Mike Kertser

Physicist and algorithm developer

My Contacts

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About Me

Highly motivated physicist and algorithm developer, with a great passion for Machine Learning and technological innovations, looking for opportunity to work in field of Data Science and Machine Learning, taking part in an interesting DS/ML projects

Remote/Partial position is preferable in this stage

Skills

- Experience with ML in **Python** and **MATLAB**, familiarity with various classical ML/DS techniques, such as **Clustering**, **Decision Trees**, **PCA**, **Boosting**, and **Monte Carlo simulations**, experience with **tabular data, time series and Deep Learning techniques**, (NLP, CNN, RNN)
- Hands-on experience with toolkits for Deep Learning (**Keras/TensorFlow and PyTorch**), and the relevant python libraries (**Scikit-learn, Pandas, NumPy, Matplotlib, seaborn**, etc.)
- Experience with statistical modeling, Visualization and corresponding Data Science packages (**Minitab, Orange, some experience with Tableau**)
- Familiarity with Computer Vision techniques and algorithms (**OpenCV**)
- Experience with data engineering databases (**MySQL/MongoDB**)
- Familiarity with **deploying** machine learning products
- Solid understanding of **functional and object-oriented programming** with general and scripting languages, including hands-on software engineering background. (Have Developed desktop/GUI, embedded (RPi) and web-based applications), mostly in **Python/C/C++/Pascal/Basic/MATLAB**
- Experience with **Git** and **Docker technologies**

Professional Software

- **TracePro/RayViz, MATLAB, SolidWorks + SW Simulations, FreeCAD, OpenFOAM, ANSYS, COMSOL multiphysics, APEX/ASAP, LabView, Minitab**
- **Scientific programming with Python (Different IDE and Frameworks)**

Additional Information

- Statistics – DRM Green Yellow Belt & Green Belt Training
- Publications - Phys.Rev. B 81, 104110 (2010): "Pressure-induced Fe↔Cu cationic valence exchange and its structural consequences: High-pressure studies of delafossite CuFeO2"

Languages:
· Russian (Mother Tongue)
· English and Hebrew (Fluent)

Professional Experience

Altlantium Technologies | Head of Physics
2020 – Present

Key responsibilities:

- Leading multidisciplinary theoretical and experimental research, managing research teams and leading R&D projects for UV technology and LED-based disinfection systems
- System Physics, Numerical Calculations and Multidisciplinary Simulations
- Optical, Mechanical, Thermal and Hydraulic Design of UV-based hydro-optical systems
- ML/DL-related projects

Alpha-Numerical | Developer (self-employed)
2020 – Present

Key responsibilities:

- Physical Simulations (CFD/Mechanical/Thermal/Optical)
- Numerical Calculations
- Data Science/Machine Learning projects
- Rapid 3D prototyping/3D printing

Medtronic (Jerusalem) | Senior Physicist
2015 – 2020

Key responsibilities:

- **Sensing Technology Group** - Predictive Engineering (FEA/CFD/Thermal/Optical Simulations) and optical sensors development
- **Pneumatic research lab** – Multidisciplinary experimental physicist with hands-on capabilities in a wide range of applied and experimental research fields. Research and Development of Medical Respiratory Devices
- **Medical Consumables' development** – Tech Lead in Capnography. Responsible for several development projects, dedicated to the O2/CO2 consumables R&D (capnography/oximetry) - All stages, including theoretical calculations, CFD, SW 3D modeling, SLA 3D prototyping, testing and delivery for production

Education Background

- Tel Aviv University
  M.Sc. in Physics (Condensed Matter Physics)
  2003-2006
- Ben-Gurion University of Negev, Beer-Sheba
  B.Sc. in Physics and Computer Science
  2000-2003
- Coursera/Udemi/Self-Learning courses for Machine Learning, Data Science and Programming

Patents (partial list)

https://patents.justia.com/inventor/michael-kertser

- Nov 28, 2021: ULTRAVIOLET DISINFECTION WITH AUGMENTED REALITY MONITORING
- Dec 23, 2021: REDUCTION OF PRESSURE FROM SURFACE MOUNT COMPONENTS IN A MEDICAL SENSOR
- Dec 16, 2021: WAVEGUIDE-BASED PULSE OXIMETRY SENSOR
- Jan 16, 2020: CAPNOGRAPHY SYSTEMS WITH INDICATOR LIGHTS - Medtronic
- Jan 9, 2020: FACIALLY FITTING DEVICES WITH ILLUMINATED PLACEMENT MARKERS - Medtronic
- May 16, 2019: DEVICE, SYSTEM, AND METHOD FOR FILTER RECONSTITUTION
- May 9, 2019: BI-FUNCTIONAL FILTER DEVICE FOR A GAS SAMPLING LINE AND SYSTEM
- Aug 22, 2018: DEVICE, SYSTEM AND METHOD FOR THERMAL CAPNOGRAPHY
- Feb 15, 2018: OXYGEN-CAPNOGRAPHY MASK FOR CONTINUOUS CO2 MONITORING – Medtronic
- Feb 9, 2018: SYSTEMS AND METHODS FOR CONCOMITANT CO2 SAMPLING AND O2 DELIVERY – Medtronic
- Oct 3, 2017: System and method for inactivation of infectious pancreatic necrosis virus (IPNV) using medium pressure ultraviolet (UV) light - Atlantium R&D
- Dec 12, 2017: PNEUMATIC SYSTEM FOR CONTROLLED OXYGEN DELIVERY – Medtronic
- Dec 06, 2016: PRONG-FREE CANNULA DEVICE FOR CO2 SAMPLING AND O2 DELIVERY
- Jun 19, 2014: Method and system for treating liquids by ultraviolet illumination (WO2014091493 A1) – Atlantium R&D
- Jun 19, 2014 Method and system for treating liquids by ultraviolet illumination (US 20140166897 A1) – Atlantium R&D
- Jun 19, 2014 System and method for controlling ultraviolet liquid disinfection (US 20140166590 A1) – Atlantium R&D
- Jun 19, 2014 System and method for controlling ultraviolet liquid disinfection (WO 2014091487 A1) – Atlantium R&D
- P-74946-CA | 2,905,257 | SYSTEM AND METHOD FOR INACTIVATION OF INFECTIOUS PANCREATIC NECROSIS VIRUS (IPNV) USING OPTIMIZED ULTRAVIOLET (UV) LIGHT
- Jan 23, 2014: METHOD AND APPARATUS FOR LIQUID DISINFECTION BY LIGHT EMITTED FROM LIGHT EMITTING DIODES – Atlantium R&D

Military Service:

- IDF Armored Corps, 401 BDE, Years: 1997-2000
- Active Reserve: IDF Infantry Corps, 2nd BDE

NewCO2Fuels (NCF-Rehovot) | Senior Physicist
2014 – 2015

Key responsibilities:

- Co-electrolysis SOEC-based systems research and development
- Experimental research

Atlantium Technologies | Physicist at R&D
2006 – 2014

Key responsibilities:

- **System design and engineering** - Theoretical modeling and practical implementation of multidisciplinary UV-based hydro-optical systems
- **Experimental work** in a variety of multidisciplinary projects (optics/lasers and optical coatings, acoustics, high temperature measurements, mechanics and hydrodynamics)
- **Computational simulations and optimization algorithms** in optics, CFD, thermal simulations and structural mechanics with FEM tools
- **UV technology company representative**

INTEL, Kiryat-Gat | Quality and Reliability Engineer
2003 – 2006

Key responsibilities:

- Reliability models and statistical analysis
- Computational tools development
- Intel products sustaining

Tel-Aviv University | Research Assistant
2003 – 2006

Key responsibilities:

- Computational models for High Pressure structural mechanics of Diamond Anvil Cells (DAC)
- XRD spectroscopy in ESRF Grenoble (ID9)
- XAS spectroscopy in ESRF Grenoble (ID24)
- Raman spectroscopy at Bayreuth Institute of Physics

Having experience in a variety of multidisciplinary fields, combining electro-optics, acoustics, mechanical, thermal and flow-dynamic computational simulations and algorithm development

***Specialties*: Simulations, CFD, Numerical Analysis, Optics, Solid State Physics, Mechanical Simulations, Thermal Physics, 3D Printing, 3D Modeling, Spectroscopy Methods, Semiconductors QA, Statistical and Data Analysis, Algorithm Development, Data Science/Machine Learning**

Recent SW/ML/DS projects:

RAG-based Multimodal Technical Document Assistant Chat-Bot (NLP)
RAG Technical Assistant

Keyboard Layout Switcher (NLP)
Open-Souce Deep Learning classifier model, based on positional embeddings and LSTM neural network. Intended for smart keyboard switching of Russian-English-Hebrew layout
https://github.com/kertser/KeyboardSwitcher

LLM-based forum assistant (NLP)
LLM model, based on a large corpus of conversational dialogues, (Israeli Military History web forum).
The model multi-modal pipeline, based on GPT2->GPT3.5turbo architecture, is intended for dialogue and image generation.
Web-scrapper, Server and Client parts are built on Oracle Cloud infrastructure, operating with XenForo Forum

Fake-News Detector (NLP)
Pet-project, using NLP Sentimental Analysis to detect fake news articles

UV systems optimizer tool (Optimization)
Web-based calculator and optimization tool for UV system parametric sizing. Algorithmic are done by means of linear programming and UV system multivariate modeling, based on optical ray-tracing and CFD simulations

RPi0-W2 embedded face-detector and classifier(CV+ML)
Embedded system with custom-made camera is trained for categorical face classification