

Pietro Lovato

Current Position

Post-doctoral researcher in Computer Science at the University of Verona.
Supervisor: Dr. Manuele Bicego

Membership

- VIPS Lab (Vision, Image Processing & Sound), University of Verona
- IAPR T.C.20: Pattern Recognition for Bioinformatics

Education

- May 2015 **Ph.D. thesis in Computer Science**, *University of Verona*.
Thesis title: *Bag of Words approaches for Bioinformatics*
Supervisor: Dr. Manuele Bicego
Committee: Prof. Dick De Ridder, Dr. Annalisa Barla
- October 2011 **M.Sc. in Computer Science (Laurea magistrale in Ingegneria e Scienze Informatiche)**, *University of Verona*.
Thesis title: *Advanced approaches for DNA-Microarray data analysis using probabilistic topic models*
Supervisor: Dr. Manuele Bicego
Co-supervisor: Prof. Marco Cristani
Grade: 110/110 cum laude
- October 2009 **B.Sc. in Bioinformatics (Laurea triennale in Bioinformatica)**, *University of Verona*.
Thesis title: *Approcci probabilistici per la classificazione e il clustering di dati derivanti da DNA Microarray*
Supervisor: Dr. Manuele Bicego
Co-supervisor: Dr. Barbara Oliboni

Research activity

Research interests

My research is focused on methodological and applicative aspects of Statistical Pattern Recognition, with main contributions in the context of Bioinformatics. From a methodological perspective, I am interested in *i)* representation issues, reasoning in particular on the bag-of-words representation – which digitally characterizes an objects by counting repeating, constituting elements occurring in the object; *ii)* modeling problems, mainly focused on probabilistic topic models. From an applicative point of view, I have investigated Pattern Recognition and bag-of-words approaches for specific bioinformatics problems: in particular, I am involved in gene expression data analysis, HIV modeling, and protein remote homology detection.

Parallel to these lines of research, I employed bag-of-words representations and models also to face Computer Vision tasks, such as characterizing users favorite images on social media communities.

Present and past scientific collaborations

- University of Verona: Department of Computer Science (VIPS lab, M. Cristani), Department of Biotechnology (Functional Genomics lab, M. Delledonne, M. Pezzotti; Applied Bioinformatics group, A. Giorgetti)
- Istituto Italiano di Tecnologia, Genova: Department of Pattern Analysis and Computer Vision (V. Murino)
- University of Trento: Department of Information Engineering and Computer Science (N. Sebe)
- Microsoft Research, Redmond (US): eScience group (N. Jojic)

Internship

June 2013 – September 2013 Internship at Microsoft Research, Redmond, WA – United States.
Supervisor: N. Jojic

Scientific communication

Talks given

- May 2015 “*Bag of Words approaches for Bioinformatics*”, Ph.D. thesis defense, University of Verona
- October 2014 “*Bag of Words approaches for Bioinformatics*”, internal defense of Ph.D. thesis, University of Verona
- August 2014 “*Count representations and models for Bioinformatics*”, invited talk at the University of Linköping, Sweden
- January 2013 “*Multi-armed bandit problem and its applications in reinforcement learning*”, seminar held at the University of Verona

Conference talks

ECCB2014 (Poster), ICPR2014 (Poster), ICPR2012 (Poster), SPR2012 (1 Oral and 1 Poster), PRIB2011 (Oral).

Review activity

Reviewer for the following international journal: Natural Computing, PLOS ONE, Electronic Letters on Computer Vision and Image Analysis (ELCVIA)

Courses attended

- July 2014 “2014 Lisbon Machine Learning School”, Instituto Superior Tecnico, Lisbon
Speakers: Various
- September 2013 Course “Dissimilarity-based Representation for Pattern Recognition”, University of Verona
Speaker: R. Duin
- October 2012 – January 2013 Course “Special Topics in AI: Intelligent Agents and Multi-Agent Systems”, University of Verona
Speaker: A. Farinelli

- October 2012 3rd PAVIS School on Component Analysis methods for Human Sensing, Sestri Levante (Genova)
Speakers: F. De la Torre and J. Cohn
- January 2012 Course "A formal framework for processes inspired by the functioning of living cells: a Natural Computing approach", University of Verona
Speaker: G. Rozenberg

Teaching and supervision activities

Teaching support

- October 2014 – January 2015 Lab instructor during the course "Information recognition and retrieval for bioinformatics", for B.Sc. students in Bioinformatics.
- October 2013 – January 2014 Lab assistant during the course "Bioinformatics and biological databases", for B.Sc. students in Bioinformatics/Biotechnology.
- October 2013 – January 2014 Lab instructor during the course "Information recognition and retrieval for bioinformatics", for B.Sc. students in Bioinformatics.
- March 2013 – July 2013 Lab assistant during the course "Bioinformatics and biological databases", for B.Sc. students in Bioinformatics/Biotechnology.
- March 2012 – July 2012 Lab assistant during the course "Bioinformatics and biological databases", for B.Sc. students in Bioinformatics/Biotechnology.
- March 2011 – July 2011 Lab assistant during the course "Bioinformatics and biological databases", for B.Sc. students in Bioinformatics/Biotechnology.
- October 2010 – January 2011 Lab assistant during the course "Laboratorio di Bioinformatica II", for B.Sc. students in Bioinformatics/M.Sc. students in Biotechnology.

Thesis supervision

Co-supervisor of a B.Sc. thesis in Bioinformatics (A. Milanese).

Publications

Papers in international journals

- [J03] P. Lovato, A. Giorgetti, and M. Bicego. "A multimodal approach for protein remote homology detection", *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, in press, (2015)
- [J02] P. Lovato, M. Bicego, C. Segalin, A. Perina, N. Sebe, and M. Cristani: "'Faved!' biometrics: tell me which image you like and I'll tell you who you are", *IEEE Transactions on Information Forensics & Security*, vol. 9(3), pp. 364-374, (2014)
- [J01] M. Bicego, P. Lovato, A. Perina, M. Fasoli, M. Delledonne, M. Pezzotti, A. Polverari, V. Murino: "Investigating topic models' capabilities in expression microarray data classification", *IEEE/ACM Trans. on Computational Biology and Bioinformatics*, vol. 9(6), pp. 1831-1836, (2012)

Papers in international conference proceedings

- [C12] P. Lovato, A. Milanese, C. Centomo, A. Giorgetti, and M. Bicego: "S-BLOSUM: classification of 2D shapes with biological sequence alignment", Proc. Int. Conf. on Pattern Recognition (ICPR2014), (2014)
- [C11] A. Perina, P. Lovato, N. Jojic: "Bags of words models of epitope sets: HIV viral load regression with counting grids", Proc. Int. Pacific Symposium on Biocomputing (PSB2014), (2014)
- [C10] P. Lovato, A. Perina, D.S. Cheng, C. Segalin, N. Sebe, M. Cristani: "We like it! Mapping image preferences on the counting grid", Proc. Int. Conf. on Image Processing (ICIP2013), (2013)
- [C09] P. Lovato, A. Perina, N. Sebe, O. Zandonà, A. Montagnini, M. Bicego, M. Cristani: "Tell me what you like and I'll tell you what you are: Discriminating Visual Preferences on Flickr Data", Proc. of 11th Asian Conference on Computer Vision (ACCV 2012), pp. 45-56, (2013)
- [C08] M. Bicego, P. Lovato: "2D shape recognition using biological sequence alignment tools", Proc. Int. Conf. on Pattern Recognition (ICPR2012), (2012)
- [C07] P. Lovato, M. Bicego: "2D shapes classification using BLAST", Proc. Int. Workshop on Statistical Techniques in Pattern Recognition (SPR2012), (2012)
- [C06] P. Lovato, M. Bicego, M. Cristani, N. Jojic, A. Perina: "Feature selection using Counting Grids: application to microarray data", Proc. Int. Workshop on Statistical Techniques in Pattern Recognition (SPR2012), pp. 629-637, (2012)
- [C05] A. Perina, P. Lovato, M. Cristani, M. Bicego: "A comparison on score spaces for expression microarray data classification", Proc. of Int. Conf. on Pattern Recognition in Bioinformatics (PRIB2011), pp. 202-213, (2011)
- [C04] A. Calvi, M. Delledonne, A. Ferrarini, P. Lovato, S. Marchesini, B. Oliboni: "Microarray System: a system for managing data produced by DNA-Microarray experiments", Proc. Int. Conf. on Bioinformatics Models, Methods and Algorithms (BIOINFORMATICS2011), pp. 293-296, (2011)
- [C03] A. Perina, P. Lovato, V. Murino, M. Bicego: "Biologically-aware Latent Dirichlet Allocation (BaLDA) for the Classification of Expression Microarray", Proc. Int. Conf. on Pattern Recognition in Bioinformatics (PRIB2010), pp. 230-241, (2010)
- [C02] M. Bicego, P. Lovato, A. Ferrarini, M. Delledonne: "Biclustering of expression microarray data with topic models", Proc. of Int. Conf. on Pattern Recognition (ICPR2010), pp. 2728-2731, (2010)
- [C01] M. Bicego, P. Lovato, B. Oliboni, A. Perina: "Expression microarray classification using topic models", Proc. of ACM SAC - Bioinformatics and Computational Biology track (SAC-BIO2010), pp. 1516-1520, (2010)

Posters

- [P01] P. Lovato, A. Giorgetti, M. Bicego: "A multimodal approach on protein remote homology detection", European Conference on Computational Biology (ECCB2014), (2014)