

Cosmo Harrigan

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Experience

- **ChannelAgility** **Seattle, WA**
2010 – Present
Founder, Chief Software Architect
 - Founder and chief software architect of a proprietary demand forecasting and price optimization software solution used by e-commerce retailers to improve gross margin and in-stock performance on Amazon.com
 - Delivered multiple invited talks at the Amazon headquarters to provide product managers and executive management with suggestions for their future product roadmap
 - Managing our new feature pipeline and supervising software engineers
 - **Streamline Distributing** **Seattle, WA**
2006 – Present
Founder, CEO
 - Founded and bootstrapped an e-commerce distribution company to millions in annual revenue with no outside investment
 - Managing operations, software development and logistics teams in offices distributed across 3 countries
 - Chosen by Amazon in 2011 as their exclusive partner for their first partner Kaizen process improvement workshop at the Amazon headquarters
 - Featured by Amazon in 2013 on the Fulfillment by Amazon home page in their first series of video interviews with successful CEOs of partner companies
 - **Center for Media and Democracy** **Madison, WI**
2012 – Present
Board Member
 - Board member responsible for making strategic decisions for the organization in collaboration with the other six board members and the Executive Director
 - **Harvard University** **Boston, MA**
2015
Visiting Researcher
 - Invited by Dr. Joscha Bach from Harvard's Program for Evolutionary Dynamics to spend the summer researching architectures for learning to control an agent from high-dimensional 3D perception data
 - Designed and collected two new Minecraft perception datasets and packaged them in HDF5 format for use as a reusable benchmark
 - Designed supervised and unsupervised learning experiments from the high-dimensional Minecraft perception data
 - Experimented with different convolutional neural network and autoencoder architectures using the Theano, Blocks and Keras frameworks
 - Contributed to weekly seminars hosted at Marvin Minsky's house
 - **Google Summer of Code** **Seattle, WA**
2014
Mentor
 - Mentor for Sebastian Ruder's Google Summer of Code project on natural language processing, applying probabilistic inference and relation extraction in a cognitive architecture. My student went on to do internships in NLP at Microsoft and IBM and is now an NLP PhD student.
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Education

- **University of Washington** **Seattle, WA**
2002 – 2004, 2014 – 2016
Bachelor of Science (Honors)
Applied Computational Mathematical Sciences: Discrete Math & Algorithms
 - Returned to university after ten years of running my own companies to restart my research career and combine my entrepreneurial skills with my interests in artificial intelligence, learning theory and reinforcement learning
 - Honors Thesis: Deep Reinforcement Learning with Direct Policy Search and Regularized Convolutional Neural Fitted Q Iteration

- Thesis Supervisor: Dr. Dieter Fox
- Developed a novel batch algorithm incorporating regularization for deep reinforcement learning
- Applied neuroevolution as a direct policy search deep reinforcement learning method
- Co-founder of Machines Who Learn, the first machine learning student organization at the University of Washington

- **Artificial General Intelligence Society** **Beijing, China**
Artificial General Intelligence Summer School 2013
 - **Singularity University** **NASA Research Park, CA**
Graduate Studies Program 2012
 - Chosen for a class of 80 admitted students out of over 3000 applicants
 - Participated in an intensive three-month curriculum on the potential applications and societal impacts of artificial intelligence and other technologies through a combination of research and product development
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Publications

- Harrigan, Cosmo. Deep Reinforcement Learning with Direct Policy Search and Regularized Convolutional Neural Fitted Q Iteration. Honors B.S. Thesis, University of Washington, 2016.
<http://machineintelligence.org/papers/deep-reinforcement-learning.pdf>
 - Harrigan, Cosmo. Deep Learning for Artificial General Intelligence: Survey of Recent Developments. Invited Talk, International Conference on Artificial General Intelligence, 2016.
<http://machineintelligence.org/deep-learning-for-agi.pdf>
 - Harrigan, Cosmo, et al. Guiding Probabilistic Logical Inference with Nonlinear Dynamical Attention Allocation. Artificial General Intelligence. Springer International Publishing, 2014. 238-241.
http://link.springer.com/chapter/10.1007/978-3-319-09274-4_24
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Projects

- Regularized Convolutional Neural Fitted Q Iteration algorithm (RC-NFQ). A batch algorithm for deep reinforcement learning. Incorporates dropout regularization and convolutional neural networks with a separate target Q network.
<http://machineintelligence.org/papers/rc-nfq.pdf>
<https://github.com/cosmoharrigan/rc-nfq>
 - Neuroevolution as a direct policy search deep reinforcement learning method, implemented using Keras and DEAP. <https://github.com/cosmoharrigan/neuroevolution>
 - OpenCog: I was the mentor for the Google Summer of Code student Sebastian Ruder's project on natural language processing, applying probabilistic inference and relation extraction in a cognitive architecture.
<https://github.com/opencog>
 - Minecraft Machine Learning Dataset. <https://github.com/cosmoharrigan/minecraft-dataset-generation>
 - Online learning and adaptive clustering: I assisted with the preliminary research led by Itamar Arel that later led to the launch of Apprente, building intelligent systems based on breakthrough neuroscience-inspired AI technology. (proprietary) <https://www.apprente.com/>
 - Approximate Solomonoff induction by sampling the space of BF programs weighted by a complexity prior to induce an unknown environment model to maximize expected long term reward of an agent
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Core Technical Skills

Tools: Python, Keras, TensorFlow, Jupyter Notebook, Pandas, NumPy, SciPy, C++, C#, Java, L^AT_EX, AWS, Azure
Subject Areas: Reinforcement learning, deep learning, entrepreneurship, information theory, statistical learning
