MONICA ANDERSON, MSCS

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PROFILE

An early adopter and implementor of **Social Media** as a user and systems designer. A solid career in industrial strength classical **AI,** a lot of Machine Learning, Natural Language Processing (NLP) and language understanding; compilers, search technology, cloud, and Big Data**.** Management experience in three positions.

EXPERIENCE

CO-FOUNDER AND CEO — SYNTIENCE INC.
NLU RESEARCHER 2001-2004,
NLU RESEARCHER 2006-DEC 2011,
NLU RESEARCHER MAY 2016 – PRESENT
CEO, Researcher - Artificial Intelligence, specializing in Semantics of Human Languages, Connectome Algorithms, Organic Learning, Graph Algorithms, and Model Free Methods

Invented Deep Neural Network algorithm called **Organic Learning** in 2001. Explored and developed the concept 2001-2004, 2006-2011, and since May 2016 with the goal of creating systems that can fully understand a human language after unsupervised training on it. Potential future applications include data mining, webpage evaluation, document classification, entity extraction, sentiment analysis, and mixed initiative dialog systems.

Gave presentation of an early version of this algorithm to researchers from Google AI group, trying to get Google to adopt Deep Neural Networks in January 2005, but was turned down. Google finally adopted Deep Learning at scale around 2012.

Developed these ideas into a comprehensive theory of general learning in minds and machines in sufficient detail to guide implementation work. **Created** artificial-intuition.com **web site** as an introduction to the theory. Identified and promoted (in blog, in presentations, and in videos) my insight that **Model Free Methods** are a necessary requirement for understanding true semantics of languages. Created another blog at https://artificial-understandging.com as an introduction to AI Epistemology.

Incorporated Syntience Inc. in Feb. 2004. **Managed** up to two other full-time **researchers** in research and development 2007-2008 and two others part time 2009 - Dec 2011.

Designed and **implemented** eighteen versions of experimental software in **Java**, **C**, and **Python** to explore and improve the algorithm. Co-designed three others that were implemented by research staff. Designed and implemented nearly all debugging, analysis and graphing/visualization tools for all versions. Made three attempts to convert algorithm to run on parallel architectures, server farms, and in the cloud based on **OpenMPI, BUPC, and OpenMP**. Last three versions are written in **Java** using **NetBeans**. Used **CVS**, **SVN**, and **git** source control systems and migrated entire historical code base from each one to the next.

Designed and built from box-level parts rack-mounted corporate compute server with 64 cores, 512GB RAM, and 24TB of RAIDed disks running SUSE Linux. Provided all **IT** infrastructure including all hardware, networks, security, IDEs, VPNs, multi-display workstations, laptops, Wiki, MySQL, web servers, and backups.

Created corporate site and a **blog** and upheld a social networking presence. Posted multiple videos of talks**.** Created presentations, documentation, and training materials. Organized over 100 AI related meetups.

Managed Syntience Inc. 2006-2010 and since May 2016.

CO-FOUNDER AND CTO — SENSAI CORPORATION — MAY 2013 - MAY-2016
Design and implementation of the Sensai Concept Discovery Engine - a WebApp for rapid interactive analysis of large text corpora, document sets, web pages, and RSS or "firehose" style document feeds.

Designed language analysis framework patterned after IBM Watson and Apache UIMA but with the intent of making it programmable by – and useful to – analysts with limited programming experience; **Designed** CDL, a problem domain specific language with easy-to-use operators for UI design, advanced document and web search, pattern matching at the word level, clustering, tagging, and other NLP tasks. Implemented a "**Deep Learning Server**" in the AWS cloud for running TensorFlow with and without Docker. Implemented Word2Vec algorithm and made results available to end users as a single CDL function call. Implemented three successive report writing capabilities using D3.js graphing library. Implemented dozens of CDL operators. Implemented RESTful services using Java, NetBeans, ANTLR, Jersey, GlassFish, and git. Designed initial UX and wrote front end using JavaScript, jQuery, and SlickGrid. Created batch testing facility for verifying pattern matching primitive functionality against hundreds of test cases. Installed and maintained SOLR search engine. Created and maintained corporate presence in the AWS cloud with up to 24 servers.

SYSTEMS ARCHITECT — EQUILAR.COM — SEP 2012 - MARCH 2103
Design of system for "high precision" natural language analysis to extract information from public documents such as web pages using UIMA (the technology framework used in IBM Watson that won Jeopardy!), the ANTLR compiler-compiler, OpenCalais Entity Extraction, RegEx, and other Language Model based tools.

Designed natural language analysis framework; **Invented** analysis chains, DB formats, and English grammars for NLP in ANTLR. Java programming using Eclipse, Eclipse Modeling Framework, UIMA, ANTLR, RegEx, TomCat; implemented RESTful services **AWS** cloud. Installed and used **Neo4j** graph database. Evaluated Open Source components for NLP, NoSQL databases, graph databases, graph visualizers, and web services.

CONTRACT PROGRAMMER — SYNTIENCE INC.
Cloud based web app and RESTful services design and deployment, Java programming.

Invented Graph Algorithm based on Model Free Methods and Gossip Algorithms for improving video chat customer retention. Used Java, Jersey RESTful services framework, GlassFish, MongoDB, under NetBeans. Deployed on Amazon's EC2 cloud. Handled all cloud-based IT and security.

Designed and implemented prototype web app for another video chat social medium. Implemented in Java for GlassFish. Used jQuery and CSS for UX and TokBox for video streaming. Deployed on Digital Ocean cloud server. Total time to Alpha deployment: Five months.

SOFTWARE ENGINEER – KOSMIX, INC. (LATER @WALMARTLABS) — MAY 2010-MAY 2011
Determining Semantics of Tweets. Hadoop (Open source MapReduce) and Mahout library

Researched ways to classify Tweets using machine learning techniques. **Invented** two graph algorithms for increased context for Tweet classification. Installed and maintained Hadoop. Installed Mahout machine learning package. Installed and configured Tomcat, Lucene, and SOLR packages.

SOFTWARE ENGINEER – GOOGLE, INC. — SEPT 2004 - SEPT 2006
International Quality, Enterprise Search

Researched automated Natural language syntax-based page quality evaluation methodologies. Initiated, designed, and implemented a visualization, analysis, and optimization **data analysis workbench** and supporting infrastructure for this purpose based on **Google's MapReduce** facility and **GnuPlot**, written in C++ and **Python**. Using this tool, **analyzed** effects and interactions among dozens of heavily interdependent variables controlling Google's results ranking algorithm. Used **MapReduce** to do **Data Mining** for Natural Language signals to improve web indexing. Gave presentation about **Genetic Algorithms** in internal Machine Learning class. Worked on GUI for Google's **enterprise search** product using **Java**. **Granted (as sole inventor) six patents** in the field of interactive social media, assigned to Google, including patents covering **real time search** and a messaging system best described as a "Super Twitter" conceived years before Twitter existed.

CO-FOUNDER, 50% OWNER – ROWANWOOD, INC. — 1998, 2001 - MARCH 2002
Systems Design and Java Programming Consultant

Client 2001 - 2002: British Shire Horse Society and Sandy Lerner, founder of cisco:
Created a system to manage horse registry since 1889 using **Java**, **Swing**, **MySQL,** and **JDBC**. Extracted information by **data mining OCR** scans of registry books. Invented **genetic algorithm** to untangle directed acyclic graphs of interrelated horses. **Invented** string comparison algorithm that is resilient to OCR or data entry errors in horse, owner and breeder names and addresses for unification purposes. Designed entire **UI** using **Swing** and **AWT** (for advanced graphics and printing on large format paper) and created a syntactic sugar overlay language to hide **SQL** from users. Created all MySQL **data models**.

SOFTWARE ENGINEER – KANISA, INC. (LATER CONSONA CORP) — 1998 - 2000
Member of AI group, Toolsmith, and Knowledge Engineer

Developed knowledge-base management software and supporting tools. Created the prototype for a tech support self-help (tier-zero CRM) system for Apple using Kanisa's product. Was **technical lead** in project for the full implementation at Apple's website. Taught classes to corporate knowledge engineers and **mentored** them.

Initiated and created **modular framework** for testing natural language processing (NLP) modules. Adapted a parts-of-speech (POS) tagger to this workbench, added CYC access, and wrote other modules such as a super-fast term scanner (implementing an algorithm I developed for the purpose).

Initiated, designed, implemented, and documented a graphical browser and editor for taxonomical datasets, the Kanisa Knowledge Factorizer, written in **Java** using **Swing**. Added **JDBC/ODBC** connectivity to access **Microsoft SQL Server** and **Oracle** databases and **XML** export and import of knowledge maps. Added graphical reporting capabilities including a small report specification language interpreter. Although originally an internal tool, the Factorizer became so popular with customers that it was made part of the product offering. Trained a document classifier using the Xerox/Kaplan **entity extraction** tool. Attempted to introduce XP (Extreme Programming) years before Agile Programming became popular; management declined to use it.

SOFTWARE ENGINEER – COMMUNITIES.COM — 1996 - 1998
MMO Game Systems Designer and Java Programmer

Designed and developed software for a distributed **virtual world MMO** platform, written in **Java**. Maintained, redesigned, and re-implemented a **distributed Object Persistence Repository** developed in-house. Created tools for managing these. Initiated, designed, implemented, and documented a Java Object Inspector for in-world resources using the object serialization created for the Repository. Initiated, designed, implemented, and documented an event debugging tool **capable of single-stepping the virtual world**, integrated with the Object Inspector. Designed and implemented a peer-to-peer Java object publishing and downloading scheme that uses MD5 CryptoHashes of in-world resources (for both code and and artwork) as globally unique keys and caches downloaded objects in the Persistence Repository.

EDUCATION

Master of Science, Computer Science – minor in **Electrical Engineering**. Linköping University, Sweden.

OTHER

Born in Sweden; **U.S. citizen**. Also Swedish citizen; employable in EU.

SKILLS

Multilingual: Fluent in English, Swedish, and Finnish, speaks and reads German, and reads some French; understands Norwegian and Danish. Some familiarity with UNICODE and Japanese character sets. Experienced public speaker. **Facilitator** and frequent presenter at over 100 meetings at ai-meetup.org which has over 2600 members on mailing list and is **second largest AI meetup in the world**. Competent with **HDTV video**, multi-channel digital sound recording (in the studio and in the field), lighting, **animation** (using Apple **KeyNote** or **Apple Motion**), and **video post-production** using **Final Cut Pro X**. Assembled and customized mobile high-quality sound and video recording facility for in-field video recording. **Composed** and **recorded** jingle for animated corporate video intro. **Songwriter**. Keyboard player. Duplicate Bridge player.

PLATFORMS AND LANGUAGES

Used 20+ programming languages professionally, including several Assembly Languages and C++. Fluent in C, **Java**, LISP, **Python**, and **JavaScript**. **Designed** four programming languages and used them. Have installed, used, and maintained a multitude of Linux distributions including Red Hat, Fedora, Ubuntu, and SUSE.

Expert level skill in Apple KeyNote and Pages. Fluent in Final Cut Pro, Logic Express, and Apple Motion, Microsoft Word, Excel, and Powerpoint. Deep knowledge of Apple OS X management.

Expert level Emacs and ANTLR skills. Have used Yacc, Lex, GCC, GDB, and many other UNIX/Linux tools. Used NetBeans, Eclipse, Microsoft Visual C++ and J++ development environments. CVS, SVN, Perforce, and git source control systems. Created and used WIKIs.

Can perform all IT level tasks on Macintosh, Linux, and UNIX platforms. Can design and install TCP/IP based networks and troubleshoot them at all levels. Can design custom hardware as needed.

Designed and implemented embedded and real-time systems for industrial robot control, audio equipment, hobby/experimental robot control and professional maritime electronics.

US PATENTS

Pat #	Issued	Assignee	Title
7539656	May 26, 2009	Consona Inc.	System and method for providing an intelligent multi-step dialog with a user
7865553	Jan 4, 2011	Google Inc.	Chat system without topic-specific rooms
7899869	Mar 1, 2011	Google Inc.	Broadcasting in chat system without topic-specific rooms
7904500	Mar 8, 2011	Google Inc.	Advertising in chat system without topic-specific rooms
7860928	Dec 28, 2010	Google Inc.	Voting in chat system without topic-specific rooms
8006191	Aug 23, 2011	Google Inc.	Chat room with thin walls
8015246	Sep 6, 2011	Google Inc.	Graphical user interface for chat room with thin walls

LINKS

http://syntience.com/links	Published materials
http://videos.syntience.com	Videos of presentations
https://artificial-understanding.com	Blog: Introduction to AI Epistemology
http://artificial-intuition.com	Theory about Model Free Methods
https://www.youtube.com/watch?v=REzrYWOzhWc	Video of 24-legged robot that I built