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Andrea Brunello

WORK EXPERIENCE

OCT 2022 – CURRENT
ASSISTANT PROFESSOR (RTD-B, TENURE TRACK) UNIVERSITY OF UDINE

Research activities on machine/deep learning applied to the fields of:
- healthcare
- indoor/outdoor seamless positioning
- virtual sensing
- predictive maintenance (with the integration of formal methods techniques)
- humanities and cultural heritage

Research on the theoretical and practical aspects of the formalisation of natural language utterances by means of temporal logic formulas.

Teaching and dissemination activities at the universities of Udine and Trieste, Italy, and at national and international private companies.
Coordination and supervision tasks within the Data Science and Automatic Verification Laboratory research group at the University of Udine, Italy.
Tools: PyTorch, Keras, Scikit-learn, SciPy, DEAP framework

MAR 2023 – MAY 2023 Udine, Italy
R&D CONSULTANT BEANTECH

Themes include:
1. Development of a data warehouse to store industrial sensors data
2. Design of data analytics and process optimization tasks

OCT 2019 – OCT 2022 Udine, Italy
POSTDOCTORAL RESEARCHER (RTD-A SINCE JAN 2022) UNIVERSITY OF UDINE

Research on and development of machine/deep learning techniques and evolutionary computation solutions applied to virtual sensing, healthcare, microbiology, and indoor positioning. Integration between machine learning and automatic verification techniques.
Teaching and dissemination activities at the universities of Udine and Trieste, Italy.
Coordination and supervision tasks within the Data Science and Automatic Verification Laboratory research group at the University of Udine, Italy.
Other duties include the software and hardware maintenance of the Laboratory's servers and workstations.
Tools: PyTorch, Keras, Scikit-learn, SciPy, DEAP framework

OCT 2019 – JAN 2022 Udine, Italy
R&D CONSULTANT GAP S.R.L.U.

Support to natural language processing and data integration/storage/analysis/presentation tasks.
Tools: Python, PostgreSQL, MySQL, Pentaho suite

JUN 2017 – DEC 2017 Pasian di Prato (UD), Italy
ICT CONSULTANT ASSOCIAZIONE 'LA NOSTRA FAMIGLIA'

Development of a database for the management of the medical activities of the center, and of the processes necessary for their planning through operational research solutions, including linear

programming and genetic algorithms. The association is a non-profit organization dedicated to the care and rehabilitation of people with disabilities, in particular children and young adults.
Tools: Python, PostgreSQL, GNU Linear Programming Kit

MAY 2016 – NOV 2016 Udine, Italy
EMPLOYEE AT RESEARCH AND DEVELOPMENT DEPARTMENT GAP S.R.L.U.

Development of data science solutions, related to speech to text models and text mining. Specifically, a speech analytics process has been developed which, starting from audio recordings, first transcribes them by means of model, ad-hoc developed according to the needs of the company; afterwards, conversations with specific characteristics are automatically identified.
Tools: Python, R, Perl, Kaldi ASR Toolkit, Pentaho Data Integration

AUG 2016 – DEC 2016 Switzerland
ICT CONSULTANT U-BLOX

Development of data migration processes to/from a document management system related to positioning devices.
Tools: Python, PostgreSQL, NodeJS

MAY 2015 – JUN 2016 Udine, Italy
RESEARCH FELLOW UNIVERSITY OF UDINE

The addressed topics include business intelligence and data mining analysis in the context of Contact Centers. Specifically, the focus has been on the following aspects:

- Development and deployment of a business intelligence layer, on top of an enterprise-wide data warehouse for GAP s.r.l.u., currently employed in a production setting (*PostgreSQL, Pentaho Business Analytics, Jasper Reports*)
- Detailed study and test of several techniques in the context of attribute selection, supervised and unsupervised learning. The gained experiences have been presented through a series of seminars, held at the University of Udine, University of Ferrara, and at GAP company
- Development of a set of tools, also employing data/text mining techniques (*Python, NLTK, WEKA*), for:
    - the evaluation of operator's work performance
    - the detection of anomalies in company's processes
    - the scheduling of outbound telephonic campaigns (propensity models)

All developed tools have then been deployed into a Decision Support System in a production setting.

MAR 2015 – JUN 2015 Udine, Italy
EMPLOYEE AT RESEARCH AND DEVELOPMENT DEPARTMENT GAP S.R.L.U.

Development of an enterprise-wide data warehouse for the company, currently employed in a production setting, and of the related ETL processes.
Tools: Perl, Pentaho Data Integration, PostgreSQL, MySQL, Microsoft SQL Server, Oracle

EDUCATION AND TRAINING

OCT 2016 – 18 MAR 2020
PHD: COMPUTER SCIENCE, MATHEMATICS, AND PHYSICS University of Udine

XXXII cycle of the PhD course at the University of Udine.
Data mining / machine learning research project, related to the integration and management of temporal information within interpretable predictive models. Results have been published on journals and presented at international conferences.
Side activities: multi-objective optimization by means of evolutionary algorithms, information retrieval, cellular-based positioning.

Supervisor: Prof. Angelo Montanari

Final grade cum laude |

Thesis Temporal Information in Data Science: An Integrated Framework and its Applications

JAN 2019 – JUN 2019

VISITING STUDENT University of Western Australia

Study period abroad as a visiting student at the University of Western Australia, in Perth, to carry out research on issues related to text natural language processing and text formalization by means of (temporal) logic constructs.

SEP 2012 – 25 MAR 2015

JOINT MASTER'S DEGREE IN INTERNATIONAL COMPUTER SCIENCE University of Udine (Italy) / Alpen Adria Universität (Austria)

Joint master degree between the University of Udine (Italy) and the Alpen Adria Universitaet (Austria).
As an integral part of the degree, I spent six months in Klagenfurt (Austria), where I was able to benefit both from experiencing a different learning environment and from living with students from all over Europe.
I achieved both an Italian master's degree in Computer Science, and an Austrian master's degree in Computer Science Engineering.

Final grade 110/110 cum laude | **Thesis** A data warehouse for a contact center with multiple channels and skills

SEP 2009 – 17 OCT 2012

BACHELOR'S DEGREE IN COMPUTER SCIENCE University of Udine

Final grade 110/110 cum laude | **Thesis** Database normalization based on hypergraph decomposition

2004 – 2009 Palmanova, Italy

HIGH SCHOOL DIPLOMA IN ACCOUNTING AND BOOKKEEPING ITC Luigi Einaudi

First foreign language: English
Second foreign language: German

Internships at Assicurazioni Generali Group.

Address Palmanova, Italy | **Final grade** 100/100

LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		**SPEAKING**		**WRITING**
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C1	C1	C1
GERMAN	A2	A2	A2	A2	A2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

C | Java | Perl | Haskell | SQL | R | Unix Shell | PostgreSQL | MS SQL Server | MySQL | Oracle | WEKA Data Mining Suite | JasperReports | Kaldi | GLPK GNU Linear Programming Kit | Keras | PyTorch | Google Cloud Platform | NoSQL | Evolutionary Computation | Scikit-learn | SciPy | Pentaho Suite | Python | DEAP

ADDITIONAL INFORMATION

PROJECTS

2016 – CURRENT
GNCS - Gruppo Nazionale per il Calcolo Scientifico **Principal investigator**:
- GNCS 2022: Natural Language Processing and Temporal Logic for the Formalization of Texts (€ 3.000)

Member of the unit at the University of Udine of the projects:
- GNCS 2020-2021: Strategic reasoning and automatic synthesis for multi-agent systems
- GNCS 2019: Formal methods for combined verification techniques
- GNCS 2017: Logic and automata for interval model checking

Cooperation between several Italian universities.

2022 – CURRENT
A framework to synthesis of controllers in safety-critical scenarios Internal call for the financing of collaborative research projects - DM 737 (PRIN2020), University of Udine
Member.

FEB 2022 – CURRENT
Generali Group Academy - Business Translator Learning Path **Co-organizer of and lecturer at** the Generali Academy's Business Translator Learning Path, an education initiative promoted by the Data Science & Artificial Intelligence Institute (Generali Group), University of Udine, University of Trieste, and MIB Trieste School of Management.

DEC 2021 – CURRENT
Artificial Intelligence solutions for production process optimization and performance drop identification Funded PON 2014-2020 AZIONE IV.4 INNOVAZIONE
Principal investigator.
Research and development of techniques for the gathering and storage of massive quantities of data. Subsequent application of machine learning models for the detection of anomalies and efficiency drops.

OCT 2019 – CURRENT
COMET K1 - Machine learning and formal methods for smart systems integration and intelligent sensors Funded by the Competence Centre ASSIC–Austrian Smart Systems Integration Research Center, co-funded by the Austrian Federal Ministries of Transport, Innovation and Technology (BMVIT) and Science, Research and Economy (BMWFW) and the Federal Provinces of Carinthia and Styria within the COMET–Competence Centers for Excellent Technologies Programme (Austria).
Member.
Design of a framework for the integration of formal verification systems with machine learning.
Joint project between University of Udine (Italy) and Silicon Austria Labs (Austria).

2014 – CURRENT
Advanced solutions for positioning Research and development of advanced solutions for indoor/outdoor positioning, including machine and deep learning, and evolutionary algorithms.
Member.
Design and development of advanced deep learning solutions for indoor positioning.
Joint projects between University of Udine (Italy) and u-blox company (Switzerland).

MAY 2016 – JAN 2019
Active speech and learning analytics system Funded LR 3/2015 art. 33 Regione Friuli Venezia Giulia (Rank 12).
Member.
Designed in 2015, Speech Analytics process embeddable in a Learning Analytics Cycle for Multi Service Contact Center.
Cooperation between University of Udine (Italy) and University of Ferrara (Italy).

DEC 2013 – JUN 2016
Active Contact System - analytics and decision architecture Funded POR FESR 2007/2013 legge 47/78 Regione Friuli Venezia Giulia (Rank 13).
Member.
Designed in 2012, Decision Support System for a multi service contact center, based on data warehouse and machine learning analytics processes.
Cooperation between University of Udine (Italy), University of Ferrara (Italy), and researchers of the University of Murcia (Spain).

HONOURS AND AWARDS

2023
Google Cloud Platform research grants – Google LLC Recipient of research grants for a total of € 10.000.

2022
Grant supporting the application to "Horizon Europe" – University of Udine Grant of € 8.000 supporting the application to "Horizon Europe", call for the funding round 2022/2023. Action "ERC Starting Grant".

2019
AI*IA mobility grant – Italian Association for Artificial Intelligence Winner of an AI*IA Mobility Grant for the year 2019

2018
Best paper award 24th ICIST conference, Vilnius, Lithuania
A. Brunello, E. Marzano, A. Montanari, G. Sciavicco - J48S: A Sequence Classification Approach to Text Analysis Based on Decision Trees

2017
Best presentation award ACMLC conference, Singapore

2014
Best graduate of the academic year – University of Udine Year 2013-2014, master degree in International Computer Science (LM-18)

TEACHING ACTIVITIES

2022 – 2023
Digital Media e Beni Culturali / Laboratorio di Informatica per Umanisti

University of Udine, Italy - Bachelor's degree course
(Main Lecturer)

Topics:
1. A brief introduction to Artificial Intelligence
2. Algorithms and computability
3. The computer, hardware and software
4. Information representation: text, numbers, images, sound, and video
5. Storytelling with Data
6. Computer networks and the Internet
7. HTML and CSS
8. LaTeX

2022 – 2023
Databases

University of Udine, Italy - Bachelor's degree course
(Main Lecturer)

Topics:
1. Entity-relationship model
2. Relational model
3. SQL and Postgres

2019 – 2022
Data Management for Big Data / Advanced Database Systems for Big Data

University of Trieste and University of Udine, Italy - Master's degree course
(Co-main Lecturer with Dario Della Monica)

Topics:
- Relational databases: conceptual/logical/physical design, normalization, SQL
- Data Warehousing
- Business Intelligence
- NoSQL database systems
- Text analytics

- Time series analysis

2020 – 2021
Tecnologie Digitali per il Cibo e la Ristorazione

University of Udine, Italy - Bachelor's degree course
(Main Lecturer)

Topics:
- Fundamentals of Computer Science
- Relational and NoSQL databases
- Data visualization
- Data mining

2019 – 2022
Filosofia del Digitale / Digital Philosophy

University of Udine, Italy - Master programme course
(Main Lecturer)

Topics:
- Relational and NoSQL databases
- Data warehousing
- Business intelligence
- Data science

2017 – 2019
Databases

University of Udine, Italy - Bachelor's degree course
(Main Lecturers: Angelo Montanari, Nicola Vitacolonna)

Topics:
- SQL language
- PostgreSQL DBMS

2017 – 2018
Advanced Database Systems

University of Udine, Italy - Bachelor's degree course
(Main Lecturer: Nicola Vitacolonna)

Topics:
- PostgreSQL system catalog
- Query planning and optimization
- Management of temporal data
- Data mining with PostgreSQL and Weka

CONFERENCES AND SEMINARS

Presenter at conferences
- **Workshop on Artificial Intelligence for Healthcare @ 21st International Conference of the Italian Association for Artificial Intelligence** (work: *AIOSA: An approach to the automatic identification of obstructive sleep apnea events based on deep learning*), 2022
- **European Conference on Advances in Databases and Information Systems** (work: *Assessing the role of temporal information in modelling short-term air pollution effects based on traffic and meteorological conditions: a case study in Wrocław*), 2019
- **1st Workshop on Artificial Intelligence and fOrmal VERification, Logic, Automata, and sYnthesis** (work: *Pairing Monitoring with Machine Learning for Smart System Verification and Predictive Maintenance*), 2019
- **26th International Symposium on Temporal Representation and Reasoning** (work: *Synthesis of LTL formulas from natural language texts: State of the art and research directions*), 2019
- **6th International Conference on Mining Intelligence and Knowledge Exploration** (work: *A novel decision tree approach for the handling of time series*), 2018
- **24th International Conference on Information and Software Technologies** (work: *J48S: a sequence classification approach to text analysis based on decision trees*), 2018

- **Asia Conference on Machine Learning and Computing** (work: *Decision tree pruning via multi-objective evolutionary computation*), 2017

Session chair at conferences

- **21st International Conference of the Italian Association for Artificial Intelligence**, Natural Language Processing session, 2022
- **26th International Symposium on Temporal Representation and Reasoning**, Model Checking session, 2019

Co-organizer and speaker at seminars

- **An Introduction to Neural Networks** (University of Udine), 2018
- **Algoritmi per il Data Mining con applicazioni aziendali** (University of Ferrara), 2016
- **Active Contact System: Data science for contact management** (University of Udine), 2016
- **Introduzione al Data Mining e applicazioni al dominio del Contact Management** (University of Udine), 2015

Invited speaker

1. **Interpretability in practice: A gentle introduction and case studies** (Italian National PhD Programme in Artificial Intelligence), 2022
2. **Interpretability in practice: A gentle introduction and case studies** (Italian National PhD Programme in Artificial Intelligence), 2023

Digressions

1. **Intelligenza Artificiale tra Passato, Presente e Futuro** (Incontri con lo Scienziato, Cordovado), July 2022
2. **Intelligenza Artificiale e Chatbot** (ITIS Arturo Malignani, Udine), March 2023
3. **Intelligenza Artificiale fra Passato, Presente e Futuro** (Formazione docenti, rete nazionale dei Licei della Scienza dei Dati e dell'Intelligenza Artificiale), May 2023

OTHER ACADEMIC ACTIVITIES

Mentoring

(Co-)supervisor of theses:

1. 10 Bachelor students
2. 5 Master students
3. 3 PhD students

Reviewing

Journals:

1. BMC Medical Informatics and Decision Making
2. Engineering Applications of Artificial Intelligence
3. Expert Systems With Applications
4. IEEE Internet of Things Journal
5. MDPI ISPRS International Journal of Geo-Information
6. MDPI Education Sciences
7. MDPI Mining
8. PeerJ Computer Science
9. Information Systems

Conferences:

1. AAAI Conference on Artificial Intelligence (2018, 2020, 2021, 2022, 2023)
2. IEEE International Conference on Tools with Artificial Intelligence (ICTAI 2020, 2021)
3. International Joint Conference on Artificial Intelligence (IJCAI 2019, 2022)
4. European Conference on Advances in Databases and Information Systems (ADBIS 2022)

Boards

Journal editorial boards:

1. Nature Scientific Data

Final exam commissions:

1. UniMore-UniFe-UniPr, PhD in Mathematics, XXXIV cycle, *member*
2. UniUD, PhD in Computer Science, Mathematics and Physics, XXXIII and XXXV cycles, *president/secretary*

Program Committe:

1. 37th AAAI Conference on Artificial Intelligence (AAAI-23)
2. 38th Italian Conference on Computational Logic. (CILC23)

Local arrangement chair of 21st International Conference of the Italian Association for Artificial Intelligence (AIxIA 2022).

Chair of organizing committe of 14th International Symposium on Games, Automata, Logics, and Formal Verification (GandALF 2023).

Co-chair of 5th Workshop on Artificial Intelligence and fOrmal VERification, Logic, Automata, and sYnthesis (OVERLAY @ AIxIA 2023)

Member of the board of directors of the Artificial Intelligence for Cultural Heritage center (AI4CH), based in Udine and involving five different Departments of Excellence all over Italy. The aim of the initiative is to represent an European reference research center dedicated to the development, research and enhancement, through the new digital technologies, of history and culture in their broadest sense.