System
- Determination of the Most Promising Feature Sets in Machine Learning based Pipelines for Predictive Thermal Behaviour Modelling of Indoor Spaces
- Machine learning based Heat Transfer Estimation of Evaporating and Condensing R134a Flow in Micro-Finned Tubes: Determination of the Most Promising Dimensionless Feature Set

TEACHING EXPERIENCE

Sept. 2020 - Present

Teaching Assistant of Energy and Environmental Technologies for Building systems, M.Sc. Program in Energy Engineering, Politecnico di Milano, Lecturer: Prof. Najafi

- Support the M.Sc. students in the lab sessions focused on physical and data-driven modeling of building behavior using python data science stack

PUBLICATIONS

Published

- **K. Ardam**, B. Najafi, A. Lucchini, F. Rinaldi, L. Colombo, Machine Learning based Pressure Drop Estimation of Evaporating R134a Flow in Micro-fin Tubes: Investigation of the Optimal Dimensionless Feature Set, International Journal of Refrigeration (2021)
- B. Najafi, **K. Ardam**, A. Hanusovsky, F. Rinaldi, L. Colombo, Machine Learning based Models for Pressure Drop Estimation of Two-phase Adiabatic Air-Water Flow in Micro-finned Tubes: Determination of the Most Promising Dimensionless Feature Set, Journal of Chemical Engineering Research and Design (2021)

In-process

- **K. Ardam**, B. Najafi, F. Dadras, F. Rinaldi, Optimization of Machine Learning based Pipelines for Ramp-Up Time Estimation in a Smart Building System, to be submitted to the Journal of Building and Environment
- **K. Ardam**, B. Najafi, H. Khatam, J. Kampf, F. Rinaldi, Investigation of Most Promising Set of Sensors for Machine Learning based Occupancy Estimation in Buildings, to be submitted to the Journal of Building and Environment
- S. Milani, **K. Ardam**, B. Najafi, L. Colombo, A. Lucchini, F. Rinaldi, Machine Learning based Heat Transfer Estimation of Evaporating R134a Flow in Micro-fin Tubes: Determination of The Most Promising Dimensionless Feature Set, to be submitted to the International Journal of Heat and Mass Transfer