SHORT CV

SAERENS Marco

Université catholique de Louvain (UCL, Belgium)

Information Systems Research Unit (ISYS) & Machine Learning Group (MLG)

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BACKGROUND

Ph.D. in Engineering (physics), Université Libre de Bruxelles
Master in Theoretical Physics, Université Libre de Bruxelles
M.S. Degree in Physics Engineering, Université Libre de Bruxelles

COURSES TAUGHT IN 2010-2011

- Data mining and decision-making (masters in computer sciences and computer sciences engineering, UCL)
- Quantitative data analysis (masters degree in management engineer, UCL)
- Programming lab in Java (bachelor degree in computer sciences and computer sciences engineering, UCL)
- Introduction to algorithms and programming (bachelor degree in management sciences, UCL)
- Introduction to formal languages (masters degree in technical engineering, ECAM)
- Data warehouse et business intelligence avec SQL server (Technofutur TIC, www.technofuturtic.be)

MAIN RESEARCH THEMES

- Data mining, graph/web mining, pattern recognition, computational statistics.
- Artificial intelligence, machine learning, artificial neural networks, fuzzy logic.
- Speech processing, speech recognition, natural language processing, text mining.

SOME CURRENT RESEARCH ACTIVITIES

- Exploratory statistical analysis and visualization of weighted directed graphs.
- Collaborative recommendation and link analysis.
- Randomized shortest path problems and exploration in reinforcement learning.
- Stochastic grammars for flat text structuring.
- Supervised classification in the presence of uncertainty about the priors.
- Experts opinion fusion.

PROFESSIONAL ACTIVITIES

- **01/10/2007**. *Full professor* at the Université catholique de Louvain, Information Systems Research Unit (ISYS Unit; www.isys.ucl.ac.be).
- **01/10/2003–30/09/2006**. *Head of the Information Systems Research Unit* (ISYS Unit, UCL).

- **01/09/2002**. *Full-time associate professor* at the Université catholique de Louvain, Information Systems Research Unit (ISYS Unit; www.isys.ucl.ac.be). Founding member of the Machine Learning Group, UCL.
- **1999–2002**. *Senior Researcher* responsible for artificial intelligence and data mining at the SMALS-MVM, R&D Department.
- **1997–1999**. *Senior Consultant* in data mining, applied statistics and data warehousing at CSC COMPUTER SCIENCES, department "Technology Consulting, Center of Excellence on Data Warehousing and Data Mining".
- **1996**. *Founder member* of Emedia sprl (www.emedia.be).
- **1995–1997**. *Research & Development Engineer* at SOPRES Belgium, R&D Department.
- **1993–1995**. *Researcher* at the Institut de Recherches Interdisciplinaires et de Développements en Intelligence Artificielle (IRIDIA, Université Libre de Bruxelles).
- **1990–1993**. *Senior Researcher* at LERNOUT & HAUSPIE SPEECH PRODUCTS (LHS), R&D Department, Speech Recognition Unit. Also "Scientific collaborator" at the ULB/IRIDIA laboratory (still ongoing).
- **1986–1990**. *Research Assistant* at (and co-founder of) the "Institut de Recherche Interdisciplinaire en Intelligence Artificielle" (IRIDIA Laboratory; iridia.ulb.ac.be), Université Libre de Bruxelles (ULB). One-year stay at the "Centre National d'Etude des Télecommunications" (CNET, Lannion, France), Speech Recognition Unit.

SOME RECENT RESEARCH & DEVELOPMENT PROJECTS AND AFFILIATIONS

Founder member of the

Machine Learning Group, UCL (MLG, www.ucl.ac.be/mlg).

Computational Intelligence and Learning doctoral school, Belgium (CIL, www.uclouvain.be/doctoralschool-cil).

Research fellow of the

IRIDIA Laboratory, ULB (IRIDIA, code.ulb.ac.be/iridia.home.php).

Some research projects:

Expertise Localization from Informal Sources & Information Technologies (Elis-IT)
Financial Support : Région Wallonne (20011-2014)
Principal Investigator : Marco Saerens (Machine Learning Group, UCL; coordinator)
Participating research units : IRIDIA (ULB – Prof. Bersini); CENTAL (UCL – Prof. Fairon); CRID (FUNDP – Prof. Poullet)
Participating company : IRIS S.A.
Total funding : about 1,300,000 Euro
Researchers : 4 researchers for three years
Short description : This project is funded by the "Region Wallonne" and has been introduced in partnership with IRIS S.A. Its aim is to develop high quality text mining/information retrieval/link analysis algorithms allowing to automatically analyze and extract information from informal sources, like emails, blogs, meeting summaries. More precisely, besides the legal aspects, the objectives of this project are three-fold. The first goal is to develop novel machine learning/data mining/text mining methods and algorithms for automatic identification of roles and expertises within a company based on informal sources. The second goal aims to exploit external ontologies or ressources, such as wikipedia or WordNet, in order to enrich and complete the information extracted from the informal sources. Finally, the last goal involves the joint mapping of key experts and roles/expertises inside a company through graph mining/link analysis techniques. All the developed algorithms will be assessed based on real data provided by IRIS, and customized according to their specific needs.

Multi-Dimensional Context-Aware Adaptation of Service Front-Ends (SERENOA)
Financial Support : ECC STREP (2010-2013)
Principal Investigator : Telefónica Investigación y Desarrollo (Spain; coordinator)
Participating research units : Université catholique de Louvain (UCL – Profs. Vanderdonckt & Saerens, Belgium), Consiglio Nazionale delle Ricerche (Italy), SAP AG (Germany), W3C Europe, W4 (France) and Fundación CTIC (Spain)
Participating company : SAP, W4, Telefonica Spain
Total funding : about 3,273,767 Euro
Researchers : 2 UCL researchers for three years
Short description : Serenoa is aimed at developing a novel, open platform for enabling the creation of context-sensitive service front-ends (SFEs). From the point of view of Serenoa, a context-sensitive SFE provides a user interface (UI) that exhibits some capability to be aware of the context and to react to changes of this context in a continuous way. As a result such a UI will be adapted to a person's devices, tasks, preferences, and abilities, thus improving people's satisfaction and performance compared to traditional SFEs based on manually designed UIs. Serenoa will perform automatic adaptation of UIs involving the end user in two major ways: users can intervene in the adaptation (e.g. by controlling, suggesting, accepting/rejecting adaptations, requesting better adaptations) and the system can learn from users (e.g., by observation, by sensing, by machine learning).The final aim is to support humans in a more effective, personalized and consistent way, thus improving the quality of life for European citizens. In this scenario, we envisage Serenoa as the open source reference implementation of a SFE adaptation platform for the 'Future Internet'.

Detection and analysis of social fraud in OASIS Databases (OASIS+)

Financial Support : Belgian Science Policy (2007-2009)
Principal Investigator : Gianluca Bontempi (Machine Learning Group, ULB; coordinator)
Participating research units : Machine Learning Group (UCL – Prof. Saerens) and Higher Institute of Labour Studies (KUL – Prof. Pacolet)
Participating company : Federal Administration
Total funding : about 300,000 Euro
Researchers : 3 researchers for two years
Short description : The OASIS+ project is funded by the "Belgian Science Policy" and has been introduced in partnership with the four federal departments of social investigation (SPF Sécurité sociale, Office national de Sécurité sociale, SPF Emploi Travail et Concertation sociale, Office national de l'emploi). It aims to study – and ultimately detect – fraud scenarios conducted by companies of the private sector. Indeed, the four federal departments of social investigation are currently using the OASIS datawarehouse (Organisation Anti-fraude des Services d'Inspection Sociale) for fiscal control monitoring. This datawarehouse centralizes administrative data from different federal services. For instance, fiscal and social data regarding any employer and worker are currently loaded into OASIS. Besides, there is another database gathering results of controls. OASIS currently helps social investigators of the fraud squad to determine which company they should monitor. However, the selection of the companies is currently done using warnings that have been implemented based on the personal experience of the investigators. Thus, up to now, there is no data mining application that is either checking, validating or upgrading these warnings. The OASIS+ project has three main goals: to upgrade OASIS by adding data mining/machine learning tools, to quantitatively assess the performances of the whole fraud detection system and to better understand the social fraud scenarios. These goals are, of course, highly complementary. We hope that using data mining techniques will lead to a better understanding of what the social fraud is and provide new, relevant, information to the persons in charge of the investigations.

Automatic structure induction from flat texts (STRATEGO)

Financial Support : Région Wallonne (2007-2010)
Principal Investigator : Marco Saerens (coordinator)
Participating research units : IRIDIA (ULB – Prof. Bersini); SIC (ULB – Prof. Francq); CENTAL (UCL – Prof. Fairon)
Participating company : IRIS S.A., Denali S.A., MENTIS SPRL
Total funding : about 1,000,000 Euro
Researchers : 4 researchers for three years
Short description : This project is funded by the "Region Wallonne" and has been introduced in partnership with IRIS S.A., Denali S.A. and MENTIS SPRL. Its aim is to develop high quality text mining/information retrieval algorithms allowing to automatically analyze and extract information from structured and unstructured documents. More precisely, the objectives of this project are three-fold. The first goal is to develop novel machine learning/data mining methods and algorithms for automatic structure induction from flat, scanned, texts and their corresponding XML DTDs. In particular, we are interested in jointly structuring and classifying the scanned manuscripts. To this end, probabilistic generative models for XML documents as well as novel models dealing with structured data are developed and investigated. The two other tasks involve supervised document classification based on the document contents and semi-automatic thesaurus processing. All the developed algorithms will be assessed based on real data provided by the companies, and customized according to their specific needs.

Network Analysis, Clustering and Relationship mining (NACRE)

Financial Support : Région de Bruxelles-capitale (2005-2007)
Principal Investigator : Marco Saerens (MLG, UCL)
Participating company : VADIS Consulting S.A.
Total funding : about 250,000 Euro
Researchers : 1 researcher for two years
Short description : This project is funded by the "Region de Bruxelles-Capitale" and has been introduced in partnership with "VADIS Consulting", a data mining company closely related to "Wegener/Sopres". Its aim is to develop novel statistical analysis and visualization methods for large, weighted, graphs. In particular, we are interested in the analysis of telecommunication networks, viewing the network of mobile phone calls as a weighted graph. The objective is to identify dense clusters of users (communities), which are highly connected, or "central persons" in the network. Identifying dense clusters or central users is important for several reasons; for instance in order to be able to forecast "churn".

"Collaborative recommendation" project

Financial Support : FIRST Enterprise contract – Région Wallonne (2004-2006)
Principal Investigator : Marco Saerens (MLG, UCL)
Participating company : CITOBI S.A.
Total funding : about 150,000 Euro
Researchers : 1 researcher for two years
Short description : This project is funded by the "Region wallonne" and has been introduced in partnership with "CITOBI", an internet marketing automation and CRM company. Its aim is to develop new collaborative recommendation methods, based mainly on new notions of distances on a graph. Collaborative recommendation models are mainly used to recommend items to users, based on their previous purchases (as in amazon.com). These novel concepts of distances are based on models of random walk on a graph (Markov models) and on the concept of « stochastic complementation », that account for all the possible paths between two nodes (and not only the shortest one as for the geodesic distance). These dissimilarities are then used in order to compute the proximity between elements of different tables of a relational database. An industrial application, with the collaboration of CITOBI, is under development.

A Multi-Agent Recommendation System Based for Sharing of Knowledge

Financial Support: FIRST Enterprise contract – Région Wallonne(2005-2006)
Principal Investigators : Manuel Kolp, Marco Saerens (ISYS and MLG, UCL)
Total funding : about 250,000 Euro
Participating company : DENALI S.A.
Researchers : 1 researcher for two years
Short description : This applied research project proposes an agent-based recommendation system for supporting communities of people in their searching task. To find information of quality from multiple heterogeneous sources is increasingly difficult. This problem finds its origin in the fast growth of the number of information available. The various formats used to store the data can also be problematic for the recommendation process. Nevertheless, for a community of people with similar interests, quality of results can be improved exploiting also the experience of the community. This experience can be shared and strengthen by all members of the same community to respond to their expectations by furnishing the best information on a specific topic.

Analysis of Networks of Criminals

Financial Support: Belgian Federal Police (2004-2005)
Principal Investigators : Marie-Paule Kestemont, Marco Saerens (LSM and MLG, UCL)
Total funding : about 20,000 Euro
Participating company : Belgian Federal Police
Researchers : no researcher
Short description : This applied research project aims to analyse networks of criminals based on recently developped « social network » techniques. In particular, we are interested in the analysis of criminal data, viewing the network as a weighted graph. : two criminals are linked if they commited a

« crime » (understood in a broad sense) together. The objective is to identify dense clusters of criminals (communities), which are highly connected, or "central persons" in the network. Detecting dense clusters or central users is important for several reasons; for instance it allows to identify communities operating together.

Two previous research projects

• With ISPRA Joint Research Center (ISPRA, J.-P.. NORDVICK), and the CREA (Polytechnique, Paris, Prof. F. VARELA), submission of a "exploratory research" to the European Commission. The project, "Exploratory Research of Biological Adaptive Systems for process control", has been funded.

• With Prof. Hugues BERSINI, IRIDIA (ULB), Septembre 1995, submission of a "Long-Term ESPRIT Basic Research Project proposal" (main contractor), with SIEMENS Automation Toulouse (Dr. Serge BOVERIE), the Lund Institute of Technology (Prof. Karl ASTRÔM), the Delft University of Technology (Prof. Henk VERBRUGGEN), and the l'University of Sevilla (Prof. Anibal OLLERO). The project, "Fuzzy Algorithms for Multi-Input Multi-Output Process Control (FAMIMO; `iridia.ulb.ac.be/~famimo`)", has been funded.

PUBLICATIONS (selection)

▪ Reports and working papers

SCHOENTGEN J. & SAERENS M. (1987), "Un progiciel phonétique". *Rapport d'Activités de l'Institut de Phonétique de l'ULB*, 21, pp. 73-88.

BEECKMANS R., SAERENS M. & SERNICLAES W. (1989), "The relative contributions of acoustic cues and contextual factors to the perception of the voicing feature for French stops in spontaneous speech". *Rapport d'Activités de l'Institut de Phonétique de l'ULB*, 23-24, pp. 187-234.

SAERENS M. (1990), "A preliminary study of a competitive cost function applied to clustering". *Rapport d'Activités de l'Institut de Phonétique de l'ULB*, 25, pp. 93-101.

SAERENS M. & SOQUET A. (1990), "A neural controller based on back-propagation algorithm". *Rapport d'Activités de l'Institut de Phonétique de l'ULB*, 25, pp. 103-125.

SAERENS M., SOQUET A., RENDERS J.-M. & BERSINI H. (1990), "Preliminary comparisons between a neural adaptive controller and a model reference adaptive controller". *Rapport d'Activités de l'Institut de Phonétique de l'ULB*, 26, pp. 129-142.

SOQUET A., SAERENS M. & JOSPA P. (1990), "Acoustic-articulatory inversion, based on a neural controller, of a vocal tract model". *Rapport d'Activités de l'Institut de Phonétique de l'ULB*, 26, pp. 143-150.

SAERENS M. (1990), "Unsupervised clustering based on a competitive cost function". *Rapport d'Activités de l'Institut de Phonétique de l'ULB*, 26, pp. 151-162.

SOQUET A. & SAERENS M. (1994), "A comparison of different acoustic and articulatory representations for the determination of the place of articulation of plosives". *Rapport d'Activités de l'Institut de Phonétique de l'ULB*, 30, pp. 99-113.

SAERENS M. (2002), "L'intelligence artificielle: Quelques éléments de base, I et II". *Techno 20 et 22 de la Smals; disponible en libre accès à: http://smals-mvm.be/site_fr/content/Realisations/publications.html*.

SAERENS M., LATINNE P. & DECAESTECKER C. (2003), "Any reasonable cost function can be used for a posteriori probability approximation". *IAG Working Paper 73/02*.

FOUSS F., RENDERS J.-M. & SAERENS M. (2004), "Links between Kleinberg's hubs and authorities, correspondence analysis and Markov chains". *IAG Working Paper 102/04*.

FOUSS F. & SAERENS M. (2004), "A maximum entropy approach to multiple classifiers combination". *IAG Working Paper 107/04*.

FOUSS F., FAULKNER S., KOLP M., PIROTTE A. & SAERENS M. (2005), "Web recommendation system based on a Markov-chain model". *IAG Working Paper 123/04*.

SAERENS M., FOUSS F., YEN L. & DUPONT P. (2005), "The principal components analysis of a graph, and its relationships to spectral clustering". *IAG Working Paper 124/04*.

SAERENS M. & FOUSS F. (2005), "HITS is PCA". *IAG Working Paper 125/04*.

FOUSS F., PIROTTE A., RENDERS J.-M & SAERENS M. (2006), "A novel way of computing similarities between nodes of a graph, with application to collaborative filtering and subspace projection of the graph nodes ". *IAG Working Paper* 06/08.

▪ Proceedings of peer-reviewed international conferences

SAERENS M., SERNICLAES W. & BEECKMANS R. (1988), "Contributions relatives des indices acoustiques et des facteurs contextuels a la perception du trait de voisement des occlusives du français dans la parole spontanée". *Actes des 17e Journées d'Etude sur la Parole (JEP)*, Nancy, pp. 95-100.

SAERENS M. & SOQUET A. (1989), "Un système de commande connexionniste". *Actes des 4èmes Journées Françaises de l'Apprentissage,* Rennes, pp. 153-167.

SAERENS M. & SOQUET A. (1989), "A neural controller". *Proceedings of the first IEE International Conference on Artificial Neural Networks,* London, pp. 211-215.

SAERENS M. (1990), "A preliminary study of a competitive cost function applied to clustering". *Proceedings of the IEEE International Neural Network Conference (INNC),* Paris, pp. 318-321.

SAERENS M. (1990), "Unsupervised clustering based on a competitive cost function". *Proceedings of the IEEE International Joint Conference on Neural Network (IJCNN),* San Diego, pp. 343-348.

SAERENS M. (1990), "Etude préliminaire d'une fonction coût compétitive avec application à la classification automatique". *Actes des XXIIièmes Journées de Statistique*, Tours, pp. 191-193.

BERSINI H., SAERENS M., SOQUET A. & DECOSSEAUX E. (1990), "Connectionism for low-level and high-level process control". *Proceedings of the Ninth European Annual Conference on Human Decision Making and Manual Control*, Varese, pp.151-160.

SOQUET A., SAERENS M. & JOSPA P. (1990), "Acoustic-articulatory inversion based on a neural controller of a vocal tract model". *Proceedings of the ESCA First International Workshop on Speech Synthesis,* Autrans, pp. 71-74.

SOQUET A., SAERENS M. & JOSPA P. (1991), "Trying to determine place of articulation of plosives with a vocal tract model". *Proceedings of the XIIth International Conference on Phonetic Sciences (ICPhS),* Aix En Provence, pp. 66-69.

SOQUET A., SAERENS M. & JOSPA P. (1991), "Acoustic-articulatory inversion based on a neural controller of a vocal tract model: Further results". In "*Artificial Neural Networks*"; Kohonen, Mäkisara, Simula & Kangas (editors), *Proceedings of the 1991 International Conference on Artificial Neural Networks* (ICANN, Helsinki), North-Holland, pp. 371-376.

RADEAU M., MORAIS J., MOUSTY P., SAERENS M. & BERTHELSON P. (1991), "The effect of the uniqueness point in processing printed words". Abstract of conference, the "Annual Meeting of the Psychonomic Society '91", in *Bulletin of the Psychonomic Society*, 29, p. 511.

JOSPA P., SOQUET A. & SAERENS M. (1992), "Commande d'un modèle de conduit vocal sur base d'estimation des fonctions de sensibilité". *Actes des 19èmes Journées d'Etudes sur la Parole (JEP)*. Bruxelles, pp. 341-346.

JOSPA P., SOQUET A. & SAERENS M. (1992), "Acoustical sensitivity functions and the control of a vocal tract model". Invited paper in the *Proceedings of the European Signal Processing Conference (EUSIPCO)*, Brussels, pp. 171-174.

SAERENS M., GONZALES SOTELINO L. & BERSINI H. (1992), "Classification of temporal trajectories by continuous time recurrent nets". *Proceedings of NeuroNîmes,* Nîmes, pp. 367-377.

RENDERS J.-M., BERSINI H. & SAERENS M. (1993), "Adaptive neurocontrol: How black box and simple can it be". *Proceedings of the 10th International Conference on Machine Learning (ICML),* Amherst, pp. 260-267.

SAERENS M. (1993), "Hidden Markov models assuming a continuous-time dynamic emission of acoustic vectors". *Proceedings of the European International Conference on Speech Processing (EUROSPEECH)*, Berlin, pp. 587-590.

SAERENS M. & BOURLARD H. (1993), "Linear and nonlinear prediction for speech regognition with hidden Markov models". *Proceedings of the European International Conference on Speech Processing (EUROSPEECH)*, Berlin, pp. 807-810.

BOURLARD H., BOITE J.-M., D'HOORE B. & SAERENS M. (1993), "Performance comparison of hidden Markov models and neural networks for task dependent and independent isolated word recognition". *Proceedings of the European International Conference on Speech Processing (EUROSPEECH)*, Berlin, pp. 1925-1928.

ROBINSON T., ALMEIDA L., BOITE J.-M., BOURLARD H., FALLSIDE F., HOCHBERG M., KERSHAW D., KOHN P., KONIG Y., MORGAN N., NETO J. P., RENALS S., SAERENS M. & WOOTERS C. (1993), "A neural network based, speaker independent, large vocabulary, continuous speech recognition system: The WERNICKE project". *Proceedings of the European International Conference on Speech Processing (EUROSPEECH)*, Berlin, pp. 1941-1944.

RENDERS J.-M., SAERENS M. & BERSINI H. (1994), "Adaptive neurocontrol of MIMO systems based on stability theory". *Proceedings of the IEEE International Conference on Neural Network (ICNN),* Orlando, pp. 2476-2481; also in the *Proceedings of the IEE Colloquium on Advances in Neural Networks for Control and Systems*, Berlin, pp. 13.1-13.6.

RENDERS J.-M., SAERENS M. & BERSINI H. (1994), "On the stability of a certain class of adaptive fuzzy controllers". Invited paper in the *Proceedings of the European Conference on Fuzzy and Intelligent Technologies (EUFIT),* Aachen, pp. 27-34.

SOQUET A. & SAERENS M. (1994), "A comparison of different acoustic and articulatory representations for the determination of the place of articulation of plosives". *Proceedings of the International Conference on Spoken Language Processing (ICSLP)*, Yokohama (Tokyo), pp. 1643-1646.

SAERENS M. (1995), "Viterbi algorithm for acoustic vectors generated by a linear stochastic differential equation". *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Detroit, pp. 233-236.

RENDERS J.-M. & SAERENS M. (1995), "Robust adaptive control of a certain class of continuous-time processes". *Proceedings of the first Neural Adaptive Control Technology Workshop (NACT 1)*, Glasgow.

SOQUET A. & SAERENS M. (1995), "Vowel classification based on acoustic and articulatory representations". *Proceedings of the XIIIth International Conference on Phonetic Sciences (ICPhS)*, Stockholm, pp. 322-325.

DECAESTECKER C. & SAERENS M. (1995), "Comparisons of different radial basis function networks for classification". *Proceedings of the International Conference on Artificial Neural Networks (ICANN)*, Paris, pp. 591-596.

SAERENS M. (1996), "Non mean square error criteria for the training of learning machines". Proceedings of the *13th International Conference on Machine Learning (ICML)*, july 1996, Bari (Italy), pp. 427-434.

SOQUET A., SAERENS M. & LECUIT V. (1999), "Complementary cues for speech recognition". Proceedings of the *International Conference on Phonetic Sciences (ICPhS)*, San Francisco, pp. 1645-1649.

ZIEREISEN F., HEINRICH C., DUFOUR D., SAERENS M. & AVNI F. (2000), "Doppler assessment of pulsability index of the uterine artery in girls around puberty". *Proceedings of the 37th annual congress of the European Society of Paediatric Research (ESPR 2000)*, Lisbon, may 2000. Awarded as the J. Lefebvre "Best Paper" award of the European Society of Paediatric Research.

LATINNE P., SAERENS M. & DECAESTECKER C. (2001), "Adjusting the outputs of a classifier to new a priori probabilities may significantly improve classification accuracy: Evidence from a multi-class problem in remote sensing". Proceedings of the *18th International Conference on Machine Learning (ICML)*, pp. 298-305.

FOUSS F., RENDERS J.-M. & SAERENS M. (2003), "Links between Kleinberg's hubs and authorities, correspondence analysis and Markov chains". Proceedings of the *3th IEEE International Conference on Data Mining (ICDM)*, pp. 521-524.

FOUSS F., RENDERS J.-M. & SAERENS M. (2004), "Some relationships between between Kleinberg's hubs and authorities, correspondence analysis and Markov chains". Proceedings of the 7th *International Conference on the Statistical Analysis of Textual Data (JADT)*, pp. 445-455.

FOUSS F., PIROTTE A. & SAERENS M. (2004), "A Novel Way of Computing Dissimilarities between Nodes of a Graph, with Application to Collaborative Filtering". 15th European Conference on Machine Learning (ECML 2004); *Proceedings of the Workshop on Statistical Approaches for Web Mining* (SAWM), pp 26-37.

YEN L., VANVYVE D., WOUTERS F., FOUSS F., VERLEYSEN M. & SAERENS M. (2005), "Clustering using a random walk-based distance measure". Proceedings of the 13th *European Symposium on Artificial Neural Networks* (ESANN 2005), pp. 317-324.

FOUSS F., FAULKNER S., KOLP M., PIROTTE A. & SAERENS M. (2005), "Web recommendation system based on a Markov-chain model". Proceedings of the 7th *International Conference on Enterprise Information Systems* (ICEIS 2005), vol. 4, pp. 56-63.

FOUSS F., PIROTTE A., RENDERS J.-M & SAERENS M. (2005), "A novel way of computing similarities between nodes of a graph, with application to collaborative recommendation". Proceedings of the 2005 *IEEE/ACM International Joint Conference on Web Intelligence*, pp. 550-556.

SAERENS M. & FOUSS F. (2005), "HITS is principal components analysis". Proceedings of the 2005 *IEEE/ACM International Joint Conference on Web Intelligence*, pp. 782-785.

FOUSS F., YEN L., PIROTTE A. & SAERENS M. (2006), "An experimental investigation of graph kernels on two collaborative recommendation task". Proceedings of the 2006 *IEEE International Conference on Data Mining* (ICDM 2006), pp. 863-868.

JURETA I., FAULKNER S., ACHBANY Y. & SAERENS M. (2007), "Dynamic task allocation within an open service-oriented MAS architecture". Proceedings of the 2007 *International Conference on Autonomous Agents & Multiagent Systems* (AAMAS 2007), pp. 1237-1239.

FAULKNER S., JURETA I., ACHBANY Y. & SAERENS M. (2007), "Dynamic web service composition within a service-oriented architecture". Proceedings of the 5th *International Conference on Web Services* (ICWS 2007), IEEE Society Press, pp. 304-311.

FRENAY B. & SAERENS M. (2008), "QL2, a simple reinforcement learning scheme for two-player zero-sum Markov games". Proceedings of the 16th *European Symposium on Artificial Neural Networks* (ESANN 2008), pp.137-142.

YEN L., MANTRACH A., SHIMBO M. & SAERENS M. (2008), "A family of dissimilarity measures between nodes generalizing both the shortest-path and the commute-time distances". Proceedings of the 14th SIGKDD *International Conference on Knowledge Discovery and Data Mining* (KDD 2008), pp. 785-793.

FOUSS F. & SAERENS M. (2008), "Evaluating performance of recommender systems: an experimental comparison". Proceedings of the 2008 *IEEE/ACM International Joint Conference on Web Intelligence* (WI'08), pp.735-738.

KEVERS L., MANTRACH A., FAIRON C., BERSINI H. & SAERENS M. (2010), "Classification hybride par motifs lexicaux étendus et classificateurs SVM". Proceedings of the *Journées Internationales d'Analyse statistiques des Données Textuelles* (JADT 2010), vol. 1, pp. 105-117.

GARCIA-DIEZ S., FOUSS F., SHIMBO M. & SAERENS M. (2010), "Normalized sum-over-paths edit distances". Proceedings of the 20th *International Conference on Pattern Recognition* (ICPR 2010), pp. 1044-1047.

CALLUT J., DUPONT P. & SAERENS M. (2009), "Sequence classification in the Jensen-Shannon embedding". Submitted for publication.

GARCIA-DIEZ S., VANDENBUSSCHE E. & SAERENS M. (2011), "A continuous-state version of discrete randomized shortest-paths". Proceedings of the 50th *IEEE International Conference on Decision and Control* (IEEE CDC 2011), pp. 6570-6577.

GARCIA-DIEZ S., SENELLE M., FOUSS F. & SAERENS M. (2011), "A simple-cycles weighted kernel based on harmony structure for similarity retrieval". Proceedings of the 12th *International Society for Music Information Retrieval Conference* (ISMIR 2011), pp. 61-66.

SUZUKI I., HARA K., SHIMBO M., MATSUMOTO Y. & SAERENS M. (2012), " Investigating the effectiveness of laplacian-based kernels in hub reduction". To appear in the proceedings of the 26th *Association for the Advancement of Artificial Intelligence Conference* (AAAI 2012).

▪ Book chapters and journal papers

SAERENS M., SERNICLAES W. & BEECKMANS R. (1989), "Acoustic versus contextual factors in stop voicing perception in spontaneous speech". *Language and Speech*, 32 (4), pp. 291-314.

SAERENS M. & SOQUET A. (1991), "Neural controller based on back-propagation algorithm". *IEE Proceedings–F*, 138 (1), pp. 55-62. Reprinted in "*Artificial Neural Networks: Concepts and Control Applications*" by Rao Vemuri (editor), 1992, pp. 484-491, IEEE Computer Society Press.

SAERENS M., SOQUET A., RENDERS J-M. & BERSINI H. (1992), "Some preliminary comparisons between a neural adaptive controller and a model reference adaptive controller". In "*Neural Networks in Robotics*", Bekey G. & Goldberg K. (editors), pp. 131-146. Kluwer Academic Press.

RADEAU M., MORAIS J., MOUSTY P., SAERENS M. & BERTHELSON P. (1992), "A listener's investigation of printed word processing". *Journal of Experimental Psychology – Human Perception and Performances*, 18 (3), pp. 861-871.

SAERENS M. (1993), "A continuous-time dynamic formulation of Viterbi algorithm for one-Gaussian-per-state hidden Markov models". *Speech Communication*, 12 (4), pp. 321-333.

SAERENS M., RENDERS J.-M. & BERSINI H. (1995), "Neurocontrol based on the backpropagation algorithm". Chapter 12 of "*Intelligent Control Systems: Theory and applications*", Gupta M. & Sinha N. (editors), pp. 292-326. IEEE Press.

GONZALES SOTELINO L., SAERENS M. & BERSINI H. (1994), "Classification of temporal trajectories by continuous time recurrent nets". *Neural Networks*, 7 (5), pp. 767-776.

SAERENS M. & BOURLARD H. (1994), "HMM/MLP and predictive models". Collaboration with H. Bourlard to a chapter of "*Connectionist Speech Recognition. A hybrid approach*", H. Bourlard & N. Morgan, pp. 243-252. Kluwer Academic Press.

BERSINI H., SAERENS M. & GONZALES SOTELINO L. (1994), "Hopfield net generation, encoding and classification of temporal trajectories". *IEEE Transactions on Neural Networks*, 5 (6), pp. 945-953.

JOSPA P., SOQUET A. & SAERENS M. (1995), "Variational formulation of the acoustico-articulatory link, and the inverse mapping by means of a neural network". Chapter in "*Levels in Speech Communication: Relations and Interactions*", Sorin C., Meloni H., Mariani J. & Schoentgen J. (editors), pp. 103-113. Elsevier Science, North-Holland.

SAERENS M. (1995), "Design of a perceptron-like algorithm based on system identification techniques". *IEEE Transactions on Neural Networks*, 6 (2), pp. 504-506.

SAERENS M., RENDERS J.-M. & BERSINI H. (1995), "Adaptive neurocontrol of a certain class of discrete-time MIMO processes based on stability theory". Chapter in "*Neural Network Engineering in Dynamic Control Systems*", K. Hunt, G. Irwin & K. Warwick (editors), pp. 43-60. Springer-Verlag.

RENDERS J.-M., SAERENS M. & BERSINI H. (1997), "Fuzzy adaptive control of a certain class of SISO discrete-time processes". *Fuzzy Sets and Systems*, 85 (1), pp. 49-61.

RENDERS J.-M. & SAERENS M. (1996), "Robust adaptive neurocontrol of continuous-time MIMO processes based on the e_1-modification scheme". Chapter 7 of "*Neural Adaptive Control Technology*", R. Zbikowski & K. Hunt (editors), pp. 207-236. World Scientific Series in Robotics and Intelligent Systems, vol. 15, World Scientific Publishing.

SAERENS M. (1997), "A study of non mean square error criteria for the training of neural networks". Chapter 6 of "*Dealing with complexity: A neural networks approach*", M. Karny, K. Warwick & V. Kurkova (editors), pp. 76-92. Springer Series on Perspectives in Neural Computing, Springer-Verlag.

SAERENS M. (2000), "Building cost functions minimizing to some summary statistics". *IEEE Transactions on Neural Networks,* 11 (6), pp. 1263-1271.

ZIEREISEN F., HEINRICH C., DUFOUR D., SAERENS M. & AVNI F. (2001), "The role of doppler evaluation of the uterine artery in girls around puberty". *Pediatric Radiology*, 31, pp. 712-719.

SAERENS M., LATINNE P. & DECAESTECKER C. (2002), "Adjusting the outputs of a classifier to new a priori probabilities: A simple procedure". *Neural Computation*, 14 (1), pp. 21-41.

SAERENS M., LATINNE P. & DECAESTECKER C. (2002), "Any reasonable cost function can be used for a posteriori probability approximation". *IEEE Transactions on Neural Networks,* 13 (7), pp. 1204-1210.

FOUSS F. & SAERENS M. (2004), "Yet another method for combining experts opinions: A maximum entropy model". Proceedings of the 5th *International Workshop on Multiple Classifier Systems* (MCS 2004); *Lecture Notes in in Computer Science*, Vol. LNAI3077, Springer-Verlag, pp 82-91.

SAERENS M., FOUSS F., YEN L. & DUPONT P. (2004), "The principal components analysis of a graph, and its relationships to spectral clustering". Proceedings of the 15th *European Conference on Machine Learning* (ECML 2004), *Lecture Notes in Computer Science*, Vol. LNAI3201, Springer-Verlag , pp. 371-383.

ACHBANY Y., FOUSS F., YEN L., PIROTTE A. & SAERENS M. (2006), "Optimal tuning of continual, online, exploration in reinforcement learning". Proceedings of the *International Conference on Artificial Neural Networks* (ICANN 2006); *Lecture Notes in in Computer Science*, Vol. LNAI4131, Springer-Verlag, pp 790-800.

FOUSS F., PIROTTE A., RENDERS J.-M. & SAERENS M. (2007), "Random-walk computation of similarities between nodes of a graph, with application to collaborative recommendation". *IEEE Transactions on Knowledge and Data Engineering*, 19 (3), pp. 355-369.

YEN L., FOUSS F., DECAESTECKER C., FRANCQ P. & SAERENS M. (2007), "Graph Nodes Clustering based on the Commute-Time Kernel". Proceedings of the 11th Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD 2007). *Lecture Notes in Computer Science*, Vol. LNAI4426, Springer-Verlag, pp. 1037-1045.

ACHBANY Y., FOUSS F., YEN L., PIROTTE A. & SAERENS M. (2008), "Tuning continual exploration in reinforcement learning: An optimality property of the Boltzmann strategy". *Neurocomputing*, 71, pp. 2507–2520.

ACHBANY Y., FAULKNER S., FOUSS F., JURETA I. AND SAERENS M. (2008) "Continually learning optimal web service compositions". Accepted for publication in the *Journal of Web Services Research*.

CALLUT J., FRANCOISSE K., SAERENS M. & DUPONT P. (2008), "Semi-supervised classification from discriminative random walks". Proceedings of the European Conference on Machine Learning (ECML/PKDD 2008). *Lecture Notes in Computer Science*, Vol. LNAI5211, Springer-Verlag, pp. 162-177.

FRENAY B. & SAERENS M. (2009), "QL2, a simple reinforcement learning scheme for two-player zero-sum Markov games". *Neurocomputing*, 72, pp. 1494-1507.

YEN L., FOUSS F., DECAESTECKER C., FRANCQ P. & SAERENS M. (2009), "Graph nodes clustering with the sigmoid commute-time kernel: A comprehensive study". *Data & Knowledge Engineering*, 68, pp. 338-361.

SAERENS M., YEN L., FOUSS F. & ACHBANY Y. (2009), "Randomized shortest-path problems: two related models". *Neural Computation*, 21 (8), pp. 2363-2404.

MANTRACH A., YEN L., CALLUT J., FRANCOISSE K., SHIMBO M. & SAERENS M. (2010), "The sum-over-paths covariance kernel: a novel covariance measure between nodes of a directed graph". *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 32 (6), pp. 1112-1126.

FOUSS F., ACHBANY Y. & SAERENS M. (2010), "A probabilistic reputation model based on transaction ratings". *Information Sciences*, 180 (11), pp. 2095-2123.

YEN L., SAERENS M. & FOUSS F. (2011), "A link-analysis extension of correspondence analysis for mining relational databases and graphs". *IEEE Transactions on Knowledge and Data Engineering*, 23 (4), pp. 481-495.

MANTRACH A., VAN ZEEBROECK N., FRANCQ P., SHIMBO M., BERSINI H. & SAERENS M. (2011), "Semi-supervised classification and betweenness computation on large, sparse, directed graphs". *Pattern Recognition*, 44 (6), pp. 1212-1224.

GARCIA-DIEZ S., FOUSS F., SHIMBO M. & SAERENS M. (2011), "A sum-over-paths extension of edit distances accounting for all sequence alignments". *Pattern Recognition*, 44 (6), pp. 1172-1182.

FOUSS F., FRANCOISSE K., YEN L., PIROTTE A. & SAERENS M. (2012), "An experimental investigation of graph kernels on collaborative recommendation and semi-supervised classification". *Neural Networks*, 31, pp. 53-72.

FRANCOISSE K., FOUSS F. & SAERENS M. (2012), "A link-analysis-based discriminant analysis for exploring labeled graphs". To appear in *Pattern Recognition Letters*.

GARCIA-DIEZ S., LAFORGE J. & SAERENS M. (2010), "An optimally randomized minimax algorithm". Submitted for publication.

MOLES LOPEZ X., DEBEIR O., MARIS C., RORIVE S., ROLAND I., SAERENS M., SALMON I. & DECAESTECKER C. (2012), "Clustering methods applied in the detection of KI67 hot-spots in whole tumor slide images: an efficient way to characterize heterogeneous tissue-based biomarkers". Submitted for publication to *Cytometry part A*.

SAERENS M. & DECAESTECKER C. (2012), "Dealing with unknown a priori probabilities in classification". Submitted for publication.

HERSSENS C., MANTRACH A. & SAERENS M. (2012), "Ant colony optimization revisited from a randomized shortest path perspective". Submitted for publication.