Cristina Morariu

Contact

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Tech Skills

ML
Python: >6 years
Tensorflow: >2 years
R: >4 years
Hadoop: <3 months

VIS
Plot.ly: >4 years
Dash: >2 years
ggplot2: >2 years
d3: 1 year
Observablehq: <6 months

Services/Architecture
SQL
Mongo
Neo4J
Docker, docker-compose
AWS, Heroku
Python Flask

Crowdsourcing
AB Testing: 3 studies
Study-design: 3 studies

Amazon MTurk: >1 year
jsPsych: >1 year

Consultancy Skills

Proposal Writing: £700k won
Team Building: team of 4
Public speaking: >20 industry events, meetups, conferences

Work Experience

Researcher - ML for Automatic Design — **VISUS** 07/19 - Now

- Created ML models of human perception used to automate design parameters.
- Currently supervising 3 research assistants and their individual projects.
- Ongoing research:
  - **Vis2Data** - Recommendation System (RecSys) for visualizations based on what people share on Twitter/Tableau Public.
  - **DumbleDR** - Perception-based RecSys for Dimensionality Reduction (DR)
  - **SepMe** - ML model of human perception of class separability in scatterplots

Senior Data Scientist / Consultant — **decisionLab, London** 06/18 - Now

- **Illegal Activity Detection for the UK Space Agency**
  ML engineer/product owner on predictive policing satellite app that helps South American officials detect illegal deforestation carried out in the Amazon.
- **Active Learning Risk Predictor for South East Water**
  Designed and implemented 'human-in-the-loop' method designed to collect risk data from humans (active learning) and infer rules for future ML-aided decisions.
- **Predictive Maintenance for Royal Navy (App Demo)**
  Project owner/lead scientist for the design, development & deployment of the first ML solution ever released in a Royal Navy operational environments.
- **Reinforcement Learning for Manufacturing Line Optimization**
  Implemented a policy gradient method in Anylogic in order to improve decisions on the job allocation problem & outperformed the off-the-shelf Anylogic algorithm.
- **Dispersion Modelling for Hazardous Agents (PoolRe)**
  Developed a Gaussian dispersion model of chem-bio agents in London to better estimate the costs of building damage resulting from unconventional terrorism.
- **Survey of the latest research in Multi-Agent Reinforcement Learning** for the naval industry (covered 150 papers).

Data Scientist / Consultant — **decisionLab, London** 09/17 - 06/18

- **Predictive Maintenance for Rolls Royce**
  Data scientist on the development team of a predictive maintenance solution using LSTMs and autoencoders to predict remaining useful life of A380 plane engine.
- **Manufacturing Line Optimization for Rolls Royce**
  Developed ensemble model (xgboost, random forests, GLMs) to determine the main factors who lead to performance improvements on manufacturing line. Our suggestions improved productivity of the manufacturing line by 15%.

Data Scientist — **Shpock, Vienna** 06/16 - 09/16

- Analyzed inApp Store purchases and contributed to the redesign of the e-store which improved traffic by 20%

Teaching Assistant: Human-Computer Interaction — **University of Vienna** 03/16 - 06/16

Projects

ML Ensembles: 5
(xgboost, random forests, stacked models)

Interpretability: 5
(SHAP, LIME, saliency)

Deep Learning: 3
(LSTM, CNN)

Sensitivity Analysis: 2

RecSys: 2

Probabilistic Modelling: 1

Languages

Romanian *mothertongue*
English *C2 Level*
IELTS Score: 8.0
German *B2 Level*
ÖSD-Certificate: 65%

MOOCs

AWS Solution Architect
PySpark for BigData
Tensorflow for Deep Learning
DeepLearning & Computer Vision A-Z

Hobbies

Watercolor painting
Photography / Light painting
Poetry
The EU / political activism

Places Lived

Sibiu, Romania
Vienna, Austria
Edinburgh, UK
London, UK
Stuttgart, Germany

Publications

HAGRID: Gridify scatterplots with Space-filling Curves **IEEE VIS** 2020 (under review)
Efficient layout gridifying algorithms for scatterplots and node-link diagrams.
Authors: Rene Cutura, Cristina Morariu, Michael Sedlmair

DumbIDR: A Recommendation System for DR **CHI** 2020 (to be submitted)
An automatic system to recommend dimensionality reduction (DR) projection to users for image based datasets
Authors: Cristina Morariu, Adrien Bibal, Rene Cutura, Benoit Frenay, Michael Sedlmair

SepMe: Fine Grained Models for class separation **CHI** 2020 (to be submitted)
A ML model for human perception of class separability in scatterplots.
Authors: Cristina Morariu, Michael Aupetit, Michael Sedlmair

Education

MSc in Machine Learning & Operational Research **University of Edinburgh** 09/16 - 09/17

- **Grade:** Distinction
- **Main subjects:** Machine Learning & Pattern Recognition, Biomedical Data Science, Data Mining & Exploration
- **Thesis:** *Feature Selection for Biomarker Discovery*
  The goal was the identification of groups of biomarker panels for CHD and diabetes. We investigated how much more predictive power would be gained if we asked for additional features for user subgroups and which -omics technologies should be selected for additional information.
- **Tools Used:** R, Shiny

BSc in Computer Science **University of Vienna** 10/12 - 01/16

- **Grade:** 2:1 degree
- **Main subjects:** Scientific Data Management, Visualisation & Data Analysis
- **Thesis:** Lattice Sampling Methods

Hackathons & Awards

Machine Learning Summer School (MLSS) **Tübingen, Germany** Summer 2020

MLSS 2020 Virtual Poster
Selected in the top 10% amongst 1300 applicants.
2 weeks of lectures and tutorials given by world-class researchers in Causality, Reinforcement Learning, Optimisation etc. by Max Planck Institute for Intelligent Systems.

Deep Learning Summer School **University of Ulm** 2019
Participated as part of a 30 people cohort in a summer school focused on applying deep learning to visualization use cases.

Unilever AI Challenge Winner **Digital Catapult** 2019
Best solution out of 5 teams: RL solution that optimizes Unilever packaging lines.

A Unified Asset Health Model and Risk Forecasting Tool using Advanced Machine Learning **OR60 Publication** 2018

National Applied Mathematics Olympiad - 2nd Place **Iasi, Romania** 2012
Also participated in 2019 and 2010 with top 10 results.

National Applied Mathematics Olympiad - 1st Place **Iasi, Romania** 2011