Cameron MacKeen, PhD

Data Scientist | Research Scientist

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Skills

Programming: Python (pyspark, pandas, scikit-learn, sqlalchemy, torch, tensorflow/keras, flask, plotly, bokeh) · Kafka · Linux · Web3 · AWS · Spark · SQL · GraphQL · Java · C++ · Grafana · Javascript

Work Experience

Machine Learning Engineer

TENSORTRADE *January 2020 – June 2020*

- Contributed to open source AI framework that trains a reinforcement learning agent to trade currencies.
- Aggregated, explored, and engineered features including wavelet transforms to enrich agent's observation space.
- Invented first OpenAI gym environment based on Maker DAO protocol, trained agent to recreate auction exploit.
- Integrated graph CNN model and streaming anomaly detection to discover active yet unlisted Ethereum tokens.

Research Scientist

UNIVERSITY OF CALIFORNIA, SANTA CRUZ — DR. FRANK BRIDGES *June 2014 - March 2019*

- Many research projects resulted in academic publications, awarded Chancellor's Dissertation Fellowship for achievements.
- Analyzed interference patterns of the X-ray absorption fine structure, engineered physical models using high parameter fits.
- Successfully collected and processed data, iterative background characterization with command line and Linux shell scripts.
- Created automated analysis framework with Python to optimize pipeline, redefined lab procedures, and saved 600 work-hours.
- Discovered two new, self-consistent algorithms for extracting an anomalous parameter of a general stochastic distribution.
- Developed framework for unsupervised clustering on big XAS data using pyspark, pandas, and scikit-learn.
- Built 1D CNN trained on simulated spectra to predict atomic properties and dopant species of real data.

Data Scientist

SERACARE LIFE SCIENCES — LORN DAVIS *May 2016 - September 2016*

- Created precision-incentivized model to maximize profit from $600k of stagnant inventory, while increasing turnover ratio.
- Employed AWS and cleaned large data sets; began with an analytical overview of test data and imputed sparse features.
- Engineered features and developed a random forest model coupled with an industry-based economic loss function.
- Presented results and strategic roadmap to executives, with explicit short-term action items for next phase of program.

Machine Learning Engineer

CONCORD CONSORTIUM — DR. HEE-SUN LEE *January 2015 – May 2015*

- Utilized Python to parse and clean log data of students' interactions with computer module, engineered entropy-based features.
- Self-taught R to use Rattle for statistically analyzing data and developed a binary decision tree model to categorize students.
- Compiled results and protocols in a manuscript; established new link between student understanding and action entropy.

Undergraduate Researcher

UNIVERSITY OF MASSACHUSETTS, AMHERST— DR. ANDREA POCAR *April 2010 – June 2013*

- Erected an ultra-high vacuum manifold with a liquid nitrogen plumbing system to cool avalanche photodiodes.
- Constructed a circuit to bias photodiodes, wrote C++ scripts to interface with circuit board firmware for signal analysis.
- Research presented at symposium; awarded an Honors grant and fellowship for exceptional work.

Education

University of California, Santa Cruz *September 2013 – March 2019*

PH.D. IN PHYSICS

- Published 7 papers (3 first authors) and collaborated internationally.
- Awarded Chancellor's Dissertation Fellowship.
- Trained multiple students in lab technique and analysis, delegated research tasks, assisted students on individual projects.

University of Massachusetts, Amherst *September 2009 – May 2013*

B.SC. IN PHYSICS AND MATH

- Submitted Honors Senior Thesis on research, received an Honors grant and Cervo fellowship.

Publications

(1) F. Bridges, R. Dudschus, C. Mackeen, T. Keiber, C. H. Booth, M. B. Maple, “EXAFS investigation of the local structure in URu2−xFexSi2; evidence for unusual distortions at low T”, *Under review* (2020)

(2) C. MacKeen, F. Bridges, L. Kovács, J. Castillo-Torres “Substitution of Er, In, and Hf in LiNbO3: evidence for multiple defect distributions about dopant sites”, *Physical Review Materials*, **2** 093602 (2018)

(3) G. Abdelmageed, C. MacKeen, K. Hellier, L. Jewell, L. Seymour, M. Tingwald, F. Bridges, J.Z. Zhang, S.A. Carter “Effect of Temperature On Light Induced Degradation in Methylammonium Lead Iodide Perovskite Thin Films and Solar Cells”, *Solar Energy Materials and Solar Cells*, **174** 566-571 (2018)

(4) C. MacKeen, F. Bridges, L. Seijo, Z. Barandiarán, M. Kozina, A. Mehta, M.F. Reid, J.-P. R. Wells, “The Complexity of the CaF_2:Yb System: A Huge, Reversible, X-ray Induced Valence Reduction”, *J. Phys. Chem. C*, **121**, 28435-28422 (2017)

(5) C. MacKeen, F. Brigdes, M. Kozina, A. Mehta, M.F. Reid, J.-P. R. Wells, Z. Barandiarán, “Evidence That the Anomalous Emission from CaF_2:Yb^{2+} Is Not Described by the Impurity Trapped Exciton Model”, *J. Phys. Chem. Let.*, **8**, 3313-3316 (2017)

(6) A. Sharenko, C. MacKeen, L. Jewell, F. Bridges, M. Toney, “Evolution of Iodoplumbate Complexes in Methylammonium Lead Iodide Perovskite Precursor Solutions”, *Chem. Mater.*, **29** (3) (2017)

(7) F. Bridges, C. MacKeen, and L. Kovács, “No difference in local structure about a Zn dopant for congruent and stoichiometric $LiNbO_3$”, *Phys. Rev. B*, **94**, 014101/1-5 (2017)