THOMAS LAUTENSCHLÄGER

Master of Science in Computer Science

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EXPERIENCE

Machine Learning Scientist / Quant Analyst

Inkubator 100 Plus GmbH & Co. KG

Feb 2021 – Present Darmstadt,Germany

- Strategy design for investment algorithms.
- Application of machine learning on the stock market.
- Testing of different investing strategies.
- Evaluation of executed trades.
- Resarch and application of (probabilistic) non-linear gradient solvers for risk minimization algorithms (PyTorch).
- Design, implementation and evaluation of a hypothesis test framework. (sklearn, scipy)
- Access and visualization of tested hypothesis and backtests with a web application dashboard. (django)

Machine Learning Engineer

Inkubator 100 Plus GmbH & Co. KG

Feb 2020 – Feb 2021 Darmstadt,Germany

- Development of data processing algorithm pipelines for financial data.
- Design and planning of data processing and visualization architectures in a small team.
- Design and implementation of a backtesting software.
- Usage of NumPy and Pandas for on machine data management before, while and after processing.
- Usage of PostgreSQL and MongoDB for a relational and multidimensial data lake. (Storing raw and processed data).
- Integration of CI/CD with Github actions for testing and auto deployment.
- Containerized deployment setup (Docker).
- RestAPI communication with the data lake with FastAPI.
- Development of an internal application to execute and evaluate trades on the stock market (django).

Student Research Assistant

TU Darmstadt - Laboratory of Lighting Technology

Aug 2018 – Oct 2019 Darmstadt,Germany

- Collected the experience to work in a research lab and got insights to the differences between operating business companies.
- Research on non linear optimization tasks to develop a light setting controller that computes the LED configurations corresponding to the given input criteria (Tensorflow Python).
- Implementation and application of recent pupil detection algorithms for live tracking systems (C++).
- Integration of deep learning algorithms into a tool with a user interface defined in Matlab.

System Administrator & DevOps

Appschmiede

Jul 2016 – Aug 2018 Darmstadt,Germany

- Set up the IT infrastructure of the company.
- Established automated backup plans, failover networks and a new firewall system.
- Set up the backend and the data streaming pipeline (MQTT) for a bycicle riding event.

EDUCATION

M.Sc, Computer Science

TU Darmstadt

April 2018 – September 2020

- **Master thesis** - Variational Inference for Switching Dynamics
  - Identification and control of switching dynamics
  - Derivation and implementation of Bayesian rARHMMs
  - Integration of rARHMMs to *reinforcement learning*
- **Focusing courses**
  - Reinforcement learning
  - Optimization of static and dynamic systems
  - Statistical machine learning

B.Sc, Computer Science

TU Darmstadt

April 2013 – Feb 2017

- **Bachelor thesis** - Darknet Crawling and Data Analysis
  - Extraction of market data to databases. (scrapy)
  - Market analysis using the extracted data.

PROJECTS

Autonomous trading bot

- Developed a live trading bot software that autonomously interacts on the market.
- Risk management algorithms (non-linear gradient solver in PyTorch).

Burrolib: A Markov game framework

- Designed and developed a framework to simulate multi-agent Markov games.
- The agents provide an interface to integrate learning algorithms e.g. RL algorithms.
- Integrated basic reinforcement learning (RL) algorithms in PyTorch.

Reinforcement learning project

- Implementation and evaluation of recent RL algorithms on real hardware (PyTorch).
- Quanser environments (furuta pendulum, cart-pole etc.)

Twitter sentiment analyzer

- Real-time sentiment analysis on Twitter for given hashtags.

Crypto market anomalie detection

- Anomalie detection on crypto assets in real-time (deep learning algorithms in Tensorflow).
- Implemented a complete ETL pipeline with additional notification functionality.

Stock market analysis evaluator

- Market and individual stock risk evaluation. (PyTorch)
- Implemented several model learning and inference technologies for stock markets.
- Model testing and deployment with google cloud services.
- Setup of the infrastructure with terraform on google cloud.