David Loker, M.Math.

CTO/Co-Founder
WaveAI Inc.

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Summary:

CTO — Machine Learning Expert — AI Researcher

Innovative leader in generative AI since 2017, with deep expertise in machine learning, natural language processing, and over 20 years in software development. As CTO of WaveAI, I drive the vision and operations of engineering teams to create AI-powered music and lyrical solutions. I hold a Masters in Mathematics with a focus on AI, supported by extensive research and numerous academic honors, including prestigious scholarships and awards. Proven track record of leading machine learning and software development teams, and deploying advanced AI models in production environments.

Professional Experience:

CTO/Co-Founder Sept 2017 - present
WaveAI Inc. Los Gatos, CA

- Lead high level vision as well as day-to-day operation of the engineering teams
- Supervised building of multiple ML data pipelines and models
- Built custom generative AI models for music, including melody and lyrical poetry generation
- Research and invention of machine learning approaches for the integration of music with language
- Research and invention of approaches to co-creative generation of lyrical poetry
- Development throughout the software life cycle, from inception to in-production systems
- Scaling systems to support large-scale usage while remaining flexible to budget constraints
- Python, PyTorch, Docker, Javascript, React, NextJS, Git, Firebase, Google Cloud, AWS

Machine Learning Analyst/Consultant Jan 2013 - present
Orbitwerks, LLC. Los Gatos, CA

- Consulted companies requiring statistical modeling and machine learning expertise
- Designed and implemented personalization/recommendation and predictive modeling systems
- Utilized both supervised and unsupervised learning techniques, including, but not limited to, clustering, linear regression, SVM, random forests, boosting, hierarchical Dirichlet processes, neural networks, and LDA
- Experience with model building and tuning, R, Python, Java, and data pre-processing techniques.

Lead Data Scientist and Machine Learning Engineer Jun 2016 - March, 2018
Ayzenberg, Inc. Pasadena, CA

- Formed and managed a small team contributing to a variety of data science projects from inception through to in-production ML systems
- Heavy NLP with an emphasis on understanding meaning behind social text
- Entity linking, word sense disambiguation, topic modeling, and building word and paragraph/post models, sentiment modeling for social media via tensorflow, ontology mapping via neo4j
- Python, NLTK, gensim, pySpark, AWS, Neo4J

Senior Research Engineer & Machine Learning Specialist Sep 2013 - Aug 2014
Netflix Los Gatos, CA

- Work on personalization systems and services to drive continued innovation and global growth
- Design, implement, and iterate on machine learning algorithms and A/B tests
- Optimize and enhance production systems in Java, Python, and R
- Work collaboratively to drive projects from the idea stage through to running code

Intermediate Software Developer Feb 2008 - Oct 2009
PTC Integrity Waterloo, ON

- Responsible for both design and development of features within MKS Integrity server and client
- Developed creative solutions to complex problems using advanced software development practices

Software Developer Sep 2007 - Feb 2008
Research in Motion Waterloo, ON

- Enhanced an automation framework for computer-directed blackberry testing
- Designed a scripting language for QA to incorporate manual tests into the automated system

Software Development Engineer Sep 2003 - Aug 2005
Amazon.com Seattle, WA

- Spent a total of three co-op terms working on the design and development of software systems
- Improved the efficiency of product placement using linear optimization techniques, resulting in monetary savings
- Redesigned a knowledge network for maintaining training, courses, and instructor data within warehouses (C/C++, Java, Javascript, Perl, HTML, Mason)

Software Development Engineer Jan 2001 - Apr 2003
Sybase Waterloo, ON

- Designed and implemented a communications protocol over wireless networks (C/C++, ODBC, SMS, SQL)
- Designed and implemented transcoding software, which converted HTML into content for handheld devices in real-time (Java, HTML, WML, XHTML Basic, XML)

Education:

PhD ABD, University of Waterloo Sep 2009 - Aug 2013
Computer Science
Supervised by Shai Ben-David

Master of Mathematics, Thesis Option, University of Waterloo Sep 2005 - Dec 2007
Computer Science
Supervised by Naomi Nishimura and Kate Larson

Bachelor of Mathematics, Honours Co-op, University of Waterloo Sep 2000 - Apr 2005
Computer Science with a Combinatorics and Optimization Minor
Graduated with Distinction and Dean's Honours

Research Experience:

Collaborative Research May 2009 - Sep 2013
University of Waterloo Waterloo, ON

- Formulated a characterization of linkage-based clustering algorithms
- Extended the characterization from k-stopping criteria to work with entire dendogram
- Worked towards furthering a taxonomy for clustering algorithms
- Investigating the gap between optimal hinge and 0-1 loss predictors
- Experimenting with a technique for augmenting query search results with those from orthogonal queries

Independent Thesis Research May 2006 - Aug 2007
University of Waterloo Waterloo, ON

- Research in the field of Auction Theory and Parameterized Complexity
- Analyzed combinatorial auctions within the scope of parameterized complexity theory, a previously unexplored approach to the problem
- Showed how the structure of various representations of combinatorial auctions can allow us to use graph theoretical results in solving the auctions
- Discovered new construction techniques for auction representation

Publications:

Refereed Conference Publications

- M. Ackerman and D. Loker. "Algorithmic Songwriting with ALYSIA." International Conference on Computational Intelligence in Music, Sound, Art and Design (EvoMUSART), 2017.
- M. Ackerman, D. Brown, and D. Loker. "Effects of Rooting via Outgroups on Ingroup Topology in Phylogeny." International Journal of Bioinformatics Research and Application (IJBRA), 2014.
- H. Vahabi, M. Ackerman, D. Loker, R. Baeza-Yates and A. Lopez-Ortiz. "Orthogonal Query Recommendation." ACM Conference on Recommender Systems (ACM Recsys), 2013.
- M. Ackerman, S. Ben-David, D. Loker, and S. Sebato. "Clustering Oligarchies." Proceedings of the Twelfth International Conference on Artificial Intelligence and Statistics (AISTATS), 2013.
- M. Ackerman, S. Ben-David, S. Branzei, and D. Loker. "Weighted Clustering." Proc. 26th AAAI Conference on Artificial Intelligence, 2012. (26% acceptance)
- M. Ackerman, D. Brown, and D. Loker. "Effects of Rooting via Outgroups on Ingroup Topology in Phylogeny." IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS 2012).
- S. Ben-David, D. Loker, N. Srebro, and K. Sridharan."Minimizing The Misclassification Error Rate Using a Surrogate Convex Loss." 29th International Conference on Machine Learning, 2012. (27% acceptance)
- M. Ackerman, S. Ben-David and D. Loker. "Towards Property-Based Classification of Clustering Paradigms." Neural Information Processing Systems (NIPS). Vancouver, Canada, 2010. (24% acceptance)
- M. Ackerman, S. Ben-David and D. Loker. "Characterization of Linkage-Based Clustering." COLT 2010. Haifa, Israel. (32% acceptance)
- D. Loker and K. Larson. "Parameterizing the Winner Determination Problem for Combinatorial Auctions." (Extended Abstract) Ninth International Conference on Autonomous Agents and Multiagent Systems (AAMAS). Toronto, 2010. (2 pages, 43% acceptance, poster presentation)
- D. Loker and K. Larson. "An Investigation of Representations of Combinatorial Auctions." (Extended Abstract) Ninth International Conference on Autonomous Agents and Multiagent Systems (AAMAS). Toronto, 2010. (2 pages, 43% acceptance, poster presentation)

Refereed Journal Articles

- C. Boucher, D. Loker and M. Omanovic. "Graph Isomorphism Completeness for Perfect Graphs and Subclasses of Perfect Graphs." Congressus Numerantium. Vol 185. pp 3-12. 2007.

Other Refereed Publications

- M. Ackerman, S. Ben-David and D. Loker. "Characterization of Linkage-based Clustering." NIPS Workshop. 4 page extended abstract. Dec 2009.
- C. Boucher and D. Loker. "Graph isomorphism completeness for perfect graphs and subclasses of perfect graphs." 38th Southeastern International Conference on Combinatorics, Graph Theory, and Computing, March 2007.
- C. Boucher and D. Loker. "Expected approximation guarantees for the demand matching problem." 2nd International Conference on Algorithmic Operations Research (AlgOR 2007), January 2007.
- D. Loker. "Graph Isomorphism and Recognition of Self-Complementary Graphs." Discrete Math Day. Carleton University. Ottawa, ON. May 2006.
- D. Loker. "Combinatorial Auctions as Graphs." Ontario Combinatorics Workshop. Fields Institute. Toronto, ON. Apr 2006.