Ivar Thorson, Ph.D.

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OBJECTIVE

A position in software development, preferably with a focus on machine learning, algorithms, or data science.

SKILLS AND EXPERIENCE

Whibse, Inc. & LegitScript, Inc.   DEC 2014 – MAY 2017
Senior Research Developer

- Designed and implemented a masterless cluster to harvest and parse Whois, DNS, HTML records for 300M+ websites every 21 days. Used Clojure, Java, and many AWS EC2 Linux (CentOS, Debian) instances.
- Designed and implemented REST API endpoints for custom search-engine backends, fraudulent website detection, cluster job management, spreadsheet analysis, data aggregation, and data visualization.
- Designed and implemented MVC web interfaces for cluster management, internal analyst tools, and prototype client products. Used Javascript, React, Clojurescript, websockets, and HTML5/CSS.
- Designed and implemented workflow for production microservice APIs deployed to openshift containers. Established mandatory unit tests during builds, and designed integration tests required to deploy production code. Wrote build scripts for Maven, Gradle, Lein, Boot-CLJ, and Jenkins, and Bash shell-script glue.
- Designed and implemented an API for Nutch and ElasticSearch for bulk custom full-text searches of websites.
- Designed a continuously operating data archival system for AWS S3 (up to 1 TB/week)
- Configured, tuned, migrated, and maintained a Cassandra NoSQL cluster for 18 months as it grew from 6 nodes to 24. Reported bugs found to DataStax. Monitored operation with Opscenter and nodetool.
- Used Grafana, Kibana, ElasticSearch, and Logstash for aggregated and individual monitoring of logfiles, events, and activity of thousands of EC2 instances.
- Used Clojure and Python to statistically analyze accumulated data from 7 years of 20 human analysts classifying websites; created plots for reporting purposes and presented findings to stakeholders.
- Used Hadoop and map/reduce algorithms for prototyping, data filtering, and statistical analysis.
- Used JIRA and Trello for developer ticket management.
- Used Git and GitHub for creation and version control of >10 project repositories.
- Used agile methodologies: kanban, stand-ups, pair programming, business model generation canvases.
- Used Emacs and Eclipse IDEs for development; profiled memory/CPU use on the JVM with JvisualVM
- Used MS Office suite, OpenOffice, and LaTeX to typeset documentation, reports, budget proposals, and presentations for stakeholders (CEO, COO), other developers, and patent attorneys.

Technologies: Cassandra, Clojure, Clojurescript, CSS, ElasticSearch, Gradle, HTML, Java, Javascript, Linux (CentOS, Debian), Maven, MySQL, Nutch, Openshift, Python, REST APIs, React, Shell scripts (Bash)
Reference: John Horton, CEO. (john.horton@legitscript.com)

Oregon Hearing Research Center, Oregon Health & Science University   SEP 2012 – DEC 2014
Research Software Developer

- Designed and implemented a modular functional programming framework in MATLAB to test >780,000 parameterized functional models of cortical neural activity to experimentally obtained data.
- Implemented a GUI browser using MATLAB and Swing to plot and visualize neural model results.
- Configured, compiled custom Linux kernels for a low-cost diskless (netboot) compute cluster.
- Analyzed neural data mathematically and did model comparison with classical and bayesian inference techniques. Used digital filtering (FIR, IIR), wavelet models, and advanced linear algebra techniques.
- Developed novel mathematical models of cortical neural function that resulted in an academic publication.

Technologies: C, MATLAB, MySQL, LaTeX, Linux (Ubuntu), Shell scripts (Bash)
Reference: Prof. Stephen David. (davids@ohsu.edu)

Istituto Italiano di Tecnologia, Italy

Post-Doctoral Fellow

- Designed and implemented multi-threaded balance control software for a monopod "kangaroo" hopping robot with a carbon fiber exoskeleton in C++ and Clojure.
- Designed and implemented a software network oscilloscope soft real-time plotting system in Clojure.
- Reverse-engineered the network protocol from a Vicon marker-tracking camera system and wrote software to perform sensor fusion on data from the cameras and optical motor encoders.

Technologies: C, C++, Clojure, Linux, ProEngineer, Solidworks, Vicon
Reference: Prof. Darwin Caldwell. (darwin.caldwell@iit.it)

Dept of Brain-Machine Interfaces, Advanced Telecommunications Research Center, Japan   JAN – JUN 2010

Visiting Researcher

- Debugged legacy hard real-time control code (for Xenomai) written in C.
- Designed and implemented a posture control system for a 51-DOF hydraulic humanoid robot. (C++)
- Implemented a multi-threaded, soft real-time scheduler and custom control software in C++ for a hybrid electric-pneumatic exoskeleton for rehabilitiation of elderly and paraplegic patients.
- Wrote a fast monotone cubic spline interpolation library for use with trajectory generation in Clojure.

Technologies: C, C++, Clojure, Linux, RTLinux, Shell scripts (Bash), Xenomai
Reference: Prof. Sang-Ho Hyon. (sangho@ieee.org)

EDUCATION

2009 – 2011   **Ph.D. Advanced Robotics**, *Istituto Italiano di Tecnologia, Italy*
2005 – 2008   **M.S. Mechatronics**, *Nagoya University, Japan*
2000 – 2004   **B.S. Electrical Engineering** , *University of Washington, USA*

PATENTS

US   8821338: Elastic Rotary Actuator
ITALY   0001407702: Attuatore Rotante Elastico con Meccanismo Ipocicloida

LANGUAGES

ENGLISH   Native speaker
JAPANESE   Fluent, JLPT Level 1 (highest level)
ITALIAN   Intermediate

REPRESENTATIVE PUBLICATIONS

THORSON, I. LIENARD, J. DAVID, S. The Essential Complexity of Auditory Receptive Fields. *PLOS Computational Biology, 2015.*

THORSON, I. A Hopping Monopod Robot Incorporating Nonlinear Series Elastic Actuators, Fiber-Reinforced Polymer Construction, and a Concurrent Asynchronous Dataflow-based Centroidal Momentum Balance Controller. *Ph.D. Thesis, Istituto Italiano di Tecnologia. 2012.*

THORSON, I. CALDWELL, D. A Nonlinear Series Elastic Actuator for Highly Dynamic Motions. *IEEE International Conference on Robotics and Automation, San Francisco, USA. 2011.*