Curriculum Vitae

Fabio Leuzzi

Born in Taranto on July 5th, 1986, accomplished the high school diploma in 2005 in Computer Science at the State Industrial Technical Institute "Pacinotti" of Taranto. He received his bachelor's degree on June 19th, 2008 in Computer and Digital Communication at the University of Bari “Aldo Moro”, Taranto seat, with a thesis entitled "Un ambiente per l'analisi dell'evoluzione dei FLOSS: JaDA" (An environment for analyzing the evolution of FLOSS: JaDA) concerning the study of open-source projects written in Java, where he examined the evolution of design patterns implemented in the various releases of the projects. He received his master's degree with full marks and honors in Computer Science on July 19th, 2011 at the University of Bari, discussing an experimental thesis entitled "Techniques for automatic inference on conceptual graphs" on the application of two automatic inference techniques to a graph constructed from the conceptual elaboration of natural language texts. On November 24th, 2014 he accomplished a professional master (2nd level) in Management Engineering for Public Safety and Security (Ingegneria Gestionale per la Pubblica Sicurezza) at University of Naples “Federico II”. On April 14th, 2017 he defended his PhD thesis entitled “Automatic inductive and analogical reasoning on concept networks: a forensic application”[1] at the University of Bari.

Adjunct Professor at the University of Bari, Taranto seat, teaching:

- Computer Science, B.Sc. degree course in Environmental Sciences, a.y. 2013-14;
- Digital Forensics, M.Sc. degree course in Cyber Security, a.y. 2018-19.

Since 2014, he is a Captain at Italian National Police, in the Traffic Police unit, as director of the Section “ICT, Experiments and Research”.

He gained the *Bosch CDR Operator* Certification in November 2018.

Research experiences

The interest that characterized the training of Dr. Leuzzi focus on issues of Machine Learning, Data Mining, Knowledge Representation, Multi-Strategy reasoning, Applied research to traffic data and road events.

During the whole academic career, he had the opportunity to study and contribute to some advanced topics of research:

- under the project METAMORPHOS, during the bachelor's degree thesis, he has developed a wrapper to optimize the use of a design pattern recognition engine, designed for open-source Java projects, in order to study how their use can influence the evolution of software through the releases, as well as to develop useful strategies to migrate legacy software to the Web and to service-oriented architectures;
- regarding the Optical Character Recognition (OCR), during the university course on Methods for the Treatment of Digital Documents, has contributed (in collaboration with Dr. Fulvio Rotella) to improve JTOCR, a wrapper useful to have an advanced use of the Tesseract functionalities;
- in the study of inference techniques, during the master's degree thesis, he has conduced a study on partial simulation of some mental skills, applied to a taxonomy that represent the knowledge extracted from a collection of natural language documents. The proposed solution has been designed to simulate: generalization of concepts considered similar on the bases of their description; given two starting concepts, research in the conceptual graph of the path that

[1]. Available for free on www.researchgate.net

expresses indirect semantic interaction, making an inference 'by association';

- in the study of techniques for semantic information extraction, has contributed with an approach to improve the use of Digital Libraries, in particular applies a Word Sense Disambiguation on the documents in the collection, and another on the user's search query, in order to be able to identify the documents containing the concepts searched by the user, passing through the semantic level, a possible solution to the intrinsic ambiguity of natural language;
- studying the point of contacts between Artificial Intelligence and Cognitive Science, he focused on Reasoning by Analogy, proposing a technique that exploits Argumentation to carry out an analogical-reasoning outcome working on restricted domains;
- he contributed to the forensic field, proposing two techniques, respectively of author and speaker identification, successively integrated in a hypothesis of forensic pipeline for knowledge discovery for crimes, defended in the PhD thesis.

The experiences mentioned above, from OCR systems to Natural Language Processing, from optimization techniques to automatic reasoning techniques, from cognitive science to forensics, have been a useful path to the delineation of a broader view of research fields, sometimes distant. Such studies lead to several publications in proceedings, post-proceedings and journals.

PhD schools and experiences

He attended the PhD School named Bertinoro International Spring School 2012 (BISS 2012), where he attended the courses: Algorithm for the web and for social networks (taught by Paolo Boldi, University of Milan, Italy); Software verification and interactive theorem proving (taught by Andrea Asperti University of Bologna, Italy); Regularization methods for high dimensional learning (taught by Francesca Odone, University of Genoa, Italy, and by Lorenzo Rosasco, MIT, USA). Regarding these courses he passed successfully all the examinations.

He attended the PhD summer school Advanced Course on Artificial Intelligence 2013 (ACAI 2013), held in London (UK), having as main topic “Argumentation in Artificial Intelligence”.

Visiting student at the Italian Scientific Police for one year, studying techniques of forensic phonetics.

Teaching activities

Adjunct Professor at the University of Bari, Taranto seat, teaching:

- Computer Science, B.Sc. degree course in Environmental Sciences, a.y. 2013-14;
- Digital Forensics, M.Sc. degree course in Cyber Security, a.y. 2018-19.

He taught about the practical aspects and the laboratory activities in the *Programming Course* for the academic years 2012/13 and 2013/14. It is a course for Bachelor in Computer Science and Technologies for the Software Development, University of Bari.

He also taught about the practical aspects and the laboratory activities in the *Algorithms and Data Structures Course* for the academic years 2011/12 and 2012/13. It is a course for Bachelor in Computer Science and Digital Communication, University of Bari, detachment of Taranto.

Several teaching experiences have been done in specialization courses of Traffic Police, regarding Computer Science for Control-rooms operators, ICT specialists and detachment heads.

National and international research projects

Title: “L’ingegneria dei servizi Internet-based per lo sviluppo strutturale di un territorio “intelligente” - Puglia@Service” (PON02 00563 3489339, PON 2007-2013) (Service engineering Internet-based system for the structural development of a “smart” territory).

Date: December 2012 to December 2013.
Brief Description: This project is dedicated to the research of methods of scientific analysis for the design, production and delivery of innovative services. Its objective is the development of strategy aimed to the innovation of services for the “sustainable knowledge society” and the transition of the Italian region named Puglia towards a model of “smart region”.
Task: My task is the R&D of innovative techniques based on Social Network Analysis and on Social Network Mining. In this project, I exploited my experiences on Android platform and my knowledge about machine learning algorithms.

Title: “C-Roads Italy” (Horizon 2020).

Date: January 2017 until now.
Brief Description: Being a part of Intelligent Transport Systems, cooperative ITS (C-ITS or cooperative systems) encompass a group of technologies and applications that allow effective data exchange through wireless communication technologies between components and actors of the transport system, very often between vehicles (vehicle-to-vehicle or V2V) or between vehicles and infrastructure (vehicle-to-infrastructure or V2I). Harmonization is the core asset of the C-Roads Cooperation, since it ensures sustainable and efficient deployment. Consequently, all partners share the vision of the main objectives, which are – beside harmonization – (pilot) implementation of day one services, demonstrations of C-ITS deployment and advance to large-scale deployment. Also this project will make “smart” the covered regions.
Task: My task is the supervision of R&D activities regarding road-controls facilities that will be distributed to Traffic-Police operators to watch over the respect of traffic laws.

Title: “Ursa-Major NEO” (Horizon 2020).

Date: January 2017 until now.
Brief Description: It deploys ITS services to improve freight traffic along the Rhine-Alpine and Scandinavian-Mediterranean CEF core network corridors, linking North-Sea-Ports, the Rhine and Ruhr area, metropolitan areas in southern Germany and in northern Italy and Mediterranean ports down to Sicily. This project provides direct user benefits to international truck drivers and hauliers (better truck parking, navigation, safety, less delays and uncertainties). It includes real life pilots to test feasibility, suitability and added value prior to a potential large scale deployment of innovative C-ITS services.
Task: My task is the supervision of acquirement and delivery of technologies dedicated to electronic road control and communication between patrols and Control room.

Acknowledgements

- Acknowledgement for the contribution at the publication: A. Bianchi, F. Lanubile, T. Mallardo: "Experimental Evaluation of Design Patterns Changes", in "Metamorphos". Methods and tools for migrating software systems towards web and service oriented architectures: experimental evaluation, usability, and technology transfer", di De Lucia Andrea, Tortora Genoveffa, Editor: Rubbettino, Collana scientifica Univ. di Salerno, ISBN: 8849828365, ISBN-13: 9788849828368, pages 227-247, 2010.
- Winner of the Travel Grant, a "Call for scholarship" offered concurrently with the participation at XII International Conference of the Italian Association for Artificial Intelligence 2011 (AI*IA 2011).
- Winner of the Travel Grant, a "Call for scholarship" offered concurrently with the participation at the Advanced Course on Artificial Intelligence 2013 (ACAI 2013), held at King's College London, and having the topic “Argumentation in Artificial Intelligence”.

Publications

A selection of papers is listed below:

1. S. Ferilli, F. Leuzzi, F. Rotella. ***Cooperating Techniques for Extracting Conceptual Taxonomies from Text***, in Proceedings of the Workshop on Mining Complex Patterns held at 11th Conference of the Italian Association for Artificial Intelligence (AI*IA), Palermo, Italy, September 2011.
2. B. De Carolis, S. Ferilli, N. Novielli, F. Leuzzi, F. Rotella. ***Social attitude recognition in multimodal interaction with a pedagogical agent***, Vol 8, Num 3, pg 141-151, Journal of e-Learning and Knowledge Society (JeLKS), Italian e-Learning Association (SIe-L), ISSN (online) 1971 - 8829, ISSN (paper) 1826 - 6223, 2012.
3. S. Ferilli, F. Leuzzi, F. Rotella, F. Esposito. ***A Run Length Smoothing-based Algorithm for Non-Manhattan Document Segmentation***, in Proceedings of GIRPR 2012, Certosa di Pontignano, Siena, Italy, 21-23 May 2012.
4. F. Rotella, S. Ferilli, F. Leuzzi. ***A Domain Based Approach to Information Retrieval in Digital Libraries***, Digital Libraries and Archives – 8th Italian Research Conference IRCDL 2012 - Revised Selected Papers, Series CCIS, Vol 354, ISBN 978-3-642-35833-3, 2013.
5. F. Leuzzi, S. Ferilli, C. Taranto, F. Rotella. ***Improving Robustness and Flexibility of Concept Taxonomy Learning from Text***, in Post-Proceedings of Workshop New Frontiers in Mining Complex Patterns 2012 - Revised Selected Papers, Series LNCS, Subseries LNAI, Vol 7765, ISBN 978-3-642-37381-7 (Softcover), ISBN 978-3-642-37382-4 (eBook), 2013.
6. F. Rotella, S. Ferilli, F. Leuzzi. ***An Approach to Automated Learning of Conceptual Graphs from Text***, Springer Berlin Heidelberg, Lecture Notes in Computer Science, Volume 7906, 2013, pp 341-350, ISBN: 978-3-642-38576-6 (Print) 978-3-642-38577-3 (Online).
7. F. Leuzzi, S. Ferilli. ***Reasoning by Analogy Using Past Experiences***, in Proceedings of 28th Italian Conference on Computational Logic (CILC 2013), CEUR-WS.org, volume 1068, 2013, pp 115 – 129 (Online).
8. F. Leuzzi, S. Ferilli, F. Rotella. ***A Relational Unsupervised Approach to Author Identification***, in Post-Proceedings of Workshop New Frontiers in Mining Complex Patterns 2013 - Revised Selected Papers, eries LNCS, Subseries LNAI.
9. F. Leuzzi, S. Ferilli, and F. Rotella. ***Connektion: A tool for handling conceptual graphs automatically extracted from text.*** In T. Catarci, N. Ferro, and A. Poggi, editors, Bridging Between Cultural Heritage Institutions: 9th Italian Research Conference, IRCDL 2013, Rome, Italy, January 31 - February 1, 2013, Revised Selected Papers, volume 385 of Communications in Computer and Information Science, pages 93-104. Springer Berlin Heidelberg, Berlin, Heidelberg, 2014.
10. F. Rotella, F. Leuzzi, and S. Ferilli. ***Learning and exploiting concept networks with Connektion***. Applied Intelligence, 42(1):87-111, 2015.
11. F. Leuzzi and S. Ferilli. ***Generalizing patterns for cross-domain analogy***. In M. Ceci, C. Loglisci, G. Manco, E. Masciari, and W.Z. Ras, editors, New Frontiers in Mining Complex Patterns: 4th International Workshop, NFMCP 2015, Held in Conjunction with ECML-PKDD 2015, Porto, Portugal, September 7, 2015, Revised Selected Papers, pages 147-162. Springer International Publishing, Cham, 2016.
12. F. Leuzzi, G. Tessitore, S. Delno, C. Fusco, M. Gneo, G. Zambonini, and S. Ferilli. ***A statistical approach to speaker identication in forensic phonetics,*** eld. In New Frontiers in Mining

Complex Patterns - NFMCP 2016, Held in Conjunction with ECML/PKDD 2016, Riva del Garda, IT, September 19-23, 2016, Revised Selected Papers.

13. F. Leuzzi and S. Ferilli. ***A multi-strategy approach to structural analogy making***. Journal of Intelligent Information Systems, pages 1-28, 2017, doi:10.1007/s10844-017-0447-6.
14. F. Leuzzi, E. Del Signore, R. Ferranti. ***Towards a Pervasive and Predictive Traffic Police***. In F. Leuzzi and S. Ferilli, editors, Traffic Mining Applied to Police Activities: Proceedings of the 1st Italian Conference for the Traffic Police (TRAP- 2017), Series AISC, Vol 728, pages 19-35, ISBN 978-3-319-75607-3 (softcover), ISBN 978-3-319-75608-0 (eBook), DOI https://doi.org/10.1007/978-3-319-75608-0.
15. S. Guarino, F. Leuzzi, F. Lombardi, E. Mastrostefano. ***Traffic Data Classification for Police Activity***. In: Ceci M., Japkowicz N., Liu J., Papadopoulos G., Raś Z. (eds) Foundations of Intelligent Systems. ISMIS 2018. Lecture Notes in Computer Science, vol 11177. Springer, Cham, pages 169-178, ISBN 978-3-030-01850-4 (softcover), ISBN 978-3-030-01851-1 (eBook), DOI https://doi.org/10.1007/978-3-030-01851-1_17.

Editing

Co-editor of the following volumes:

1. ***Traffic Mining Applied to Police Activities: Proceedings of the 1st Italian Conference for the Traffic Police (TRAP- 2017)***, F. Leuzzi and S. Ferilli, editors, Series AISC, Vol 728, ISBN 978-3-319-75607-3 (softcover), ISBN 978-3-319-75608-0 (eBook), DOI https://doi.org/10.1007/978-3-319-75608-0.

Conference organization

Member of the following organizing-committees:

1. 1st Italian Conference for the Traffic Police (TRAP-2017), October 25-26, 2017, Rome (Italy).
2. Intelligent Methodologies for Traffic Data Analysis and Mining, Special Session held in the 24th International Symposium on Methodologies for Intelligent Systems (ISMIS-2018), October 29-31, 2018, Limassol (Cyprus).