Tuomo Sipola
Curriculum Vitae

Summary

Data mining and machine learning professional with experience in various application areas such as cyber security, industrial fault monitoring, text mining and biomedical imaging. Practical business and management experience, including sales and customer collaboration at a high technology startup. Co-founder and CEO at CAP Data Technologies. Experience in scientific research, planning and publishing. Interested in languages and graphic design. Ph.D. in information technology in 2013. Practical software development skills and general programming experience (Python, C, Java, Assembly), data platforms (SQL, Elastic/Logstash, Apache Kafka, Apache Spark) and mathematical/statistical programming environments (Matlab, R, Octave).

Personal information

Family name	Sipola
Given name	Tuomo Severi
Date of birth	November 8th 1985
Place of birth	Varkaus, Finland
City of residence	Jyväskylä, Finland
Language skills	Finnish (native), English (excellent), French (good), Latin (good), Swedish (good), Modern Hebrew (basics), Greek (basics), Italian (basics), German (basics)

Contact

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`http://www.iki.fi/tuomo.sipola/`

LinkedIn `http://linkedin.com/in/tuomosipola`

Twitter `https://twitter.com/TuomoSipola`

Education

2010-04-26–2013-12-20 *Ph.D., information technology*
University of Jyväskylä
Jyväskylä, Finland
Student in Finnish Doctoral Programme in Computational Sciences (FICS)
Included a research visit to Tel Aviv University 2012-02-28–2012-05-17
Dissertation: *Knowledge discovery using diffusion maps*
Advisors: Prof. Amir Averbuch, Prof. Tapani Ristaniemi

2009-02-11–2009-11-05 *M.Sc., information technology*
University of Jyväskylä
Jyväskylä, Finland
Thesis: *Applying Hilbert-Huang transform to mismatch negativity*
Advisors: Prof. Tapani Ristaniemi, Dr. Fengyu Cong

2005-09-01–2009-02-10	*B.Sc., information technology* University of Jyväskylä Jyväskylä, Finland
2004-05-29	*Matriculation examination* Varkaus upper secondary school Varkaus, Finland

Employment

2014-11-01–	Co-founder, CEO, Board member CAP Data Technologies Managing high-tech startup, developing and launching CAP Anomaly Spotter for cybersecurity Jyväskylä, Finland
2012-01-15–	Partner Koodilehto Co-operative Software design, graphic design, logo design, administrative work Jyväskylä, Finland
2014-06-24–2015-06-24	Board member Koodilehto Co-operative Administration and company development, helping with PR and administration of projects, namely Kryptoradio Jyväskylä, Finland
2014-01-01–2014-10-31	Postdoctoral researcher Department of mathematical information technology (CAP project) Developing data mining product prototype Jyväskylä, Finland
2011-10-01–2013-12-31	Doctoral student Department of mathematical information technology Data mining using diffusion maps Jyväskylä, Finland
2010-10-01–2011-09-30	Doctoral student Department of mathematical information technology (MIPCOM project) Data mining with dimensionality reduction in dynamic systems Jyväskylä, Finland
2010-01-01–2010-09-30	Research assistant (continued)
2009-10-01–2009-12-31	Research assistant Department of mathematical information technology (MIPCOM project) EEG signal analysis, manifold learning methods for anomaly detection Jyväskylä, Finland
2009-05-01–2009-06-30	Teaching assistant (part-time) Department of mathematical information technology Courses Algorithms 1 and Algorithms 2 Jyväskylä, Finland
2009-07-01–2009-09-30	Project coordinator (continued)
2009-01-01–2009-06-30	Project coordinator (continued)
2008-09-01–2008-12-31	Project coordinator (continued)
2008-05-15–2008-08-31	Project coordinator Department of mathematical information technology (MIPCOM project) EEG signal analysis with nonlinear methods Jyväskylä, Finland

2007-08-01–2007-08-31	Programmer (continued)
2007-06-01–2007-06-30	Programmer Agora Center (Käytech project) Data analysis software development Jyväskylä, Finland

Acquired funding

2017	CAP Data Technologies raised seed plus funding (€105,000)
2015	CAP Data Technologies acquired Tekes loan (€207,000)
2015	CAP Data Technologies raised seed funding (€145,000)
2015	CAP Data Technologies acquired Tekes subvention (€50,000)
2013	FICS programme for conference participation (SampTA 2013)
2013	Finnish Foundation for Technology Promotion
2012	Nokia Scholarship

Publications

Refereed Journal Articles

Antti Juvonen, Tuomo Sipola, and Timo Hämäläinen. Online anomaly detection using dimensionality reduction techniques for HTTP log analysis. *Computer Networks*, 91:46–56, 2015.

Tuomo Sipola, Tapani Ristaniemi, and Amir Averbuch. Gear classification and fault detection using a diffusion map framework. *Pattern Recognition Letters*, 53:53–61, 2015.

Fengyu Cong, Tuomas Puoliväli, Vinoo Alluri, Tuomo Sipola, Iballa Burunat, Petri Toiviainen, Asoke K. Nandi, Elvira Brattico, and Tapani Ristaniemi. Key issues in decomposing fMRI during naturalistic and continuous music experience with independent component analysis. *Journal of Neuroscience Methods*, 223:74–84, 2014.

Paavo Nieminen, Ilkka Pölönen, and Tuomo Sipola. Research literature clustering using diffusion maps. *Journal of Informetrics*, 7(4):874–886, 2013.

Tuomo Sipola, Antti Juvonen, and Joel Lehtonen. Dimensionality reduction framework for detecting anomalies from network logs. *Engineering Intelligent Systems*, 20(1):87–97, 2012.

Fengyu Cong, Tuomo Sipola, Tiina Huttunen-Scott, Xiaonan Xu, Tapani Ristaniemi, and Heikki Lyytinen. Hilbert-Huang versus Morlet wavelet transformation on mismatch negativity of children in uninterrupted sound paradigm. *Nonlinear Biomedical Physics*, 3:1, 2009.

Conference Papers

Tuomo Sipola, Fengyu Cong, Tapani Ristaniemi, Vinoo Alluri, Petri Toiviainen, Elvira Brattico, and Asoke K. Nandi. Diffusion map for clustering fMRI spatial maps extracted by independent component analysis. In *Machine Learning for Signal Processing (MLSP), 2013 IEEE International Workshop on*, Southampton, United Kingdom, September 2013. IEEE.

Antti Juvonen and Tuomo Sipola. Combining conjunctive rule extraction with diffusion maps for network intrusion detection. In *The Eighteenth IEEE Symposium on Computers and Communications (ISCC 2013)*, pages 411–416, Split, Croatia, July 2013.

Yaniv Shmueli, Tuomo Sipola, Gil Shabat, and Amir Averbuch. Using affinity perturbations to detect web traffic anomalies. In *Proceedings of the 10th International Conference on Sampling Theory and Applications (SampTA)*, pages 444–447, Bremen, Germany, July 2013. EURASIP.

Antti Juvonen and Tuomo Sipola. Adaptive framework for network traffic classification using dimensionality reduction and clustering. In *Ultra Modern Telecommunications and Control Systems and Workshops (ICUMT), 2012 4th International Congress on*, pages 274–279, St. Petersburg, Russia, October 2012. IEEE.

Tuomo Sipola, Antti Juvonen, and Joel Lehtonen. Anomaly detection from network logs using diffusion maps. In Lazaros Iliadis and Chrisina Jayne, editors, *Engineering Applications of Neural Networks*, volume 363 of *IFIP Advances in Information and Communication Technology*, pages 172–181. Springer, 2011.

Fengyu Cong, Tuomo Sipola, Xiaonan Xu, Tiina Huttunen-Scott, Heikki Lyytinen, and Tapani Ristaniemi. Concatenated trial based Hilbert-Huang transformation on event-related potentials. In *Proc. International Joint Conference on Neural Networks 2010 (IEEE World Congress on Computational Intelligence)*, pages 1379–1383, 2010.

Book Chapters

Tuomo Sipola. Knowledge discovery from network logs. In Martti Lehto and Pekka Neittaanmäki, editors, *Cyber Security: Analytics, Technology and Automation*, volume 78 of *Intelligent Systems, Control and Automation: Science and Engineering*, chapter 12, pages 195–203. Springer, Berlin, Heidelberg, 2015.

Technical Reports and Preprints

Antti Juvonen and Tuomo Sipola. Anomaly detection framework using rule extraction for efficient intrusion detection. arXiv:1410.7709 [cs.NI], 2014.

Tuomo Sipola, Tapani Ristaniemi, and Amir Averbuch. Gear classification and fault detection using a diffusion map framework. Reports of the Department of Mathematical Information Technology Series B. Scientific Computing, No. B 6/2013, University of Jyväskylä, 2013.

University teaching

2013	Teacher, Neuroscience tools (with Juha Karvanen and Tiina Parviainen)
2011	Tutor, Processing of High Dimensional Data (Jyväskylä Summer School 21)
2009	Teaching Assistant, Algorithms 1 (14 hrs) and Algorithms 2 (14 hrs)

Supervising activity

2011	Juhana Keskinen and Lasse Valkonen. Ihomuutosten rajaaminen hyperspektrikuvauksen avulla (Demarcation of skin irregularity margins using hyperspectral imaging). Master's thesis. (Together with Pekka Neittaanmäki, Paavo Nieminen and Ilkka Pölönen.)

Invited talks

2017-08-24	Workshop track *Entrepreneurship and Innovations* in Research Services Event 2017 (Tutkimuspalvelupäivät 2017), University of Jyväskylä, Finland
2016-12-08	Lecture for anomaly detection course, *Anomaly detection from startup perspective*, University of Jyväskylä, Finland

2015-09-30	Lecture for international visitors, *Diffusion maps – Theory, Practice and Applications*, University of Jyväskylä, Finland
2015-06-05	National Yearly Computer Science Event, Jyväskylä, Finland
2010-11-24	Advanced Data Mining Methods with Applications Workshop, Jyväskylä, Finland

Visits and conferences

2017-05-03–2017-05-04	Arctic15, Helsinki, Finland
2016-11-30–2016-12-01	Slush 2016 Startup Conference, Helsinki, Finland
2016-11-25–2016-11-27	Ultrahack, Helsinki, Finland (presented AI Guardian in teams qualifier pitching)
2016-06-07–2016-06-09	Infosecurity Europe, London, United Kingdom
2016-06-02–2016-06-03	Arctic15, Helsinki, Finland (presented CAP Data Technologies in TOP15 startups pitching competition)
2015-11-11–2015-11-12	Slush 2015 Startup Conference, Helsinki, Finland
2015-05-26–2015-05-27	Arctic15: Exit Path, Helsinki, Finland
2014-11-18–2014-11-19	Slush 2014 Startup Conference, Helsinki, Finland
2014-11-10–2014-11-11	DevOps Days 2014, Helsinki, Finland
2014-05-27–2014-05-28	Arctic15: Exit Path, Helsinki, Finland
2013-12-09–2013-12-11	Meeting project's industrial partners in Paris, France
2013-09-22–2013-09-25	IEEE International Workshop on Machine Learning for Signal Processing (MLSP) 2013, Southampton, United Kingdom (poster presentation)
2013-06-30–2013-07-06	International Conference on Sampling Theory and Applications (SampTA) 2013, Bremen, Germany (poster presentation)
2012-02-28–2012-05-17	Research visit to School of Computer Science, Tel Aviv University, Israel (2½ months)
2011-09-22–2011-09-28	Research visit to School of Computer Science, Tel Aviv University, Israel
2011-09-14–2011-09-19	Engineering Applications of Neural Networks (EANN) 2011, Kerkyra, Corfu, Greece (oral presentation)

Expert statements given

2014	Reviewer for Cognitive Computation
2014	Reviewer for International Joint Conference on Neural Networks (IJCNN 2014) (part of WCCI 2014)
2013	Reviewer for International Joint Conference on Neural Networks (IJCNN 2013)
2012	Reviewer for Engineering Intelligent Systems
2012	Reviewer for International Joint Conference on Neural Networks (IJCNN 2012)
2011	Reviewer for Neural Network World
2011	Reviewer for International Joint Conference on Neural Networks (IJCNN 2011)
2010	Reviewer for International Joint Conference on Neural Networks (IJCNN 2010) (part of WCCI 2010)

Technical skills

Proficient	Data analytics, Git, Python, LaTeX, Linux, Matlab, Octave, Linux server administration, Docker, Scipy, Sklearn, SQL

Familiar	Amazon AWS, Apache Kafka, Assembly, C, C++, C#, CVS, Devops, Elastic, Excel, Fortran, Google Analytics, Haskell, Inkscape, Java, JavaScript, JSON, LibreOffice, Powerpoint, PySpark, GNU R, Apache Spark, SVN, Windows, Word, XML, Elastic

Jyväskylä, September 19, 2017