

Theodoros Giannakopoulos

General Information

Date of birth: 09/04/1980
Place of birth: Athens, Greece
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Education

PhD, University of Athens, Dept of Informatics and Telecommunications, 2009

- Thesis Title: *Study and application of acoustic information for the detection of harmful content, and fusion with visual information*
- Advisor: Professor Sergios Theodoridis

MSc, Signal and Image Processing Systems, 2004

- With Honors (final grade: 9.34/10)
- Thesis Title: *Design and implementation of real-time processing methods of speech signals, using microphone arrays*
- Advisor: Professor Nikos Fakotakis

B.S., University of Athens, Dept of Informatics and Telecommunications, 2002

- Final grade: 7.14/10
- Thesis Title: *Design and implementation of a semi-automatic method for boundary detection in high resolution ultrasound images*

Research Interests

Audio Analysis: speech - music discrimination, segmentation, multi-class audio classification, event detection, music tracking, speech recognition, speaker clustering, speech emotion recognition.

Multimedia signal processing: movie classification and summarization, emotion recognition, detection of harmful events in movies.

Data mining

Pattern Recognition and Machine Learning: parametric and non-parametric classification techniques, Hidden Markov Models, Bayesian Networks, Neural Networks, feature selection, classifier combination techniques, clustering.

Image processing and image analysis: emphasis on medical image processing.

Publications

Books

- 1 Theodoros Giannakopoulos and Aggelos Pikrakis, Introduction to Audio Analysis: A MATLAB Approach, Academic Press, 2014, ISBN: 9780080993881

Patents

- 1 National Center for Scientific Research Demokritos, E. Spyrou, T. Giannakopoulos, S. Perantonis, D. Sgouropoulos, G. Siantikos, K. Spyropoulos, System for speaker discrimination based on audio-visual data, Industrial Property Organization (Greek), 1008860 - 27/09/2016

Journals

- 8 Nivolianitou, Z. S., Koromila, I. A., Giannakopoulos, T. "Bayesian network to predict environmental risk of a possible ship accident", *International Journal of Risk Assessment and Management*, 19(3), 228-239, 2016
- 7 Sarafianos, Nikolaos, Theodoros Giannakopoulos, and Sergios Petridis. "Audio-visual speaker diarization using fisher linear semi-discriminant analysis." *Multimedia Tools and Applications* 75.1 (2016): 115-130.
- 6 Giannakopoulos Theodoros. *pyAudioAnalysis: An Open-Source Python Library for Audio Signal Analysis*. *PloS one* 10.12 (2015): e0144610.
- 5 Petridis, S., Giannakopoulos, T., Spyropoulos, C. D. (2015). A Low Cost Pupillometry Approach. *International Journal of E-Health and Medical Communications (IJEHMC)*, 6(4), 49-61.
- 4 Theodoros Giannakopoulos and Sergios Petridis. Fisher Linear Semi-discriminant Analysis for Speaker Diarization, *IEEE Transactions On Audio, Speech, And Language Processing*, Vol. 20, No. 7, September 2012
- 3 Thanassis Perperis, Theodoros Giannakopoulos, Alexandros Makris, Dimitrios I. Kosmopoulos, Sofia Tsekeridou, Stavros J. Perantonis and Sergios Theodoridis. Multimodal and ontology-based fusion approaches of audio and visual processing for violence detection in movies. *Expert Systems with Applications*, Vol 38(11), October 2011, pp: 14102-14116
- 2 Aggelos Pikrakis, Theodoros Giannakopoulos, and Sergios Theodoridis. A speech - music discriminator of radio recordings based on dynamic programming and bayesian networks. *Multimedia, IEEE Transactions on*, 10(5):846-857, 2008.
- 1 Theodoros Giannakopoulos, Nikolas Tatlas, Todor Ganchev, and Ilias Potamitis. A practical, real-time speech-driven home automation front-end. *IEEE Transactions on Consumer Electronics*, 51(2):514-523, 2005.

Book Chapters

- 4 D. Sgouropoulos, Th. Giannakopoulos, G. Siantikos, E. Spyrou and S. Perantonis, Detection of Clothes Change Fusing Color, Texture, Edge and Depth Information. M.S. Obaidat, A. Holzinger and J. Filipe (eds.), *E-Business and Telecommunications*, vol. 554 of *Communications in Computer and Information Science*, pp. 383-392, Springer, 2015
- 3 Giannakopoulos, Theodoros, Stasinou Konstantopoulos, Georgios Siantikos, and Vangelis Karkaletsis. "Design for a System of Multimodal Interconnected ADL Recognition Services." In *Components and Services for IoT Platforms*, pp. 323-333. Springer International Publishing, 2017
- 2 Petridis, Sergios, Theodoros Giannakopoulos, and Stavros Perantonis. "Unobtrusive Low-Cost Physiological Monitoring Using Visual Information." *Handbook of Research on Innovations in the Diagnosis and Treatment of Dementia* (2015): 306.

- 1 Aggelos Pikrakis, Theodoros Giannakopoulos, and Sergios Theodoridis. An overview of speech - music discrimination techniques in the context of audio recordings. *Multimedia Services in Intelligent Environments (Advanced Tools and Methodologies, Studies in Computational Intelligence)*, 120:81-102, 2008.

Book Translations - Editing

- 2 Translation (to Greek) of the book: "Multimedia Systems: Algorithms, Standards, and Industry Practices", Parag Havaladar and Gerard Medioni
- 1 Translation (to Greek) and editing of the book: "Pattern Recognition", Sergios Theodoridis and Konstantinos Koutroumbas

Conferences

- 43 Theodoros Giannakopoulos, Georgios Siantikos, "A ROS Framework for Audio-Based Activity Recognition", In Proceedings of the 9th ACM International Conference on Pervasive Technologies Related to Assistive Environments (PETRA 2016)
- 42 Christos Smailis, Nikolaos Sarafianos, Theodoros Giannakopoulos, Stavros Perantonis, "Fusing Active Orientation Models and Mid-term Audio Features for Automatic Depression Estimation", In Proceedings of the 9th ACM International Conference on Pervasive Technologies Related to Assistive Environments (PETRA 2016)
- 41 Bougiatiotis, Konstantinos, and Theodoros Giannakopoulos. "Content Representation and Similarity of Movies based on Topic Extraction from Subtitles." Proceedings of the 9th Hellenic Conference on Artificial Intelligence. ACM, 2016.
- 40 Antonopoulos, Christos, Georgios Keramidas, Nikolaos S. Voros, Michael Hübner, Diana Göhringer, Maria Dagioglou, Theodore Giannakopoulos, Stasinou Konstantopoulou, and Vangelis Karkaletsis. "Robots in assisted living environments as an unobtrusive, efficient, reliable and modular solution for independent ageing: The RADIO perspective." In International Symposium on Applied Reconfigurable Computing, pp. 519-530. Springer International Publishing, 2015.
- 39 Charou, E., Bratsolis, E., Gyftakis, S., Giannakopoulos, T., & Perantonis, S. (2015, July). Use of Sentinel-1 data for Maritime Domain Awareness: Preliminary results. In Information, Intelligence, Systems and Applications (IISA), 2015 6th International Conference on (pp. 1-4). IEEE.
- 38 Sgouropoulos, D., Spyrou, E., Siantikos, G., & Giannakopoulos, T. (2015, November). Counting and tracking people in a smart room: An IoT approach. In Semantic and Social Media Adaptation and Personalization (SMAP), 2015 10th International Workshop on (pp. 1-5). IEEE.
- 37 Siantikos, G., Sgouropoulos, D., Giannakopoulos, T., Spyrou, E. (2015, September). Fusing multiple audio sensors for acoustic event detection. In Image and Signal Processing and Analysis (ISPA), 2015 9th International Symposium on (pp. 265-269). IEEE.
- 36 Giannakopoulos, T., Papakostas, M., Perantonis, S., Karkaletsis, V. (2015, September). Visual sentiment analysis for brand monitoring enhancement. In Image and Signal Processing and Analysis (ISPA), 2015 9th International Symposium on (pp. 1-6). IEEE.
- 35 Koromila, I., Nivolianitou, Z., Perantonis, S., Giannakopoulos, T., Charou, E., Gyftakis, S., Spyrou, K. (2015). Environmental Risk Assessment for the Aegean Sea. 11th International Conference on Marine Navigation and Safety of Sea Transportation (TransNav 2015)

- 34 Tsiakas, Konstantinos, Lynette Watts, Cyril Lutterodt, Theodoros Giannakopoulos, Alexandros Papangelis, Robert Gatchel, Vangelis Karkaletsis, and Fillia Makeidon. A Multimodal Adaptive Dialogue Manager for Depressive and Anxiety Disorder Screening: A Wizard-of-Oz Experiment, . In Proceedings of the 8th ACM International Conference on PErvasive Technologies Related to Assistive Environments
- 33 Lioulemes, A., Sarafianos, N., Giannakopoulos, T., Karkaletsis, V. (2015, July). A two-step identification method for human-robot interaction in assistive environments. In Proceedings of the 8th ACM International Conference on PErvasive Technologies Related to Assistive Environments (p. 71)
- 32 Akasiadis, C., Spyrou, E., Pierris, G., Sgouropoulos, D., Siantikos, G., Mavrommatis, A., Vrakopoulos C., Giannakopoulos, T. (2015, July). Exploiting future internet technologies: the smart room case. In Proceedings of the 8th ACM International Conference on PErvasive Technologies Related to Assistive Environments (p. 85)
- 31 Giannakopoulos, T., Siantikos, G., Perantonis, S., Votsi, N. E., Pantis, J. (2015, July). Automatic soundscape quality estimation using audio analysis. In Proceedings of the 8th ACM International Conference on PErvasive Technologies Related to Assistive Environments (p. 19)
- 30 Giannakopoulos, T., Foufoulas, I., Stamatogiannakis, E., Dimitropoulos, H., Manola, N., Ioannidis, Y. (2015, May). Visual-Based Classification of Figures from Scientific Literature. In Proceedings of the 24th International Conference on World Wide Web Companion (pp. 1059-1060)
- 29 Giannakopoulos, T., Gyftakis, S., Charou, E., Perantonis, S., Nivolianitou, Z., Koromila, I., Makrygiorgos, A. (2015). Long-term marine traffic monitoring for environmental safety in the aegean sea. International Archives of the Photogrammetry, Remote Sensing Spatial Information Sciences.
- 28 Lehinevych, T., Kokkinis-Ntrenis, N., Siantikos, G., Giannakopoulos, T., Konstantopoulos, S. "Discovering similarities for content-based recommendation and browsing in multimedia collections" Signal-Image Technology and Internet-Based Systems (SITIS), 2014 Tenth International Conference on. IEEE, 2014.
- 27 Dimitris Sgouropoulos, Theodoros Giannakopoulos, Sergios Petridis, Stavros Perantonis and Antonis Korakis, "Clothes Change Detection Using the Kinect Sensor" in 11th International Conference on Signal Processing and Multimedia Applications, 2014
- 26 Giannakopoulos, Theodoros, et al. "Realtime depression estimation using mid-term audio features." Artificial Intelligence and Assistive Medicine (AI-AM/NetMed 2014) (2014): 41.
- 25 Theodoros Giannakopoulos, Ioannis Foufoulas, Eleftherios Stamatogiannakis, Harry Dimitropoulos, Natalia Manola and Yannis Ioannidis, "Discovering and visualizing interdisciplinary content classes in scientific publications", 3rd International Workshop on Mining Scientific Publications, 2014
- 24 Theodoros Giannakopoulos, Ioannis A. Vetsikas, Ioanna Koromila, Vangelis Karkaletsis, Stavros Perantonis, "AMINESS: A Platform for Environmentally Safe Shipping", the 7th International Conference on PErvasive Technologies Related to Assistive Environments , PETRA 2014

- 23 Ioanna Koromila, Zoe Nivolianitou and Theodoros Giannakopoulos, "Bayesian network to Predict Environmental Risk of a Possible Ship Accident", the 7th International Conference on Pervasive Technologies Related to Assistive Environments, PETRA 2014
- 22 Konstantinos Tsiakas, Theodoros Giannakopoulos, Stasinios Konstantopoulos, "A Semi-Automatic Multimodal Annotation Environment for Robot Sensor Data", 6th International Conferences on Advances in Multimedia, MMEDIA 2014
- 21 Giannakopoulos, T., Stamatogiannakis, E., Foufloulas, I., Dimitropoulos, H., Manola, N. and Ioannidis, Y.. "Content Visualization of Scientific Corpora Using an Extensible Relational Database Implementation." Theory and Practice of Digital Libraries-TPDL 2013
- 20 Petridis, Sergios, Theodoros Giannakopoulos, and Constantine D. Spyropoulos. "Unobtrusive Low Cost Pupil Size Measurements using Web cameras." International Workshop on Artificial Intelligence and NetMedicine 2013.
- 19 Giannakopoulos, Theodoros, Harry Dimitropoulos, Omiros Metaxas, Natalia Manola, and Yannis Ioannidis. "Supervised Content Visualization of Scientific Publications: A Case Study on the ArXiv Dataset." In Language Processing and Intelligent Information Systems, pp. 206-211. Springer Berlin Heidelberg, 2013 (Proc. of The 20th International Conference Intelligent Information Systems).
- 18 Theodoros Giannakopoulos and Sergios Petridis. Detection and Clustering of Musical Audio Parts Using Fisher Linear Semi-Discriminant Analysis, accepted for publication in 20th European Signal Processing Conference (EUSIPCO2012), 2012.
- 17 Theodoros Giannakopoulos and Sergios Petridis. Unsupervised speaker clustering in a linear discriminant subspace. In Ninth International Conference on Machine Learning and Applications, 2010.
- 16 Theodoros Giannakopoulos, Makris Alexandros, Dimitrios Kosmopoulos, Stavros Perantonis, and Sergios Theodoridis. Audio-visual fusion for detecting violent scenes in videos. In 6th Hellenic Conference on Artificial Intelligence (SETN10), 2010.
- 15 Sergios Petridis, Theodoros Giannakopoulos, and Stavros Perantonis. A multi-class method for detecting audio events in news broadcasts. In 6th Hellenic Conference on Artificial Intelligence (SETN10), 2010.
- 14 Theodoros Giannakopoulos, Sergios Petridis, and Stavros Perantonis. User-driven recognition of audio events in news videos. In 5th International Workshop on Semantic Media Adaptation and Personalization (SMAP2010), 2010.
- 13 Sergios Petridis, Katernia Papantoniou, Theodoros Giannakopoulos, Georgios Paliouras, Miltiadis Koutsokeras, Ilias Zavitsanos, George Tsatsaronis, Girorgos Akriivas, Basilis Gatos, Kostas Ntirogiannis and Stavros Perantonis, Joint analysis of audio and text data in CASAM, in Proceedings of the 5th International Conference on Semantic and Digital Media Technologies (SAMT 2010), 2010
- 12 Theodoros Giannakopoulos, Aggelos Pikrakis, and Sergios Theodoridis. A multi-modal approach to violence detection in video sharing sites. In 20th International Conference on Pattern Recognition (ICPR2010), 2010.
- 11 Theodoros Giannakopoulos, Aggelos Pikrakis, and Sergios Theodoridis. A dimensional approach to emotion recognition of speech from movies. In 34th International Conference on Acoustics, Speech, and Signal Processing (ICASSP2009), 2009.

- 10 Theodoros Giannakopoulos, Aggelos Pikrakis and Sergios Theodoridis. Gunshot detection in audio streams from movies by means of dynamic programming and bayesian networks. In 33rd International Conference on Acoustics, Speech, and Signal Processing (ICASSP08), 2008.
- 9 Theodoros Giannakopoulos, Aggelos Pikrakis, and Sergios Theodoridis. A novel efficient approach for audio segmentation. In 19th International Conference on Pattern Recognition, 2008 (ICPR08), 2008.
- 8 Theodoros Giannakopoulos, Aggelos Pikrakis, and Sergios Theodoridis. Music tracking in audio streams from movies. In IEEE International Workshop on Multimedia Signal Processing (MMSP08), 2008.
- 7 Aggelos Pikrakis, Theodoros Giannakopoulos, and Sergios Theodoridis. A dynamic programming approach to speech - music discrimination of radio recordings. In 15th European Signal Processing Conference (EUSIPCO07), 2007.
- 6 Theodoros Giannakopoulos, Aggelos Pikrakis, and Sergios Theodoridis. A multi-class audio classification method with respect to violent content in movies, using bayesian networks. In IEEE International Workshop on Multimedia Signal Processing (MMSP07), 2007.
- 5 Aggelos Pikrakis, Theodoros Giannakopoulos, and Sergios Theodoridis. A computationally efficient speech - music discriminator for radio recordings. In 2006 International Conference on Music Information Retrieval and Related Activities (ISMIR06), 2006.
- 4 Theodoros Giannakopoulos, Dimitrios Kosmopoulos, Andreas Aristidou, and Sergios Theodoridis. Violence content classification using audio features. In 4th Hellenic Conference on Artificial Intelligence (SETN06), 2006.
- 3 Theodoros Giannakopoulos, Aggelos Pikrakis, and Sergios Theodoridis. A speech - music discriminator for radio recordings using bayesian networks. In 2006 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP06), 2006.
- 2 Aggelos Pikrakis, Theodoros Giannakopoulos, and Sergios Theodoridis. Speech - music discrimination for radio broadcasts using a hybrid hmm-bayesian network architecture. In 14th European Signal Processing Conference (EUSIPCO06), 2006.
- 1 T. Giannakopoulos, D. Cavouras, N. Dimitropoulos, and S. Theodoridis. Design and implementation of a semi-automatic algorithm for boundary detection of breast nodules in high-resolution ultrasound images. In 3rd European Symposium on Biomedical Engineering and Medical Physics, 2002.

Awards

Winner of the IEEE International Workshop on Multimedia Signal Processing (MMSP07) student paper contest, for the paper titled "A multi-class audio classification method with respect to violent content in movies, using bayesian networks"

First award in the Ninth International Conference on Machine Learning and Applications Speaker Clustering Challenge (2010), for the paper titled "Unsupervised Speaker Clustering in a Linear Discriminant Subspace".

Teaching Experience

University of Athens, Dept of Informatics and Telecommunications

Teaching and laboratory assistant for the undergraduate course: *Introduction to Digital Signal Processing*, 2004 to 2008

Supervision of 3 diploma theses in the field of pattern recognition

University of Patras, Dept Computer Engineering and Informatics Department

Teaching and laboratory assistant for the undergraduate course *Introduction to Programming*, 2002 to 2004

Research Experience

January 2016 - today: Post-doc research member in the in the EU funded research project "Radio: UNOBTRUSIVE, EFFICIENT, RELIABLE AND MODULAR SOLUTIONS FOR INDEPENDENT AGEING" . Participant: Computational Intelligence Lab, Department of Informatics and Telecommunications, National Centre for Scientific Research "Demokritos", Greece

August 2014 - September 2015: Post-doc research member in the in the EU funded research project "Sentimagi: Brand monitoring and reputation management via multi-modal sentiment analysis" (2935). Participant: Computational Intelligence Lab, Department of Informatics and Telecommunications, National Centre for Scientific Research "Demokritos", Greece

August 2013 - May 2015: Post-doc research member in the in the EU funded research project "AMINESS: Analysis of Marine INformation for Environmentally Safe Shipping". Participant: Computational Intelligence Lab, Department of Informatics and Telecommunications, National Centre for Scientific Research "Demokritos", Greece

June 2012 - February 2014: Post-doc research member in the in the EU funded research project "USEFIL: Unobstrusive Smart Enviroments For Independent Living". Participant: Computational Intelligence Lab, Department of Informatics and Telecommunications, National Centre for Scientific Research "Demokritos", Greece

February 2012 - November 2015: Post-doc research member in the Institute for the Management of Information Systems (IMIS) of the Research and Innovation Centre in Information, Communication and Knowledge Technologies "Athena".

July 2009 - April 2011: Post-doc research member in the EU funded research project "Computer-Aided Semantic Annotation of Multimedia - CASAM". Participant: Computational Intelligence Lab, Department of Informatics and Telecommunications, National Centre for Scientific Research "Demokritos", Greece

February 2009 - June 2009: Research member in the EU funded research project "Prometheus" (PRediction and interpretation of huMan bEHaviour based on probabilistic sTructures and HETerogeneoUs Sensors - FP7-214901). Participant: University of Patras, The Wire Communications Laboratory.

December 2005 - November 2008: Research member in the research project "PENED - 03ED375" ("Reinforcement Programme of Human Research Manpower", and co-financed by National and European Community funds). Participant: University of Athens, Department of Informatics and Telecommunications.

December 2004 - November 2005: Research member in the IST I-IMAS project (Intelligent Imaging Sensors for Industry, Health and Security). Participant: Computer Technology Institute and Press "Diophantus"

February 2003 - September 2004: Research member in the European Union IST research projects INSIPRE (INfotainment management with Speech Interaction via REmote-microphones and telephone interfaces, IST-2001-32746) and 2023 ITEA-AMBIENCE: Context aware environments for ambient services. Participant: University of Patras, The Wire Communications Laboratory.

March - April 2002: Visiting researcher in the Institute of Child Health, University of Birmingham. Subject: Telemedicine and Medical Image Processing.

Other activities

2015 - Today: CEO and Cofounder of the Ramon Private Company (www.ramon.gr)

Reviewer:

In conferences:

- International Conference on Digital Signal Processing (DSP): 2008, 2011, 2013
- International Conference on Pattern Recognition (ICPR): 2010, 2012, 2016
- Hellenic Conference on Artificial Intelligence (SETN): 2010, 2012
- European Signal Processing Conference (EUSIPCO): 2012

In journals:

- Transactions on Multimedia - IEEE
- Transactions on Transactions on Audio, Speech and Language Processing - IEEE
- Electronics Letters - IEEE
- PLOS ONE
- Artificial Intelligence Review - ELSEVIER
- Journal of Computational Intelligence - Wiley Online Library
- Pattern Recognition Letters - ELSEVIER
- Neurocomputing - ELSEVIER
- Journal on Advances in Signal Processing - EURASIP
- Language Resources and Evaluation - SPRINGER

2004-2008: Administrator of the web site of the International Society for Pediatric Neurosurgery ispneurosurgery.org.

2007 - 2009: Co-founder of the Spyros Sgouros - MIP: Medical Image Processing Co (reg: 246433), focusing on the development of web-based medical image processing tools.

2008 - 2011: Administrator of the web site of the European Association for Signal Processing - EURASIP: eurasip.org.

Technical Skills

Matlab experience: signal processing, audio processing and analysis, image processing, etc. Member of the Mathworks File Exchange Center.

Programming Languages: Python, C, C++, Java, Pascal, UNIX shell scripting

Databases: MySQL, PostgreSQL, mongo

Web-development: JSP, ASP, PHP, JavaScript

Other packages: Pentaho Weka, SPSS, R, MS Office

Operating Systems: Linux, Microsoft Windows family

Foreign
Languages

English: First Certificate (Cambridge)

German: Elementary understanding