Antonio D'Aquilio

Associate | Data Science, Building Physics

ant.daquilio@gmail.com

+447526733099

https://www.linkedin.com/in/antoniodaquilio/

https://github.com/ant-daq

London, UK

https://ant-daq.github.io/AD_Portfolio/

PUBLICATIONS

A surrogate CFD model using Machine Learning for fast design explorations of the indoor environment

IBPSA 2023 - Shanghai

Introducing a novel approach for the fast prediction of the indoor environment performance of a HVAC system. The surrogate modelling approach implements a fully Convolutional Neural Network architecture and can output physics field such as air temperature, velocity and age of air. The model is able to predict results 4 order or magnitude faster than standard CFD, with low error metrics.

Exploration of Design Alternatives using Multivariate Analysis Algorithms

SimAUD 2016 - London

Investigation of SOM clustering algorithm for the support of early stage multivariate exploration of architectural designs. Winner of the 'Best Paper' award at the SimAUD conference.

Simulating natural ventilation in large sports buildings.

SimAUD 2016 - London

An investigation of the potential for a novel workflow capable of capturing the airflow and temperature distribution within large volume spaces such as indoor swimming pools.

PROFILE

Hello! I'm Antonio, an Associate Engineer specialized at the intersection of Data Science and Building Physics. Throughout my professional journey, I've crafted software and cutting-edge tools that empower automation, enable data analysis, and enhance efficiency throughout the lifecycle of the project delivery. Presently, I'm developing novel Machine Learning techniques with the aim of delivering fast design explorations and introducing innovative services.

PROFESSIONAL EXPERIENCE

Hoare Lea

Associate | Building Physics, Data Science - Team Lead

May 2022 – present | London, UK

Running a team of five focusing on the delivery of innovative computational workflows, automation software and Machine Learning applications. Idealised and led the development of a novel Machine Learning toolset for the near real-time prediction of the performance of the indoor environment, with 95% reduction of simulation time. The proof of concept of this development project led to the publication of a research paper at the IBPSA 2023 conference, for which I was invited to present my work in Shanghai, China.

Introba (ex. Integral Group)

Senior Building Physicist

Oct 2017 – Dec 2021 | London, UK

Accelerated the transition to computational and parametric design workflows within the team, including climate analysis, detailed energy modelling, complex daylighting as well as indoor and outdoor comfort analysis making use of Computational Fluid Dynamics (CFD).

Arup

Graduate Mechanical Engineer

Jan 2016 – Sep 2017 | Amsterdam, Netherlands

Developed computational workflows for the delivery of complex building physics analysis within the early design stages of projects, looking at solar radiation, daylighting and natural ventilation analysis.
Developed capability statement videos showing the company's cutting-edge parametric approach to analytics and design optimisation.

SKILLS

Data Science – *Numpy / Pandas / Sklearn / Pytorch / MLFlow*

Data Visualisation – *Plotly / Matplotlib / Seaborn / Bokeh / Streamlit*

Programming – *Python / Javascript / HTML+CSS / Matlab*

API/Web scraping – *Flask / Beautiful Soup*

Version control – *Git / Github*

SIDE PROJECTS

EPW Weather analysis tool

python / streamlit / bokeh / pandas

I created a web dashboard for exploring EPW weather files, a standard format for typical annual weather data. The app features interactive plots, allowing users to analyze the data and identify patterns.

Pigeon

python / grasshopper for rhino / contam

This is a tool that allows the quick simulation of natural ventilation rates between rooms within the Grasshopper parametric environment.

Floorplan to BEM

A side project for the automatic generation of Building Energy Models from a raster or PDF floorplan image. The ML system makes use of You Only Look Once (YOLO) model to identify the location and typology of node elements on the floorplan, needed for the downstream generation of a working gbXML output.

COURSES

Deep Learning Specialization

DeepLearning.AI

2023

Neural nets, Sequence models, Convolutional neural networks, Structuring ML projects, Hyperparameter tuning and optimisation

Machine Learning Professional Certificate

IBM

2022

Regression, Classification, Recommender systems, Clustering, Scikit-Learn, Python, NumPy, Pandas, Data Science, Matplotlib, Seaborn, SQL

Machine Learning Specialization

DeepLearning.AI

2021

Linear Regression, Support Vector Machine, Logistic Regression, Artificial Neural Networks, K-means clustering, Principal Component Analysis, MATLAB

EDUCATION

Delft University of Technology (TU Delft)

MSc Building Technology (cum laude)

Sep 2013 - Jun 2015 | Delft, Netherlands

Master thesis on the use of Genetic Algorithms for the optimisation of building's energy performance and natural ventilation in the early stages of the design process.

Roma Tre University

Architecture Sciences (cum laude)

Sep 2009 - Mar 2013 | Rome, Italy

CERTIFICATIONS

MCIBSE / CEng

Chartered Engineer and Member of CIBSE

LANGUAGES

Italian – *Native speaker*, **English** – *Highly proficient*, **Spanish** – *Limited working proficiency*