MARIO MEZZANZANICA

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CURRENT POSITIONS

Associate Professor of Computer Engineering (ING-INF/05) *2005 - present*
Department of Statistics and Quantitative Methods (DISMEQ)
University of Milano-Bicocca, Italy

Vice-Rector of Advanced Training and Job Placement *2019 - present*
University of Milano-Bicocca, Italy

Head of Department *2018 - present*
Department of Statistics and Quantitative Methods (DISMEQ)
University of Milano-Bicocca, Italy

Director *2012 - present*
Master in Business Intelligence and Big Data Analytics
University of Milano-Bicocca, Italy

Scientific Director *2005 - present*
CRISP Research Centre - Interuniversity Research Centre on Public Services at University of Milano-Bicocca, Italy

RESEARCH INTERESTS

The main area of interest is Information Systems, Big Data, and Labour Market Intelligence (LMI) where he has carried on several research activities that have been published on scientific journals, conference proceedings, and books both at international and national level. Specifically:

Business Intelligence and Decision Making
This research area studies and analyses the methodological aspects of design, management, and analysis of data derived from business process as well as data external to the company for supporting decision makers at different levels (e.g., operation, strategic and tactical). The approach and methodologies have been applied to several different usage focusing on the needs of individual organizations. Furthermore, a particular attention is given to the "knowledge" needs of public services, that require specific methodologies and techniques to design Statistical Informative System for decision making. In this setting he has been developing a methodology for processing statistical and administrative data, focusing on the definition of KPI for supporting policy making. Here, he has been guiding several research projects at regional, national and European level.

Big Data Analytics and Labour Market Intelligence
The rapid diffusion of Information Systems has made available a huge amount of data, that require the use of Big Data techniques and methodologies for dealing with huge masses of data coming from several sources (structured and unstructured), as they represent a valuable value for enterprises and PAs for deeply understand social, economic and business phenomena. His research in this direction has covered all the main steps of the data cycle process, which includes the data selection and integration; data preprocessing, transformation and cleaning; data mining and multidimensional data visualization as well. Specifically, he investigated automatic techniques for big data cleaning (i.e., based both of AI and ETL methods), and AI in genearal (i.e., machine learning, information extraction and knowledge

representation, word embedding representation and reasoning) applying it successfully to the labour market domain for supporting decision making (aka *Labour Market Intelligence*). In the context of LMI, he has been guiding many national and international projects to put AI into Labour Market by processing million unstructured documents (Online Job Vacancies), CVs; to estimate the effect of digitalisation within occupations; to use AI for deriving similarities and relations between occupations and skills; to identify potential novel occupations and skills that do not appear in any official taxonomy; to update labour market taxonomies through data; as well as to study the representativeness of Web data (see projects sections).

TEACHING ACTIVITIES

Mater Degree and Bachelor Degree Courses

He is currently teaching the following courses at University of Milano-Bicocca:
- *Business Intelligence*
- *Introduction to Big Data Analytics*
- *Databases*
- *Information Systems*
- *Management of Information and Knowledge*

SELECTED RESEARCH PROJECTS (LAST 5 YEARS)

In all the projects below he has been involved as Scientific Supervisor and Senior Analyst for the following projects

- Real-time Labour Market information on Skill Requirements: Setting up the EU system for online vacancy analysis AO/DSL/VKVET-GRUSSO/Real–time LMI 2/009/16 (2016-ongoing)
Granted by CEDEFOP (European Centre for the Development of Vocational Training). The project aims at putting into production the methodological aspects investigated in the previous project, including all the 28 EU countries and respective 32 languages, building a real-time monitor of the European Web Labour Market.

- The Observatory of Digital Competences (2016,2017,2018 and 2019)
Granted by the Italian Unions of ICT (Assinform, Assintel, Assinter) with support of AgiD (Agenzia Italia Digitale) and MIUR. The project aims at measuring the pervasiveness of digital skills (aka, digital skill rate) within occupations (both ICT and non-ICT) derived from the Web Italian Labour Market.

- AI4ESCO: "A Data Driven Bridge Towards ESCO using AI Algorithms" (2020)
Granted by EURES (call EaSI-EURES VP/2019/010). it aims at realising a mapping-table allowing for matching job vacancies and CVs in the European Job Mobility Portal. Specifically, AI4ESCO employs AI algorithms (word-embeddings and machine learning) to achieve the following goals: (i) derive a machine-readable structure of the lexicon used within the Italian National Occupation Taxonomy (CP2011); (ii) connect ESCO to Italian National Taxonomy by means of AI algorithms.

- Digital innovation - Big Data and Labour Market Information Phase 2: Feasibility Study for 2 countries to ldentify, Validate, and Rank Web Job vacancy sources (2019)
Granted by ETF (The European Training Foundation). The project aims at synthesising a ranking of Web sources taking into account both qualitative and quantitative aspects to realise a Real-time labour market monitoring system.

- The Rainbow Years (Mid Life Skills Review) (2017-ongoing)
The project is funded by the EU in the Erasmus+ programme. A substantial body of evidence exists that shows people over the age of 50 in Europe exiting the labour market find it more difficult to re-enter.

The consortium is developing a digitally enabled mid-life skills review that can help prepare workers to be more resilient to labour market challenges they face in the future. This can be an important preventative measure in helping midlife and older workers remain in the labour market by supporting them to update their skills and progress in their current workplace or to make a career change.

- Digital innovation: Big Data and Labour Market Information - SP EMPL (2018-2019)
Granted by ETF. The project aims at putting the methodological basis to better understand how the adequate use of Big Data can enhance traditional labour market information and statistics (LMI) in the era of ubiquitous expansion of digital data of varied sources.

- Real-time labour market information on skill requirements: feasibility study and working prototype AO/RPA/VKVET-NSOFRO/Real-time LMI/010/14 (2014-2016)
Granted by CEDEFOP. The project aims at studying and realising a working prototype for collecting and classifying Web Job vacancies on a well-established international standard classifier (ESCO), extracting the requested skills from the data (5 EU Countries involved). The project aimed at (i) exploring the feasibility of using online sources of LMI to identify skills needs and changing skills requirements in Europe in real time and (ii) developing, implement and evaluate a functioning prototype system.

- Strengthening key competencies of low- skilled people in VET to cover future replacement positions (REPLAY VET) (2017-2018)
The project was funded by the EU in the Erasmus+ programme. The main challenges labour markets in Europe currently face are those of an ageing workforce and changes to skills and work profiles resulting from automatization and digitalization. The demand for skills is changing and some skills are becoming more and more important in labour markets. Lowskilled people are likely to be in a rather vulnerable situation since technological changes make an increasing part of their work susceptible to substitution by technology. These people need to enhance their skills and often require some external support. Regional actors, such as Employment Services, Vocational Education and Training (VET) institutions, Unions, Social Organisations and Training Providers, can develop integrated strategies to improve the matching of the workforce with the evolving demands of the labour market.

COLLABORATION WITH INSTITUTIONS AND ORGANISATIONS

He established several collaborations being involved in many technical and scientific committees activated by public Institutions, aimed at studying new models and methodologies of design, monitor and evaluation of innovation projects with relevant impact on models of supply and management of public utility services based on new ICT technologies.

European Network on Regional Labour Market monitoring (ENRLMM). Since 2011 he is member of the scientific committee of the European Network on Regional Labour Market Monitoring. The network develops research initiatives on regional labour market across European countries promoting methods for the study research and analysis of regional labour market monitoring. Within this network he has contributed also to the "Initiative for Networking Regional and Local Labour Market Observatories" within which he has contributed to the analysis of data on regional and local employment and professional development, on unemployment and inactivity as well as vocational and further education. He yearly contributed in the ENRLMM Anthology, published by Rainer Hampp Verlag.

Committee Memberships and Advisory

· Member of the Coordination committee of the "Borsa Continua Nazionale del Laboro (BCNL)" of Lombardy Region, Veneto Region and The Italian Ministry of Labour and Social Security
· He is chair and organiser of the KomIS special session (Knowledge Discovery meets Information Systems: Experiences and lessons learned dealing with real-life scenarios) since 2015 (editions: 2015, 2016, 2018, 2019, and 2020)
· He has partnered as consultant and coordinator in several projects for innovation of public services at both national and regional level. He collaborated with the Italian Presidency of the Council of

Ministers, the Italian Ministry of Labour and Social Security, the ISTAT (Italian National Institute for Statistics), the AIPA (Authority for Information Technology in Italian Public Administration), the Italian Ministry of Economy and Finance, CONSIP (Central Public Procurement Agency, a public stock company owned by Ministry of the Economy and Finance), as well as the main Italian Regions as Lombardy, Veneto, and Emilia Romagna.

AWARDS

IBM Watson Research Center   2008

· Winner of the the IBM Faculty Award on SSME

Best Paper Award   2013

· Best paper award at the Human-Computer Interaction and Knowledge Discovery, 1-3 July 2013, Maribor, Slovenia, with the paper "Inconsistency Knowledge Discovery for Longitudinal Data Management: A Model-Based Approach," published at SouthCHI13 special session on Human-Computer Interaction Knowledge Discovery, Lecture Notes in Computer Science, vol. 7947

Best Paper Award   2014

· Best paper award at the DATA 2014, International Conference on Data Management Technologies and Applications, Vienna 28-30 August 2014, with the paper "Improving Data Cleansing Accuracy: A model-based Approach", In Proceedings of the 3rd International Conference on Data Technologies and Applications (DATA) (pp.189-201). Insticc

EDUCATION

Electronic Engineer Degree   1985
Politecnico di Milano

FOREIGN LANGUAGES

Italian (mother tongue)
English (proficient user - C1)

RECENT PUBLICATIONS

He authored 140+ publications on top-tier conferences and journals on Computer Science, AI and Information Systems (See his profile at `https://tinyurl.com/yyta9yt6`). *Below a selection of 10 publications.*

Selected Publication

[1] Anna Giabelli, Lorenzo Malandri, Fabio Mercorio, and Mario Mezzanzanica. Graphlmi: A data driven system for exploring labor market information through graph databases. *Multimedia Tools and Applications*, pages 1–30, 2020.

[2] Anna Giabelli, Lorenzo Malandri, Fabio Mercorio, Mario Mezzanzanica, and Andrea Seveso. Neo: A tool for taxonomy enrichment with new emerging occupations. In *The International Semantic Web Conference (ISWC) (accepted paper)*, 2020.

[3] Francesco Colace, Massimo De Santo, Marco Lombardi, Fabio Mercorio, Mario Mezzanzanica, and Francesco Pascale. Towards labour market intelligence through topic modelling. In Tung Bui, editor, *52nd Hawaii International Conference on System Sciences, HICSS 2019, Grand Wailea, Maui, Hawaii, USA, January 8-11, 2019*, pages 1–10. ScholarSpace / AIS Electronic Library (AISeL), 2019. PDF.

[4] E. Colombo, F. Mercorio, and M. Mezzanzanica. Ai meets labor market: Exploring the link between automation and skills. *Information Economics and Policy*, 47:27–37, 2019.

[5] Pietro Giorgio Lovaglio, Mario Mezzanzanica, and Emilio Colombo. Comparing time series characteristics of official and web job vacancy data. *Quality & Quantity*, pages 1–14, 2019.

[6] Fabio Mercorio, Mario Mezzanzanica, Vincenzo, Moscato Giancarlo Sperlì, and Antonio Picariello. Dico: A graph-db framework for community detection on big scholarly data. *IEEE Transactions on Emerging Topics in Computing*, pages 1–1, 2019.

[7] Mario Mezzanzanica and Fabio Mercorio. Big data enables labor market intelligence. In Sherif Sakr and Albert Y. Zomaya, editors, *Encyclopedia of Big Data Technologies.* Springer, 2019. PDF.

[8] Roberto Boselli, Mirko Cesarini, Stefania Marrara, Fabio Mercorio, Mario Mezzanzanica, Gabriella Pasi, and Marco Viviani. Wolmis: a labor market intelligence system for classifying web job vacancies. *J. Intell. Inf. Syst.*, 51(3):477–502, 2018. PDF.

[9] Roberto Boselli, Mirko Cesarini, Fabio Mercorio, and Mario Mezzanzanica. Classifying online job advertisements through machine learning. *Future Generation Comp. Syst.*, 86:319–328, 2018. PDF.

[10] Lovaglio, Cesarini, Mercorio, and Mezzanzanica. Skills in demand for ict and statistical occupations: Evidence from web-based job vacancies. *Statistical Analysis and Data Mining*, 11(2):78–91, 2018. PDF.

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