Giorgio Leonardi

Curriculum vitae

Personal Data

Born in Valenza (AL) il 25.06.1974
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Bio and education

Dr . Giorgio Leonardi graduated in Computer Science in 2003 at the University of Piemonte Orientale and obtained the title of Doctor of Philosophy (Ph.D.) in Bioengineering and Bioinformatics in 2007 at the Department of Computer Science and Systems of the University of Pavia (Laboratory of Biomedical Informatics). He is currently Assistant Professor at the Computer Science Institute of the Department of Science and Technological Innovation (DISIT) of the University of Piemonte Orientale and collaborator in the research activities of the Department of Industrial Engineering and Information Engineering of the University of Pavia. He is lecturer of the courses of Algorithms and of Multimedia Systems at DISIT and lecturer of the course of Methodology of Research at the School of Medicine of the University of Eastern Piedmont.

University career

2013-	Assistant Professor, Università del Piemonte Orientale
2009-2013	Post-doc, Università del Piemonte Orientale
2007-2009	Post-doc, Università di Pavia
2003-2006	Ph.D. student, Università di Pavia

University positions

2013-	Member of the teaching committee, Computer Science Institute, University of Piemonte Orientale

Scientific positions

2016	PC Member of the International Congress: European Federation for Medical Informatics - Transforming Healthcare with the Internet of Things (EFMI STC 2016)
2016	PC Member of the International Congress: EFMI Medical Informatics Europe conference (MIE-HEC 2016)

2016	PC Member of the International Congress: IMIA (International Medical Informatics Association) 13th International Congress in Nursing Informatics (NI 2016)
2015-	PC Member of the International Congress: International Symposium on Network Enabled Health Informatics, Biomedicine and Bioinformatics (HIBIBI)
2015	PC Member of the International Congress: 17th Portuguese Conference on Artificial Intelligence (EPIA 2015)
2014	PC Member of the International Congress: 14th IEEE International Conference on BioInformatics and BioEngineering (BIBE-2014)
2012	PC Member of the International Congress: 14th International Conference on Artificial Intelligence in Medicine (AIIM - AIME 2012)
2011-	PC Member of the International Congress: International Conference on Case Based Reasoning (ICCBR)
2011	PC Member of the International Congress: the 9th IEEE International Conference on Web Services (ICWS 2011)
2010-	PC Member of the International Congress: IFIP Conference on Artificial Intelligence Applications & Innovations (AIAI)
2010	Organizzatore locale of the International Congress: 18th International Conference on Case Based Reasoning (ICCBR 2010)
2007-	PC Member of the International Congress: IEEE International Conference on Tools with Artificial Intelligence (ICTAI)
2007	Organizzatore locale e collaboratore area scientifica of the International Congress Artificial Intelligence in Medicine European Congress (AIME 2007)

MAIN FIELDS OF INTEREST

1. Artificial Intelligence
2. Biomedical applications of AI
3. Business Process Management
4. Case Based Reasoning
5. Temporal abstractions
6. Computational Ontologies

CURRENT ISSUES OF RESEARCH

1. **Serviceflow Management for the treatment of patients with chronic diseases.**

This type of patients is followed by agents operating in many facilities (hospitals, diagnostic centers, ASL, etc.), Who must cooperate to properly manage the care process and the exchange of documentation. The Serviceflow is an architecture specifically designed to standardize the work of the agents involved and to support the patient in his therapeutic path, also managing the need for self-care at home.

2. **Business Process Management for the improvement of care processes**

Application of process mining techniques to process logs created from the information services of hospitals, to extract the process model by which patients with specific conditions (eg. Suffering from stroke) are treated. This allows to understand what is actually done in the structure, in order to compare this model with the procedures that are expected to be performed by the staff. This comparison highlights the differences that can help understanding why the expected procedures are not properly managed, obtaining useful information for the optimization and improvement of the care process.

3. Case Based Reasoning, time series and temporal abstractions

In many contexts where CBR is a valid technique for the retrieval of similar cases, the problem of the treatment of time series arises. In this field, our research focuses on efficient retrieval of similar time series, through dimensionality reduction techniques that allow the calculation of the distance of few representative points instead of all the points of the time series. Furthermore, the introduction of Spatial Indexing trees optimize even more the retrieval performance. Moreover, the transformation of those features in the form of abstractions of trend and states allows the efficient recovery of cases, thanks to a new multi-dimensional indexing structure providing flexible queries. This structure takes into account different levels of temporal granularity and different taxonomic levels of the language that describing trends and states.

4. Development of computational ontologies for decision support

In the development of decision support systems, special attention is paid to the development of ontologies that allow the representation and reasoning on the caused effects of actions taken during the course of a process (manufacturing, clinical or other). We define these ontologies through three main classes: State, Action and EffectAction. The States are abstractions obtained from the data generated by the process. These states are categorized into initial states (initial states of the process), goal states (states desired final or otherwise) and intermediate process states. Starting with an initial (or a current) state, it is possible to reach a goal, following the recommended actions formalized through classes of type Action. Relations have been introduced to relate these entities (like for example, the Effect-Action relation), which realizes the link between actions and their effect (one State caused by the actions themselves).

CURRENT FUNDED PROJECTS

PROGRAMME	FUNDED PROJECT
EU 7th Framework Programme	FOODINTEGRITY: 'THE STATE OF BEING WHOLE, ENTIRE, OR UNDIMINISHED OR IN PERFECT CONDITION'. PROVIDING ASSURANCE TO CONSUMERS AND OTHER STAKEHOLDERS ABOUT THE SAFETY, AUTHENTICITY AND QUALITY OF EUROPEAN FOOD (INTEGRITY) IS OF PRIME IMPORTANCE IN ADDING VALUE TO THE EUROPEAN AGRI-FOOD ECONOMY. *https://secure.fera.defra.gov.uk/foodintegrity/index.cfm*

TOP FIVE PAPERS

1. MONTANI S., LEONARDI G., BOTTRIGHI A., PORTINALE L. TERENZIANI P. (2011), Supporting flexible, efficient and user-interpretable retrieval of similar time series, IEEE Transactions on Knowledge and Data Engineering 2011 (DOI: http://doi.ieeecomputersociety.org/10.1109/TKDE.2011.264)
2. MONTANI S., LEONARDI G., QUAGLINI S., CAVALLINI A, MICIELI G. (2014), Improving structural medical process comparison by exploiting domain knowledge and mined information, Artificial Intelligence in Medicine 62 (1): 33-45
3. LEONARDI G., PANZARASA S., QUAGLINI S., STEFANELLI M., VAN DER AALST, W.M.P. (2007). Interacting agents through a web-based health serviceflow management system. JOURNAL OF BIOMEDICAL INFORMATICS. vol. 40, pp. 486-499 ISSN: 1532-0464. (SCIENCE DIRECT TOP 25 MOST DOWNLOADED, PERIOD OCTOBER-DECEMBER 2007)
4. LEONARDI G., BOTTRIGHI A., GALLIANI G., TERENZIANI P., MESSINA A., DELLA CORTE F. (2012). Exceptions Handling within GLARE Clinical Guideline Framework, Proc. American Medical Informatics Association Annual Symposium (AMIA) 2012, Chicago IL (USA), November 2012 - AMIA 2012: Distinguished Paper Award
5. PELEG M., TU S., LEONARDI G., QUAGLINI S., RUSSO P., PALLADINI G., MERLINI G. (2011). Reasoning with Effects of Clinical Guideline Actions using OWL: AL amyloidosis as a Case Study, KR4HC'11 Proceedings of the 3rd international conference on Knowledge Representation for Health-Care, Springer-Verlag, Berlin, 65-79, July 2011

AWARDS

1. AMIA 2012: Distinguished Paper Award; paper: Exceptions Handling within GLARE Clinical Guideline Framework
2. MEDINFO 2010: Best poster award (3rd place): Applying process mining techniques to analyze clinical processes
3. IBM Faculty Award 2006 (Faculty of Engineering - University of Pavia): Contribution with the seminar “Development of a Service-Flow management system for outpatients”, Dept. of Computer Science and Systems, University of Pavia, under review of Paul Kontogiorgos (IT Services Program Director – IBM Almaden Research Center)