

Tsuyoshi Ide (井手 剛), Ph.D.

Business Address

tide@us.ibm.com (IBM), ide@ide-research.net (personal)

IBM T. J. Watson Research Center

1101 Kitchawan Rd., Yorktown Heights, NY 10598, USA



Professional Experience Summary

Currently I am in the position of Senior Technical Staff Member (STSM) in IBM, the third highest technical position after IBM Fellow and Distinguished Engineer. My 10+ years of experience in artificial intelligence (AI) research experience includes:

- Pioneering work in sensor data analytics, or AI for IoT (Internet-of-Things), especially in anomaly detection
- Broad project and people management experience in both the US and Japan through hundreds of customer engagements across a variety of industries

As a researcher in machine learning and data mining, I have published many papers in world's top conferences and journals such as KDD, ICDM, SDM, IJCAI, and AAAI mostly as the first author. The major research topics include

- Anomaly and change detection
- Questionnaire data analysis for service sciences
- Transportation network analysis

For more details, see my publication list.

I am a Japanese citizen and a United States permanent resident (green card holder).

Education

- 2000 Ph.D. in Physics, The University of Tokyo, Japan.
 - Thesis: “Theoretical Study on Nonlocal Effects in Resonant X-Ray Emission Spectra of Strongly-Correlated Systems”
 - Supervisor: Prof. Kotani Akio
- 1997 MSc. in Physics Science, University of Tokyo, Japan.
- 1993 BEng in Mechanical Engineering, Tohoku University, Japan.

Employment

- Today-07/12/2016, **IBM Thomas J. Watson Research Center** (Full-time regular employment, 40 hours/week)
 - **Senior Technical Staff Member**
 - Lead customer engagements and provide the team with technical guidance.
 - Play a role of technical evangelist to influence IBM's technical roadmap based on a broad range of experiences on real business.
 - Perform basic and applied research in AI to publish research outcomes in world premier conferences and journals as well as patents.
- 07/11/2016-09/04/2013, **IBM Thomas J. Watson Research Center** (full-time, 40 hours/week, on international assignment from IBM Japan)
 - **Senior Technical Staff Member** (09/2014-07/2016).
 - Led several customer engagements to success as the technical leader in AI. Industries
 - engaged include oil, mining, and chemical industries.
 - Developed innovative machine learning methods for industrial sensor data.
 - Published six first-authored papers in world's premier conference and journals in AI.
 - **Manager, Service Delivery & Risk Analytics** (09/2013-09/2014).
 - Engaged in people, project, and research strategy management of the team.
 - Proposed new AI-based approaches to IT (information technology) system development.
 - Awarded two Outstanding Technical Achievement Awards by IBM Corporation for that work.
- 09/03/2013-04/01/2000, **IBM Research - Tokyo** (full-time, 38 hours/week).
 - **Manager, Analytics & Optimization** (09/2010-09/2013).
 - Supervised the entire area of analytics at IBM Research { Tokyo (except for speech and text analytics).
 - Successfully established an organizational management model that balances business contribution and academic reputation.
 - Proposed a new business strategy based on AI technologies and led various customer engagements. Major successful projects include the development of intelligent transportation system in Kenya and a monitoring system for ocean-going vessels. The latter won General Manager Award of IBM Japan.
 - **Senior Researcher** (2010-2013), **Advisory Researcher** (2008-2010), **Staff Researcher** (2005-2008)
 - Led basic and applied research in AI as a technical leader.

- Proposed to focus on sensor data as a promising area of AI applications.
- Major research achievements include the establishment of dependency-based anomaly detection method, which was awarded Outstanding Technical Achievement Award later.
- Researcher (2000-2005)
 - Engaged in improving existing IBM products using mathematical science technologies.
 - Major contributions include a major improvement of luminance uniformity of IBM ThinkPad displays and the development anomaly detection solution of computer systems.

Executive/Board Membership

- Today-2013 IBM Academy of Technology.
- 2015-2011 Secretary, Machine Learning Activity Group of the Japan Society for Industrial and Applied Mathematics (JSIAM-ML).
- 2014-2012 Board of Directors, The Japanese Society for Artificial Intelligence.
- 2010-2008 Vice Chair, Technical Committee on Information-Based Induction Sciences, IEICE.

Awards/Honors

- 2018
 - Outstanding Technical Achievement Award (for Business and Technical Leadership in Anomaly Analyzer of Correlational Data), IBM Corporation.
- 2017
 - Best Author Award (for his article titled “Predicting project risks using latent trait model”), The Japan Society for Industrial and Applied Mathematics
- 2016
 - Outstanding Technical Achievement Award (for Financial Risk Analytics for Strategic Outsourcing), IBM Corporation.
 - Outstanding Technical Achievement Award (for End-to-end Contract Profitability Analytics for ITS), IBM Corporation.
- 2015
 - Outstanding Technical Achievement Award (for Fundamental Contribution to Anomaly Detection), IBM Corporation.
- 2013
 - General Manager Award, IBM Japan.

- 2007
 - Winner, ICDM Data Mining Contest, The 2007 Seventh IEEE International Conference on Data Mining.
- 2006
 - JSAI Annual Conference Award, The 20th Annual Conference of the Japanese Society for Artificial Intelligence.
- 2004
 - JSAI Annual Conference Award, The 18th Annual Conference of the Japanese Society for Artificial Intelligence.
- 1993
 - Hatakeyama Award, The Japan Society of Mechanical Engineers.
- 1990
 - Hatakeyama Award, The Japan Society of Mechanical Engineers.

List of Invited Talks

- 2018
 - “Recent advances in machine learning from industrial sensor data,” The 12th ICME International Conference on Complex Medical Engineering (CME 2018, September 6-8, 2018), Shimane, Japan
 - “Recent advances in sensor data analytics,” Department Seminar, Department of Computer Science (January 10, 2018), University at Albany, State University of New York, Albany, USA
- 2017
 - “Towards cognitive manufacturing,” IEEE International Workshop on Data Mining for Service (DMS 2017, November 18, 2017), New Orleans, USA
- 2015
 - “Towards consumable analytics: Challenges and recent advances,” IEEE International Workshop on Data Mining for Service (DMS 2015), Atlantic City, USA.
- 2014
 - “Formalizing expert knowledge through machine learning,” Big Data in Service, New York, USA.
- 2012
 - “Formalizing expert knowledge through machine learning,” Service Science Research Forum, Tokyo, Japan.

- “Historical Perspectives towards Analytics Revolution,” The 56th Annual Symposium of the Institute of Systems, Control and Information Engineers (SCI'12), Kyoto, Japan.
- “Trajectory regression on networks,” Japanese-French Frontiers of Science Symposium (JFFoS), Nice, France.
- “Machine Learning for Anomaly Detection and Risk Analysis, II,” IBISML Tutorial, Jan. 12, 2012, Tokyo, Japan.
- 2011
 - “Solving real business problems with math sciences,” SIG Service Science, The Operating Research Society of Japan, Dec. 19, 2011, Tsukuba, Japan.
- 2010
 - “Anomaly detection using sparse structure learning,” Adachi Lab Seminar, Keio University, Dec. 12, 2010, Tokyo, Japan.
 - “On recent advances in machine learning for system identification,” DoE Conference 2010, Nov. 15, 2010, Tokyo, Japan.
 - “On the trajectory regression problem on networks,” Sugiyama Lab. Seminar, Department of Computer Science, Tokyo Institute of Technology, Oct. 7, 2010, Tokyo, Japan.
 - “On a regression problem for path cost,” ERATO Seminar, Hokkaido University (Sep. 27, 2010), Sapporo, Japan.
 - “Detecting Anomalies from Latent Graph Structures,” The 1st Workshop on Latent Dynamics (LD-1), (Jun 16, 2010), Tokyo, Japan.
 - “On the problem of cost estimation for paths,” Mathematical Informatics Colloquium, University of Tokyo (Feb. 24, 2010), Tokyo, Japan.
- 2007
 - “Applying Machine Learning Techniques to Sensor Data Analysis,” Global COE ‘CompView’ Kickoff Event, Tokyo Institute of Technology (Dec. 13, 2007), Tokyo, Japan.
- 2006
 - “Why does subsequence time-series clustering produce sine waves?,” Departmental Colloquium, Max Planck Institute for Biological Cybernetics, Sep. 13, 2006, Tübingen, Germany.
- 2005
 - “A Spectral Approach to Anomaly Detection in Computer Systems,” Scientific Computing Seminar, Berkeley Lab (April 25, 2005), Berkeley, USA.
- 2004

- “Feature Extraction and Anomaly Detection in Web-based Computer Systems,” The Seventh Workshop on Information-Based Induction Sciences (IBIS2004), November 8-10, 2004, Tokyo, Japan.

Publications: Conference proceedings (refereed)

- **Tsuyoshi Idé**, Dzung T. Phan, and Jayant Kalagnanam
Multi-task Multi-modal Models for Collective Anomaly Detection
In Proceedings of 2017 IEEE International Conference on Data Mining (ICDM 17), pp. 177-186, 2017.
- Dzung T. Phan, **Tsuyoshi Idé**, Jayant Kalagnanam, Matt Menickelly, Katya Scheinberg
Proceedings of the 17th International Conference on Data Mining Workshops (ICDMW 2017), pp.830-833, 2017
- **Tsuyoshi Idé**, Ankush Khandelwal, and Jayant Kalagnanam
Sparse Gaussian Markov random field mixtures for anomaly detection
In Proceedings of 2016 IEEE International Conference on Data Mining (ICDM 16), pp. 955-960, 2016.
- Takayuki Katsuki, Tetsuro Morimura, and **Tsuyoshi Idé**
Unsupervised object counting without object recognition.
In Proceedings of the 23rd International Conference on Pattern Recognition (ICPR 2016), pp. 3616-3621, 2016.
- **Tsuyoshi Idé**, Dzung T. Phan, and Jayant Kalagnanam
Change detection using directional statistics
In Proceedings of the Twenty-Fifth International Joint Conference on Artificial Intelligence (IJCAI 16), pp. 1613-1619, 2016.
- **Tsuyoshi Idé** and Amit Dhurandhar
Informative prediction based on ordinal questionnaire data
In Proceedings of 2015 IEEE International Conference on Data Mining (ICDM 15), pp.191-200, 2015.
- Kuan-Yu Chen, Ee-Ea Jan, and **Tsuyoshi Idé**
Probabilistic text analytics framework for information technology service desk tickets
In Proceedings of the 14th IFIP/IEEE International Symposium on Integrated Network Management (IM 2015), pp.870-873, 2015.
- **Tsuyoshi Idé**, Sinem Güüven, Ee-Ea Jan, Sergey Makogon, and Alejandro Venegas
Latent trait analysis for risk management of complex information technology projects
In Proceedings of the 14th IFIP/IEEE International Symposium on Integrated Network Management (IM 2015), pp.305-312, 2015.

- Bin Tong, Tetsuro Morimura, Einoshin Suzuki, and **Tsuyoshi Idé**
Probabilistic two-level anomaly detection for correlated systems
In Proceedings of the 21st European Conference on Artificial Intelligence (ECAI 2014), pp.21-23, 2014.
- Sinem Güüven, Mathias Steiner, **Tsuyoshi Idé**, Sergey Makogon, and Alejandro Venegas
Mining for gold: How to predict service contract performance with optimal accuracy based on ordinal risk assessment data
In Proceedings of the 11th IEEE International Conference on Services Computing (IEEE SCC 2014), pp.315-322, 2014.
- Tetsuro Morimura, Takayuki Osogami, and **Tsuyoshi Idé**
Solving inverse problem of Markov chain with partial observations. In Proceedings of Neural Information and Processing Systems (NIPS 2013), pp.1655-1663, 2013.
- **Tsuyoshi Idé**, Takayuki Katsuki, Tetsuro Morimura, and Robert Morris
Monitoring entire-city traffic using low-resolution web cameras
In Proceedings of ITS World Congress Tokyo 2013, Number 3143, 2013.
- Takayuki Osogami, Hideyuki Mizuta, and **Tsuyoshi Idé**
Identifying the optimal road closure with simulation
In Proceedings of ITS World Congress Tokyo 2013, Number 3178, 2013.
- Toshiro Takahashi and **Tsuyoshi Idé**
Predicting battery life from usage trajectory patterns
In Proceedings of the 19th International Conference on Pattern Recognition (ICPR 2012), pp.2946-2949, 2012.
- T. Suzumura, S. Kato, T. Imamichi, M. Takeuchi, H. Kanazashi, **Tsuyoshi Idé**, and T. Onodera
X10-based massive parallel large-scale traffic flow simulation
In Proceedings of the ACM SIGPLAN 2012 X10 Workshop (X10 '12), pp.3:1-3:4, 2012.
- Takashi Imamichi, Hidetoshi Numata, Hideyuki Mizuta, and **Tsuyoshi Idé**
Nonlinear optimization to generate non-overlapping random dot patterns
In Proceedings of the Winter Simulation Conference 2011 (WSC 11), pp.2419-2430, 2012.
- **Tsuyoshi Idé** and Masashi Sugiyama
Trajectory regression on road networks
In Proceedings of AAAI Conference on Artificial Intelligence (AAAI 11), pp.203-208, 2011/
- **Tsuyoshi Idé**, Aurelie C. Lozano, Naoki Abe, and Yan Liu
Proximity-based anomaly detection using sparse structure learning
In Proceedings of 2009 SIAM International Conference on Data Mining (SDM 09), pp.97-108, 2009.
- **Tsuyoshi Idé** and Sei Kato
Travel-time prediction using Gaussian process regression: A trajectory-based approach

- In Proceedings of 2009 SIAM International Conference on Data Mining (SDM 09), pp.1185-1196, 2009.
- Masashi Sugiyama, **Tsuyoshi Idé**, Shinichi Nakajima, and Jun Sese
Semi-supervised local Fisher discriminant analysis for dimensionality reduction
In Proceedings of the Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD 08), pp.333-344, 2008.
 - Shohei Hido, **Tsuyoshi Idé**, Hisashi Kashima, Harunobu Kubo, and Hirofumi Matsuzawa
Unsupervised change analysis using supervised learning
In Proceedings of the Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD 08), pp.148-159, 2008.
 - **Tsuyoshi Idé**, Spiros Papadimitriou, and Michail Vlachos
Computing correlation anomaly scores using stochastic nearest neighbors
In Proceedings of the Seventh IEEE International Conference on Data Mining (ICDM 07), pp.523-528, 2007.
 - **Tsuyoshi Idé** and Koji Tsuda
Change-point detection using Krylov subspace learning
In Proceedings of 2007 SIAM International Conference on Data Mining (SDM 07), pp.515-520, 2007.
 - **Tsuyoshi Idé**
Why does subsequence time-series clustering produce sine waves?
In Proceedings of the 10th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD 06), pp.311-322, 2006.
 - H. Kashima, T. Tsumura, **Tsuyoshi Idé**, T. Nogayama, R. Hirade, H. Etoh, and T. Fukuda
Network-based problem detection for distributed systems
In Proceedings of the 21st International Conference on Data Engineering (ICDE 2005), pp.978-989, 2005.
 - **Tsuyoshi Idé**
Pairwise symmetry decomposition method for generalized covariance analysis
In Proceedings of the Fifth IEEE International Conference in Data Mining (ICDM 05), pp.657-660, 2005.
 - **Tsuyoshi Idé** and Keisuke Inoue
Knowledge discovery from heterogeneous dynamic systems using change-point correlations
In Proceedings of 2005 SIAM International Conference on Data Mining (SDM 05), pp.571-575, 2005.
 - **Tsuyoshi Idé** and Hisashi Kashima.
Eigenspace-based anomaly detection in computer systems

In Proceedings of ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD '04), pp.440-449, 2004.

- **Tsuyoshi Idé**, H. Numata, H. Mizuta, Y. Taira, M. Suzuki, M. Noguchi, and Y. Katsu
Moiré-free collimating light guide with low-discrepancy dot patterns
In Digest of Technical Papers of Society for Information Display 2002 (SID '02), pp.1232-1235, 2002.

Publications: Journal (refereed)

- N. Gong, **Tsuyoshi Idé**, S. Kim, I. Boybat, A. Sebastian, V. Narayanan, T. Ando,
Signal and noise extraction from analog memory elements for neuromorphic computing
Nature Communications, Vol. 9, pp.2102 (2018).
- **Tsuyoshi Idé**, Tetsuro Morimura Takayuki Katsuki, and Robert Morris
City-wide traffic flow estimation from limited number of low quality cameras
IEEE Transactions on Intelligent Transportation Systems, 2016 (accepted).
- **Tsuyoshi Idé** and Amit Dhurandhar
Supervised item response models for informative prediction.
Knowledge and Information Systems, 51:235-257, 2017.
- Takayuki Osogami, Takaashi Imamichi, Hideyuki Mizuta, and **Tsuyoshi Idé**
Toward simulating entire cities with behavioral models of traffic
IBM Journal of Research and Development, 57:6:1-6:10, 2013
- Tetsuro Morimura, Yusuke Tanizawa, Shinya yamasaki, and **Tsuyoshi Idé**
Vehicle near-miss situation prediction from probe-car data using statistical machine learning
Journal of Information Processing, 43:573-578, 2012
- Shohei Hido, Shoko Suzuki, Risa Nishiyama, Takashi Imamichi, Rikiya Takahashi, Tetsuya Nasukawa, **Tsuyoshi Idé**, Yusuke Kanehira, Rinju Yohda, Takeshi Ueno, Akira Tajima, and Toshiya Watanabe
Modeling patent quality: A system for large-scale patentability analysis using text mining
Journal of Information Processing, 20:667-671, 2010.
- **Tsuyoshi Idé** and Sei Kato
Trajectory regression for travel-time prediction
Transactions of the Japanese Society for Arti_cial Intelligence, 25:377-382, 2010.
- H. Matsuzawa, S. Hido, **Tsuyoshi Idé**, and H. Kashima
Unsupervised change analysis using supervised learning
The IEICE Transactions on Information and Systems, E93-D:816-825, 2010.

- M. Sugiyama, **Tsuyoshi Idé**, S. Nakajima, and J. Sese
Semi-supervised local Fisher discriminant analysis for dimensionality reduction
Machine Learning, 78:35-61, 2010.
- H. Kashima, **Tsuyoshi Idé**, T. Kato, and M. Sugiyama
Recent advances and trends in large-scale kernel methods
IEICE Transactions on Information and Systems, E92-D:1338-1353, 2009.
- H. Kashima, T. Tsumura, **Tsuyoshi Idé**, T. Nogayama, R. Hirade, H. Etoh, and T. Fukuda
Network-based problem detection for distributed systems
IEICE Transactions on Information and Systems, J89-D:183-198, 2006.
- **Tsuyoshi Idé**, H. Mizuta, H. Numata, Y. Taira, M. Suzuki, M. Noguchi, and Y. Katsu
Dot pattern generation technique using molecular dynamics
Journal of the Optical Society of America, A, 20:242-255, 2003.
- **Tsuyoshi Idé**, H. Numata, H. Mizuta, Y. Taira, M. Suzuki, M. Noguchi, and Y. Katsu
A novel dot-pattern generation to improve luminance uniformity of an LCD backlight
Journal of the Society for Information Display, 11:659-665, 2003.
- **Tsuyoshi Idé** and Akio Kotani
Nonlocal screening effect in Cu $4p$ - $1s$ resonant X-ray emission spectra of Nd₂CuO₄
Journal of the Physical Society of Japan, 69:3107-3114, 2000.
- **Tsuyoshi Idé** and Akio Kotani
Interplay between raman and uorescence-like components in resonant X-ray emission spectra of degenerate d_0 and d_1 systems
Journal of the Physical Society of Japan, 69:1895-1906, 2000.
- K. Hämäläinen, J. P. Hill, S. Huotari, C. C. Kao, L. E. Berman, A. Kotani, **Tsuyoshi Idé**, J. L. Peng, and R. L. Greene
Polarization and momentum dependence of a charge-transfer excitation in Nd₂CuO₄
Physical Review, B61:1836-1840, 2000.
- **Tsuyoshi Idé** and Akio Kotani
Local and nonlocal excitations in Cu $4p$ - $1s$ resonant X-ray emission spectra of Nd₂CuO₄
Journal of the Physical Society of Japan, 68:3100-3109, 1999.
- Akio Kotani and **Tsuyoshi Idé**
Theoretical study on cluster size effects on X-ray absorption and resonant X-ray emission spectra in d and f electron systems
Journal of Synchrotron Radiation, 6: 208-309, 1999.
- **Tsuyoshi Idé** and Akio Kotani
A model study on cluster size effects of resonant X-ray emission spectra
Journal of the Physical Society of Japan, 67:3621-3629, 1998.

Publications: Book authorship

- **Tsuyoshi Idé**, *Introduction to Anomaly Detection using Machine Learning — A Practical Guide with R*, Corona Publishing, 2015.
- **Tsuyoshi Idé** and Masashi Sugiyama, *Anomaly Detection and Change Detection*, Kodansha Scientific, 2015.



Publications: Book chapters

- **Tsuyoshi Idé**, Formalizing expert knowledge through machine learning. In S. K. Kwan, J. C. Spohrer, and Y. Sawatani, ed., *Global Perspectives on Service Science: Japan*, pp.157-175, Springer, 2016.
- **Tsuyoshi Idé**, Change detection from heterogeneous data sources. In Katsutoshi Yada, ed., *Data Mining for Service*. Springer Verlag, pp.221-243, 2014.



Publications: Book editor

- H. Hattori, T. Kawamura, **Tsuyoshi Idé**, M. Yokoo, and Y. Murakami, editors. *New Frontiers in Artificial Intelligence: JSAI 2008 Conference and Workshops, Revised Selected Papers*, volume 5447 of *Lecture Notes in Artificial Intelligence*. Springer Verlag, 2009.



Publications: Book translation

- M. Sugiyama, **Tsuyoshi Idé**, T. Kamishima, T. Kurita, and E. Maeda. *The Elements of Statistical Learning* (Japanese translation). Kyoritsu, 2014.
- **Tsuyoshi Idé**. Chap. 12, Continuous Latent Variables. In H. Motoda, T. Kurita, T. Higuchi, Y. Matsumoto, and N. Murata, ed., *Pattern Recognition and Machine Learning*. Maruzen, 2006.



List of Patents: Granted US Parents (as of 12/2016)

| PAT. NO. | Title |
|-----------|---|
| 9,495,330 | Anomaly detection method, program, and system |
| 9,354,381 | Information processing apparatus, calculation method, program, and storage medium |

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|-----------|--|
| 9,329,329 | Information processing apparatus, calculation method, program, and storage medium |
| 9,317,804 | Calculating risk assessment value of event sequence |
| 8,983,890 | Calculating risk assessment value of event sequence |
| 8,682,633 | Cost evaluation and prediction |
| 8,640,015 | Anomaly detection based on directional data |
| 8,600,721 | Cost evaluation and prediction |
| 8,595,155 | Kernel regression system, method, and program |
| 8,405,551 | Location estimation system, method and program |
| 8,138,974 | Location estimation system, method and program |
| 7,849,124 | Method and system for detecting difference between plural observed results |
| 7,720,640 | Diagnostic data detection and control |
| 7,702,714 | Pairwise symmetry decomposition method for generalized covariance analysis |
| 7,647,524 | Anomaly detection |
| 7,529,991 | Scoring method for correlation anomalies |
| 7,493,361 | Computer operation analysis |
| 7,483,934 | Methods involving computing correlation anomaly scores |
| 7,475,052 | Malfunction condition judgment apparatus, control method, automobile and program method |
| 7,406,653 | Anomaly detection based on directional data |
| 7,346,803 | Anomaly detection |
| 7,181,365 | Diagnostic data detection and control |
| 6,865,325 | Discrete pattern, apparatus, method, and program storage device for generating and implementing the discrete pattern |
| 6,754,419 | Discrete pattern |

List of Patents: Granted Japanese Parents (as of 12/2016)

| PAT NO. | Title (English translation) |
|-----------|---|
| 5,984,142 | Analysis apparatus, analysis method, and their program |
| 5,852,399 | System, method, and program for battery state prediction |
| 5,839,970 | Method, apparatus, and computer program for calculating the risk of event sequences |
| 5,802,041 | Information processing system, calculation method, program, and storage device |
| 5,695,763 | Method, apparatus, and computer program for calculating the risk of event sequences |
| 5,651,129 | System, method, and program for evaluating costs |
| 5,576,567 | Method, apparatus, and computer program for detecting occurrence of anomalies |

| | |
|-----------|---|
| 5,570,008 | System, method, and program for kernel regression |
| 5,203,670 | System, method, and program for estimating locations |
| 5,198,994 | System, method, and program for estimating travel time |
| 5,186,322 | System, method, and program for analyzing time-series data |
| 5,159,368 | System, method, and program for change detection |
| 4,953,239 | Method for detecting anomalies of subjects observed |
| 4,652,741 | Method, apparatus, computer program, and storage device for detecting anomalies |
| 4,201,027 | Method, apparatus, and computer program for detecting discrepancies between plural objects |
| 4,183,185 | Diagnosis apparatus, detection apparatus, control method, detection method, program, and storage device |
| 4,170,315 | Diagnosis apparatus, control method, automobile, and program |
| 4,148,524 | System and method for evaluating dependencies |
| 4,093,483 | System and method for analysis |
| 3,922,375 | System and method for detecting anomalies |

List of Patents: Granted Taiwanese Parents (as of 12/2016)

| PAT. NO. | Title |
|-----------|---|
| I524280 | Method, apparatus and computer program for detecting occurrence of anomaly |
| I224698 | Discrete pattern, optical member, light guide plate, side light device and light-transmitting liquid crystal display device using the discrete pattern, method and program for generating the discrete pattern, computer-readable storage medium on which computer-readable program for generating the discrete pattern is stored, and discrete pattern generation system |
| 201316266 | Method, apparatus and computer program for detecting occurrence of anomaly |

List of Patents: Granted Chinese Parents (as of 12/2016)

| PAT. NO. | Title (English translation) |
|----------------|---|
| CN102656427 B | Cost evaluation system and method |
| CN 103975327 B | The method used to visualize the sequence of events in the risk assessment of value and equipment |
| CN 103827653 B | A method of detecting an abnormal occurrence, equipment and computer programs |

CN 102736319 B

Information processing apparatus, and calculation method