IOANNA MARIA ATTARIAN

Software Engineer, Google Brain Robotics

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EDUCATION

University of Waterloo   September 2010 - June 2012
MASc in Electrical and Computer Engineering   *Waterloo, ON Canada*
Thesis: '"An Analysis and Reasoning Framework for Project Data Repositories" (Link)

National Technical University of Athens   September 2005 - June 2010
B.E. in Electrical and Computer Engineering   *Athens, Greece*
Thesis: "Software Quality Assessment Environment Based on Structural and Design Analysis Project Elements" (translated from Greek)" (Link)

WORK EXPERIENCE

Google Brain Robotics   July 2019 - Present
Software Engineer   *Mountain View, CA*

· Working on a research team building a robotic tele-operation platform for manipulation tasks in manufacturing settings, and extending the platform to use fully-autonomous Machine Learning.
· Utilized signals from a variety of sensors to quantify task success for a range of different robotic manipulation tasks.
· Analyzed logged data from robotic manipulation tasks to determine correlates of operational metrics including quality, availability, and performance.
· Built a convolutional neural network classifier using Tensorflow to recognize the completion state of a product kit for pick-and-place assembly tasks, and integrated this into the existing production infrastructure.

Google Canada   July 2017 - June 2019
Customer Solutions Engineer   *Toronto, ON*

· Designed and implemented a signal-processing based algorithm to auto-detect merchant product sales and automatically adjust Google Ads bidding strategies, resulting in a $1.5M annual profit increase.
· Built data-source agnostic web application which allowed Google Ads merchants to dynamically set data visibility permissions for their vendors.
· Created scalable data pipeline and data visualizer showing advertisers the estimated impact of online advertising spend on physical in-store purchases.
· Twice received an internal award recognizing significant contributions, given to only 5% of employees in the GTech Professional Services organization across all of North and South America (see Awards section).

IBM Canada Ltd.   July 2016 - June 2017
IBM Data Virtualization (formerly Queryplex) Software Engineer   *Toronto, ON*

· Designed, engineered, and managed a large-scale cloud-based analytics service for IoT distributed-computing, using technologies including Node.js, Angular, CSS, Docker and SQL.
· Presented product to customers with wide variety of use cases including weather sensor integration, trucking fleet management, and wearable device biometrics.
· Received technical innovation award signed by the CEO of IBM (see Awards section) and filed for patent on the underlying distributed-computing algorithm (see Patents section).
· Has since become the flagship product within the IBM Cloud Platform under the name "Data Virtualization".

IBM Canada Ltd. November 2015 - June 2016
IBM Db2 Warehouse Developer Edition (formerly dashDB Local) Software Engineer *Toronto, ON*
· Led a team of 10 people, assisting engineers in the team by providing in-depth cross-product insights.
· Assisted the engineering team in achieving dramatic deployment speed increases of 18x, reducing deployment time from 3 hours down to 10 minutes.
· Designed and engineered features within a Hybrid Cloud and on-premise Data Warehousing product using Docker technologies.
· Served as a client advocate to large insurance brokerage and banking customers by helping them identify beneficial use-cases and helping provide value to their businesses.

IBM Canada Ltd. August 2014 - October 2015
IBM Db2 Warehouse on Cloud (formerly dashDB on Cloud) Software Engineer *Toronto, ON*
· Engineered and implemented new features for one of IBM's most important Big Data, Analytics and Cloud offerings.
· Designed, architected and implemented a full fledged web application portal for customers and sales teams, providing easy, semi-automated access to fully functional Proofs of Concept and demonstration systems for hands-on trials.
· Collaborated with our Design teams to deliver high caliber, up to spec results.
· Assisted and mentored junior engineers on the team in advancing their work by ensuring that dependencies were met, and resolved possible issues that occurred.
· Supported DevOps operations during weekends and holidays by serving on-call shifts.

IBM Canada Ltd. August 2012 - July 2014
IBM PureData for Transactions Software Engineer *Toronto, ON*
· Owned one of the major, most critical back-end components, related to Db2 pureScale instances deployment and maintenance.
· Engineered the first version and subsequent new features as well as maintained existing functionality of the component. Ensured smooth integration with other components of the system.
· Performed critical upgrades on customer systems as well as PoC systems used for client engagement and demonstration purposes.
· Resolved customer issues and ensured that client problems were overcome successfully which involved client engagement by customer demand at any day and time, including weekends, nights and holidays.
· Assisted with Proofs of Concept and live demonstrations for large customers in the retail, banking, and automotive industries.
· Officially continued to hold both this and my previous role for 6 months, by performing my full work and responsibilities for the two projects.

IBM Canada Ltd. July 2012 - January 2013
IBM PureData for Operational Analytics Software Engineer *Toronto, ON*
· Owned one of the product components which involved front and back-end engineering.
· Collaborated and coordinated with a large team of software engineers, designers, and release manager, offering management and QA.
· Learned the fundamentals of engineering large scale software products.

RESEARCH EXPERIENCE

Google Brain Robotics Present
Software Engineer
· Collected data via a UVC camera, and trained a convolutional neural network to detect successes and partial success in a kitting task and a dekitting task, and integrated the trained network into existing production infrastructure.

· Using traditional computer vision techniques to determine whether an object has successfully been picked up by a robotic arm, by pointing a camera at the gripper and measuring the deltas between image histograms with and without the picked objects.
· Architected new structures for task code management and workcell metadata organization. New structures are much more easily digestible by machine learning algorithms, and much more robust to human logging errors which is essential for their use as labeled data.
· Co-author in our team submission accepted to CoRL 2020 (see Publications section).

Human Similarity Judgements   2019-Present
Research Software Engineer

· Collaborating with a senior researcher and academic professor to explore how to transform image embeddings, as computed by state-of-the-art convolutional networks, using a constrained linear transformation so that the neural network can represent image similarity in a way that is closer to how humans perceive image similarity.
· Converted a subset of ImageNet images to image embeddings using a pretrained VGG16 network and measured how close the correspondence was between image similarity as measured in this embedding space, and image similarity as measured by human data labelers.
· Built a training and k-fold evaluation loop to run a series of experiments including training a full NxN similarity matrix, a diagonal NxN matrix, and a full NxN unconstrained matrix, all using the first n-many principal components of the image embeddings extracted through PCA.
· Compared the results of our method to an identity-transformation baseline, as well as to techniques from other researchers.
· Paper was accepted to the NeurIPS 2020 Second Shared Visual Representations in Human and Machine Intelligence (SVRHM) as well as arXiv. (see Publications section).

Lyricgen   2018-Present
Research Software Engineer

· Collaborating with a senior researcher on a novel song lyric text generation algorithm.
· Built modules for manipulating our text datasets to transform them to a state digestible by our training and evaluation systems.
· Trained a transformer model using the open source Tensor-to-Tensor (T2T) framework.
· Co-authored a poster presented at NeurIPS 2018 2nd workshop on Creativity and Design as well as our accompanying paper in arXiv (see Publications section).
· Built a new training and evaluation pipeline leveraging the Google Flax and Jax frameworks.
· Trained a set of new models in preparation for open sourcing the software.

Bionym (currently Nymi)   Summer 2011
Software Engineer

· Built and contributed code for Bionym (was a 2 person startup at the time and has currently grown and operates as Nymi) as a freelance engineer, for performing face recognition tasks using facial biometric ratios.

University of Waterloo   2010-2012
Research Assistant, Graduate Student

· **Thesis research:** Designed, architectured, and implemented an enhancement component for a framework for IDE and software fault prediction, targeting to increase prediction accuracy by the use of machine learning, specifically Markov Logic Networks and neural networks. Results were achieved with accuracy of 97% - 99%. Work resulted in the following publication: "A goal driven framework for software project data analytics" (see Publications section).

National Technical University of Athens   2010
Research Undergraduate Student

· **Thesis research:** Thesis research: Designed, architected, and implemented a framework for IDE and software fault prediction. Potential error scenarios were modeled with the use of AND/OR Goal Trees and the controller made use of first order logic in order to validate input test cases against model instances.

National Technical University of Athens   2007-2008
Research Undergraduate Student

· Contributed to the work of a research team working on the pattern analysis of Greek inscriptions carved into ancient stones to identify the authors of the texts. Assisted in the transformation of several letters from picture to usable binary form and their testing.
· Assisted on another project within the research team by applying and testing a collection of specific stencils discovered to have been used upon the ancient wall paintings of the island of Santorini (Oia), Greece.

PUBLICATIONS

· *"Transforming Neural Network Visual Representations to Predict Human Judgements of Similarity"*, Maria Attarian, Brett D. Roads, Michael C. Mozer, NeurIPS 2020 Second Workshop on Shared Visual Representations in Human and Machine Intelligence (SVRHM, poster session). ArXiv.

· *"Rearranging the Visual World: Transporter Networks"*, Andy Zeng, Pete Florence, Jonathan Tompson, Stefan Welker, Jonathan Chien, Maria Attarian, Travis Armstrong, Ivan Krasin, Dan Duong, Vikas Sindhwani, Johnny Lee, 4th Conference on Robot Learning (CoRL) 2020. ArXiv. (Paper was one of only 20 selected for a plenary talk, 4.1% of all submitted papers).

· *"Combining Learned Lyrical Structures and Vocabulary for Improved Lyric Generation"*, Pablo Samuel Castro, Maria Attarian, NeurIPS 2018 Second Workshop on Machine Learning for Creativity and Design (poster session). ArXiv.

· *"A goal driven framework for software project data analytics"*, George Chatzikonstantinou, Kostas Kontogiannis, Maria Attarian, CAiSE'13 Proceedings of the 25th international Conference on Advanced Information Systems Engineering, June 2013. ResearchGate. Also incorporated into Lecture Notes in Computer Science book series (LNCS, volume 7908).

PATENTS

· *"Determination and Initiation of a Computing Interface for Computer-Initiated Task Response"*, Joanna W. Ng, Diana Lau, Ioanna Maria Attarian, Tinny M. Ng (under review) (Link)

· *"Table Discovery in Distributed and Dynamic Computing Systems"*, Dmitri Abrashkevich, Maria Attarian, Robert Neugebauer, David Vyvyan (under review) (Link)

· *"Aggregation in dynamic and distributed computing systems"*, D Abrashkevich, IM Attarian, R Neugebauer, D Vyvyan (under review) (Link)

AWARDS & HONORS

· Google Q4 Gold Award (January 2018).
· Google Q1 Gold Award (April 2018).
· IBM Outstanding Innovation Award (January 2017).
· IBM Outstanding Technical Achievements Award (January 2017).
· IBM Outstanding Technical Achievements Award (August 2016).

- UWaterloo Graduate Research Fellowship (2010-2012).
- Distinguished by the **Hellenic Mathematical Society** for passing to the third round of the National Mathematics Olympiad (top 3% of 15000 students) (2001).
- Full high school scholarship awarded for both years that the competition was in place (full tuition was awarded to **only two students** each year out of 150)

CONFERENCES

- Poster presented at NeurIPS 2018 Second Workshop on Machine Learning for Creativity and Design (December 2018).
- *"IBM's IoT Analytics Breakthrough: Changing the World 100,000 Interconnected Devices at a Time"*, presenter at IBM InterConnect (March 2017).
- Presented poster at the IBM TLE (March 2017).
- Staffed demo booth at the IBM World of Watson (WoW) (October 2016).
- Attended the IBM Insight (October 2015) fulfilling executive assistant duties for a senior VP executive.
- Participated in the demo session of the IBM CASCON 2010 of the IBM Toronto Lab, Markham Ontario, titled *"An Evaluation Framework for Software Development Projects"*.

TECHNICAL SKILLS

Machine Learning	Tensorflow, Keras, scikit-learn, NLTK, Google JAX, Google Flax, T2T
Languages	Python, Golang, Shell, C, Java, C++, Perl, Javascript, Prolog, OCaml
Parallel computing	signal, MPI, openMP, Apache Spark
Operating systems	Linux, Unix, AIX, iOS
Deployment frameworks	Docker, AppEngine
Web	HTML, JS, Angular, Angular2, Node.js, Express, CSS, Bootstrap.js, d3.js
Popular public REST APIs	Twitter, Twilio, Cloudant, Instagram
Internet of Things (IoT)	Node - Red
Design tools	Adobe, Flash
Databases	GoogleSQL, MySQL, Db2, Db2 pureScale, Informix, mongoDB
Scientific tools	Matlab
Version control	GIT, RTC, SVN

SERVICE & OUTREACH

- Volunteer at the Toronto SickKids hospital (September - December 2019).
- Chair of Toronto IEEE Young Professionals committee for 2015.
- President of IBM Toronto Lab Toastmasters Club (June 2014 – June 2015). VP of PR of the IBM Toronto Lab Toastmasters Club (June 2013 – June 2014).
- Secretary of IEEE Student Branch of National Technical University of Athens during 2009 - 2010.

LANGUAGES & EXTRACURRICULAR ACTIVITIES

English, Greek - Bilingual   French - Advanced   Photography   Yoga Practice - Advanced   Piano