
CURRICULUM VITAE ET STUDIORUM
OF
RUGGERO DONIDA LABATI

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1. PERSONAL DATA AND WORKING EXPERIENCES

Ruggero Donida Labati was born in Lodi, Italy, on August 25, 1983.

He has received the Bachelor's degree in *Computer Science* in October 2006 from Università degli Studi di Milano, discussing the thesis “Distributed software applications for the email notification of events related to complex approval procedures”, with vote 91/110.

During the academic year 2006/2007, he has taught Computer science, Operating systems, and Electronics to the fourth and fifth years students of the high school Istituto Italo Svevo of Crema.

He has received the Master's degree in *Computer Science* in December 2008 from Università degli Studi di Milano, discussing the thesis “Adaptive algorithms for the segmentation of iris images”, with vote 99/110.

In October 2008, in the context of the Master's degree thesis, he has achieved the publication of the obtained results in an international journal [1] and has reached the seventh place at the international competition NICE.I (*Noisy Iris Challenge Evaluation*), in which there have been involved more than 97 participants from universities and companies of 30 countries. The competition has been organized by the Soft Computing and Image Analysis Group (SOCIA Lab), Department of Computer Science, University of Beira Interior, Portugal (<http://nice1.di.ubi.pt>).

From June 2008 to November 2008, he has cooperated with the company Harding-IT S.R.L., Crema, working in the design and implementation of micrometric laser measurement systems.

From February 2009 to December 2010, he has perceived a research grant from Università degli Studi di Milano, Department of Information Technologies, performing research activities regarding biometric systems and computational intelligence techniques.

From January 2010, he is a PhD student at the Computer Science Doctorate School of Università degli Studi di Milano (XXV group), performing research activities at the Department of Computer Science, with the supervision of Prof. Piuri and Prof. Scotti. The research has regarded biometric systems, computational intelligence techniques, and environmental control systems. Moreover, in this period:

- he has attended the “International Summer School for Advanced Studies on Biometric Authentication: Forensics, Security and Remote Identification”, Alghero, Italy, June 7 – 11, 2010;
- he has attended the “International Computer Vision Summer School”, Ragusa, Italy, July 11 – 16, 2011;
- he has attended the “First IntellCIS Training School”, Albena, Bulgaria, October 10 – 13, 2011.

He is going to discuss the PhD thesis “Contactless Fingerprint Biometrics: Acquisition, Processing, and Privacy Protection”.

2. RESEARCH AND EXPERIMENTAL ACTIVITIES

2.1 Description of the performed research activity in academic context

The university research activity has regarded the high level design, implementation, and application of algorithms and hardware systems for the acquisition of images and signals. In particular, the research activity has involved the following topics.

- Three-dimensional biometric systems: the research has been focused on contactless fingerprint recognition systems based on three-dimensional models designed for live [7, 8, 10] and forensic [5] applications.
- Less-constrained biometric systems: the performed study has been focused on biometric techniques for the contactless fingerprint recognition [4, 7, 8, 10, 14, 18, 19], iris images captured on the move in uncontrolled light conditions [2, 3, 20, 21], and soft biometric methods in surveillance applications [6].
- Privacy protective biometric systems: in the context of the project PRIN 2007 “Priv-Aware: Elaborazione di segnali cifrati per la tutela della privacy nel trattamento di informazioni sensibili” he has cooperated in the design and implementation of a biometric recognition system based on the fingerprint trait and able to perform identity comparisons using only encrypted data [15, 16, 17].
- Environmental monitoring methods: in the context of the project “Sistemi Adattativi per il Monitoraggio Ambientale” supported by Università degli Studi di Milano, he has cooperated in the design of a wildfire monitoring system based on the analysis of frame sequences captured using low-cost cameras [1, 11, 12].
- Computational intelligence applications: the research has been mainly focused on the use of neural networks in classification [8, 11, 14, 18, 19, 22] and approximation [6, 9, 20, 21] applications.
- Three-dimensional reconstruction: hardware and software three-dimensional reconstruction methods based on multiple view techniques [7, 8, 9, 10], structured light approaches, shape from shading algorithms, and profilometry have been studied.
- Adaptive signal and image processing techniques: computer vision and image processing techniques have been studied in depth, mainly considering contactless fingerprint images, iris images captured in natural light conditions and presenting reflections and occlusions, and microscope blood samples [13].

2.2 Participation to national and international research projects

He has participated to the research activities regarding the following national and international research projects:

- PRIN 2007 “Priv-Aware: Elaborazione di segnali cifrati per la tutela della privacy nel trattamento di informazioni sensibili”, 2008 – 2010, related to the study and implementation of privacy protective biometric systems;
- “Sistemi Adattativi per il Monitoraggio Ambientale”, 2009 – 2010, supported by Università degli Studi di Milano, related to adaptive techniques for the detection of wildfires;
- I-PAN “Innovative Poplar Low Density Structural Panel”, 2012 – 2015, supported by the European Union, and related to the study and implementation of techniques for the production of new poplar low density structural panels.

2.3 Description of the performed research and development activities in industrial context

During the working experience at the company Harding-IT (from June 2008 to November 2008), he has been involved in the study, design, experimentation, and implementation of advanced algorithms for the elaboration of signal acquired by different kinds of sensors in micrometric laser measurement machines, principally designed for mechanic and advanced manufacturing industries (http://www.microplan-group.com/mpg/ENG/non-contact_measure_machines.html). In this context, he has designed and implemented the following techniques.

- Algorithms for the automatic recognition of the geometrical characteristics of the measured pieces: morphologic techniques have been used to estimate the objects shapes, permitting the automatic calibration of the measurement system and the automatic choice of the proper measurements that have to be performed for every section of the pieces (e.g. heights, diameters, or angles).
- Adaptive measurement algorithms: considering a set of profiles of measured pieces, acquired in polar or Cartesian coordinates, adaptive techniques have been studied to compute automatic system calibrations based on the different portions of the piece, removing systematic errors and overcoming to possible inclinations of the piece due to bad placements caused by the human operator.
- Filtering algorithms for the data acquired by the laser sensor: different kinds of filters have been tested and implemented in order to remove the noise injected in the acquired profiles by the measurement system, considering polar and Cartesian coordinates, and evaluating different operative conditions.

Moreover, he has implemented a software for the evaluation of the measurement systems uncertainty, cooperating with Prof. G. Barbato of Politecnico di Torino. This work is based on the patent N.05818133.0-2213-182005003793 “Method of determining the uncertainty of a coordinate measuring machine”, G. Barbato, R. Levi e G. Vicario.

3. TEACHING

He has taught the following seminars at Università degli Studi di Milano:

- “Techniques for the implementation of biometric systems in Matlab” for the course *Biometric Systems* of the master degree curriculum in computer science (academic years 2008 – 2009, 2009 – 2010, 2011 – 2012);
- “Development techniques in Matlab” for the course *Intelligent systems* of the master degree curriculum in computer science (academic years 2010 – 2011, 2011 – 2012, 2012 – 2013);
- “Realization of neural classifiers in Matlab” for the course *Intelligent systems* of the master degree curriculum in computer science (academic year 2011 – 2012);
- “Implementation of evolutionary algorithms in Matlab” for the course *Intelligent systems* of the master degree curriculum in computer science (academic years 2009 – 2010, 2010 – 2011, 2011 – 2012);
- “Realization fuzzy systems in Matlab” for the course *Intelligent systems* of the master degree curriculum in computer science (academic years 2009 – 2010, 2010 – 2011, 2011 – 2012).

He has been correlator of 9 thesis regarding biometric systems.

4. ORGANIZATION AND SERVICE ACTIVITIES

Since 2010, he is an IEEE Student Member, and IEEE Computational Intelligence Society Member.

4.1 Editorial activity

He has been a reviewer for a great number of conferences and for the sequent international journals:

- *IEEE Systems Journal - Special Issue on Security and Privacy in Complex Systems*, 2012;
- *Elsevier Pattern Recognition Letters*, 2011 – 2012;
- *Elsevier Signal Processing*, 2011 – 2012;
- *IET Biometrics*, 2011 – 2012.

4.2 Conference activities

He holds / has held the sequent roles in the organization of international scientific conferences:

- local arrangement chair for the *2013 IEEE International Conference on Computational Intelligence and Virtual Environments for Measurement Systems and Applications*, Milan, Italy, July 15-17, 2013
- publicity chair for the *2012 IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (IEEE BioMS 2012)*, Salerno, Italy, September 14, 2012;
- publicity chair for the *2011 IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (IEEE BioMS 2011)*, Milano, Italy, September 28, 2011;
- publicity chair for the *2010 IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (IEEE BioMS 2010)*, Taranto, Italy, September 9, 2010.

He is / has been member of the program committee of the sequent international scientific conferences:

- *14th Engineering Applications of Neural Networks (EANN 2013)*, Halkidiki, Greece, September 19-22, 2013;
- *2013 IEEE International Conference on Computational Intelligence and Virtual Environments for Measurement Systems and Applications*, Milan, Italy, July 15 – 17, 2013;
- *International Conference on Computer and Communication Technology (ICCT-2012)*, Allhabad, India, November 23 – 25, 2012;
- *13th Engineering Applications of Neural Networks / Artificial Intelligence Applications and Innovations (ALAI 2012)*, Halkidiki, Greece, September 27 – 30, 2012;
- *2012 IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (IEEE BioMS 2012)*, Salerno, Italy, September 14, 2012;
- *The Sixth International Conference on Emerging Security Information, Systems and Technologies (SECURWARE 2012)*, Rome, Italy, August 19 – 24, 2012;
- *2012 IEEE International Conference on Computational Intelligence for Measurement Systems and Applications (CIMS A 2012)*, Tianjin, China, July 2 – 4, 2012;
- *2012 IEEE International Conference on Virtual Environments, Human-Computer Interfaces and Measurement Systems (VECIMS 2012)*, Tianjin, China, July 2 – 4, 2012;
- *12th IEEE International Conference on Trust, Security and Privacy in Computing and Communications (IEEE TrustCom-12)*, Liverpool, UK, June 25 – 27, 2012;
- *International Conference on Autonomous and Intelligent Systems (AIS 2012)*, Aveiro, Portugal, June 25 – 27, 2012;

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- *10th IEEE International Conference on Trust, Security and Privacy in Computing and Communications (IEEE TrustCom-11)*, Changsha, China, November 16 – 18, 2011;
 - *Conference on Computer Convergence Technology (ICCCCT-2011)*, Seoul, Chorea, October 20 – 22, 2011;
 - *2011 IEEE International Conference on Computational Intelligence for Measurement Systems and Applications (CIMS A 2011)*, Ottawa, Ontario, Canada, September 19 – 21, 2011;
 - *12th Engineering Applications of Neural Networks / Artificial Intelligence Applications and Innovations (ALAI 2011)*, Corfu, Greece, September 15 – 18, 2011.

4.3 Participation to international conferences

He has presented nine papers of which he is a coauthor [6, 7, 10, 11, 12, 13, 14, 17, 18] in international scientific conferences.

He has participated to the sequent international conferences:

- *2012 IEEE International Conference on Computational Intelligence for Measurement Systems and Applications (CIMS A 2012)*, Tianjin, China, July 2 – 4, 2012;
- *2012 IEEE International Conference on Virtual Environments, Human-Computer Interfaces and Measurement Systems (VECIMS 2012)*, Tianjin, China, July 2 – 4, 2012;
- *2011 IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (IEEE BioMS 2011)*, Milan, Italy, September 28, 2011;
- *IntelliCIS Workshop 5*, Milan, Italy, September 27, 2011;
- *2011 IEEE International Conference on Computational Intelligence for Measurement Systems and Applications (CIMS A 2011)*, Ottawa, Ontario, Canada, September 19 – 21, 2011;
- *2011 IEEE International Conference on Virtual Environments, Human-Computer Interfaces and Measurement Systems (VECIMS 2011)*, Ottawa, Ontario, Canada, September 19 – 21, 2011;
- *2011 International Conference on Image Processing (ICIP 2011)*, Brussels, Belgium, September 11 – 14, 2011;
- *International Conference on Network and System Security (NSS 2011)*, Milan, Italy, September 6 – 8, 2011;
- *IEEE SSCI2011 Symposium Series on Computational Intelligence*, Paris, France, November 16, 2010;
- *2010 IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (IEEE BioMS 2010)*, Taranto, Italy, September 9, 2010;
- *2010 IEEE International Conference on Computational Intelligence for Measurement Systems and Applications (CIMS A 2010)*, Taranto, Italy, September 6 – 8, 2010;
- *2010 IEEE International Conference on Virtual Environments, Human-Computer Interfaces and Measurement Systems (VECIMS 2010)*, Taranto, Italy, September 6 – 8, 2010.

5.1 Refereed international journals articles

- [1] R. Donida Labati, A. Genovese, V. Piuri, and F. Scotti, "Wildfire Smoke Detection using Computational Intelligence Techniques Enhanced with Synthetic Smoke Plume Generation", in *IEEE Transactions on Systems, Man and Cybernetics – Part A: Systems and Humans*, 2012.
- [2] R. Donida Labati, and F. Scotti, "Noisy iris segmentation with boundary regularization and reflections removal", in *Image and Vision Computing, Iris Images Segmentation Special Issue*, Elsevier, pp. 270-277, February, 2010.

5.2 Chapters in books

- [3] R. Donida Labati, V. Piuri, and F. Scotti, "Biometric Privacy Protection: Guidelines and Technologies", in *Communications in Computer and Information Science*, vol. 314, . M. S. Obaidat, J.S. Sevillano, F. Joaquim (eds.), Springer, 2013 (in press).
- [4] R. Donida Labati, A. Genovese, V. Piuri, and F. Scotti, "Iris segmentation: state of the art and innovative methods", in *Cross Disciplinary Biometric Systems*, C. Liu, and V.K. Mago (eds.), Springer, pp. 151-182, 2012.
- [5] R. Donida Labati, and F. Scotti, "Fingerprint", in *Encyclopedia of Cryptography and Security (2nd ed.)*, H.C.A. van Tilborg, and S. Jajodia (eds.), Springer, pp. 460 - 465, 2011.

5.3 Refereed papers in proceedings of international conferences and workshops

- [6] R. Donida Labati, A. Genovese, V. Piuri, and F. Scotti, "Two-view Contactless Fingerprint Acquisition Systems: a Case Study for Clay Artworks", in *2012 IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (BioMS 2012)*, September 14, 2012.
- [7] R. Donida Labati, A. Genovese, V. Piuri, and F. Scotti, "Weight Estimation from Frame Sequences Using Computational Intelligence Techniques", in *2012 IEEE International Conference on Computational Intelligence for Measurement Systems and Applications (CIMS A 2012)*, pp. 29 - 34, July 2 - 4, 2012.
- [8] R. Donida Labati, A. Genovese, V. Piuri, and F. Scotti, "Virtual Environment for 3-D Synthetic Fingerprints", in *2012 IEEE International Conference on Virtual Environments, Human-Computer Interfaces and Measurement Systems (VECIMS 2012)*, pp. 48 - 53, July 2 - 4, 2012.
- [9] R. Donida Labati, A. Genovese, V. Piuri, and F. Scotti, "Quality Measurement of Unwrapped Three-dimensional Fingerprints: a Neural Networks Approach", in *2012 International Joint Conference on Neural Networks (IJCNN 2012)*, pp. 1123 - 1130, June 10 - 15, 2012.
- [10] R. Donida Labati, A. Genovese, V. Piuri, and F. Scotti, "Low-cost Volume Estimation by Two-view Acquisitions: A Computational Intelligence Approach", in *2012 International Joint Conference on Neural Networks (IJCNN 2012)*, pp. 1092 - 1099, June 10 - 15, 2012.
- [11] R. Donida Labati, A. Genovese, V. Piuri, and F. Scotti, "Fast 3-D Fingertip Reconstruction Using a Single Two-View Structured Light Acquisition", in *IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (BioMS 2011)*, pp. 1 - 8, September 28, 2011.

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- [12] A. Genovese, R. Donida Labati, V. Piuri, and F. Scotti, "Wildfire smoke detection using computational intelligence techniques", in *IEEE International Conference on Computational Intelligence for Measurement Systems and Applications (CIMS A 2011)*, pp. 1 - 6, September 19 - 21, 2011.
- [13] A. Genovese, R. Donida Labati, V. Piuri, and F. Scotti, "Virtual environment for synthetic smoke clouds generation", in *IEEE International Conference on Virtual Environments, Human-Computer Interfaces and Measurement Systems (VECIMS 2011)*, pp. 1 - 6, September 19 - 21, 2011.
- [14] R. Donida Labati, V. Piuri, and F. Scotti, "ALL-IDB: the Acute Lymphoblastic Leukemia Image Database for Image Processing", in *IEEE International Conference on Image Processing (ICIP)*, September 11 - 14, 2011.
- [15] R. Donida Labati, V. Piuri, and F. Scotti, "A neural-based minutiae pair identification method for touchless fingerprint images", in *2011 IEEE Workshop on Computational Intelligence in Biometrics and Identity Management (CIBIM)*, pp. 96 -102, April, 2011.
- [16] M. Barni, T. Bianchi, D. Catalano, M. Di Raimondo, R. Donida Labati, P. Failla, D. Fiore, R. Lazzeretti, V. Piuri, F. Scotti, and A. Piva, "A Privacy-compliant Fingerprint Recognition System Based on Homomorphic Encryption and Fingercodes Templates", in *2010 Fourth IEEE International Conference on Biometrics: Theory Applications and Systems (BTAS)*, pp. 1-7, September 27-29, 2010.
- [17] M. Barni, T. Bianchi, D. Catalano, M. Di Raimondo, R. Donida Labati, P. Failla, D. Fiore, R. Lazzeretti, V. Piuri, F. Scotti, and A. Piva, "Privacy-Preserving Fingercodes Authentication", in *Proceedings of the 12th ACM workshop on Multimedia and security*, ACM, New York, NY, USA, pp. 231 - 240, September 9-10, 2010.
- [18] T. Bianchi, R. Donida Labati, V. Piuri, A. Piva, F. Scotti, S. Turchi, "Implementing FingerCode-Based Identity Matching in the Encrypted Domain", in *2010 IEEE Workshop on Biometric Measurements and Systems for Security and Medical Applications (BIOMS)*, pp. 15 - 21, September 9, 2010.
- [19] R. Donida Labati, A. Genovese, V. Piuri, and F. Scotti, "Measurement of the Principal Singular Point in Contact and Contactless Fingerprint Images by using Computational Intelligence Techniques", in *2010 IEEE International Conference on Computational Intelligence for Measurement Systems and Applications (CIMS A 2010)*, pp. 18 - 23, September 6 - 8, 2010.
- [20] R. Donida Labati, V. Piuri, and F. Scotti, "Neural-based Quality Measurement of Fingerprint Images in Contactless Biometric Systems", in *The 2010 International Joint Conference on Neural Networks (IJCNN)*, pp. 1 - 8, July 18-23, 2010.
- [21] R. Donida Labati, V. Piuri, and F. Scotti, "Neural-based Iterative Approach for Iris Detection in Iris recognition systems", in *IEEE Symposium on Computational Intelligence for Security and Defence Applications*, pp. 1-6, December 18, 2009.
- [22] R. Donida Labati, V. Piuri, and F. Scotti, "Agent-Based Image Iris Segmentation and Multiple Views Boundary Refining", in *IEEE Third International Conference on Biometrics: Theory, Applications and Systems*, pp. 1-7, November 20, 2009.
- [23] R. Donida Labati, V. Piuri, and F. Scotti, "A low-cost neural-based approach for wood types classification", in *IEEE International Conference on Computational Intelligence for Measurement Systems and Applications (CIMS A '09)*, June 10, 2009.
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5.4 Thesis

- [24] Ruggero Donida Labati, *Contactless Fingerprint Biometrics: Acquisition, Processing, and Privacy Protection*, PhD thesis, Università degli Studi di Milano, Library of the Department of Computer Science, Milan, 2013 (to be discussed).
- [25] Ruggero Donida Labati, *Algoritmi adattativi per la segmentazione di immagini iridee*, Master's degree, Università degli Studi di Milano, Library of the Department of Computer Science, Milan, 2008.