

Dr.techn. Andrea Monacchi

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🔗 Industrial Orientation

Combining my experience in embedded systems, distributed computing and artificial intelligence: collecting, storing and analyzing large-scale streams from physical environments to optimize processes and automate daily tasks. The application field of specialty is electrical energy production and distribution.

🔗 Research Interests

Smart buildings & Microgrids (Demand-side management, Ambient-assisted living, Context-aware services), Distributed Artificial Intelligence (Multiagent decision making, Dependable Systems, Distributed Computing)

🏢 Industrial experience

IT Consultant (Data Science & Engineering), Data Reply GmbH (Reply AG), München, Germany

On-premise and cloud-based data science using the Hadoop/Spark and Kafka ecosystems July 2016 - June 2018

- Kafka connectors/sinks to push/pull data from Kafka topics
- Hadoop Map-Reduce and Interaction with HDFS-based data lake
- Definition of Oozie workflows to produce business reports using Hive queries and Map-Reduce jobs
- Spark jobs to periodically extract KPI/features and update statistical model, e.g. anomaly and fraud detection
- Spark Streaming processing from/to Kafka and HBase for real-time log analysis & event processing
- Kafka Streams based processing of Kafka topics (e.g. format conversion, extracting sessions on set-top-boxes)
- PySpark&Scikitlearn, e.g. predictive maintenance of power distribution network using Decision-tree ensembles
- Analysis of free-text fields from power outage tickets using nltk, gensim and scikit-learn
- Dockerized environments to run self-contained unit, integration and end-to-end tests on DS pipelines
- Worked under CI/CD philosophy using GitFlow and GitLabCI
- Worked in Agile teams across whole Germany, including Munich, Essen, Hamburg

IT Consultant (Energy Analytics), Power Reply GmbH (Reply AG), München, Germany

Extraction and Android-based provisioning of energy analytics for utilities Feb. 2016 - June 2016

- Event detection from outlet power data and performance assessment of industrial NILM component
- RESTful webservice with Java JEE/Spring (Boot/IoC, JPA/Hibernate/JPQL, etc.), PostgreSQL
- Visualization of energy usage at various time resolutions (MPCharts)
- Automatic reading of energy meters through OCR libraries (Anyline.io)
- Integration with SAP IS-U (tariff, invoicing) via REST/JSON services
- Geolocalization of partner offers, shown through augmented reality (PanicAR) and Google Map

Software Engineer, Towntnet Srl, Cagli, PU Italy

June - Sept. 2009

- Tested and deployed the Radius Server on Linux-based systems
- Developed web/intranet applications in PHP for internal management
- Assembled network devices (e.g., routers, CPEs, antennas)

Intern Technician, A.T.E. Elettronica Srl, Gubbio, PG Italy

July 2006

- Assembled and tested power supplies and automatic olive-oil dosers

Intern Web Developer, Lyn-x Snc, Gubbio, PG Italy

July - August 2004

- Designed web interfaces with Macromedia Fireworks and Flash MX
- Developed several websites in PHP and MySQL

& Research experience

Researcher, Alpen-Adria-Universität Klagenfurt

Oct. 2015 - Jan. 2016

- Grant-supported research on power trading for Microgrids
- Dissemination and dissertation writing

Research assistant, Lakeside Labs, Klagenfurt, Austria

Smart Microgrid lab: establishment of a μ -grid experimental lab

Apr 2015 - August 2015

- Designed a Smart- μ Grid testbed for testing load-balancing algorithms
- Implemented event-driven architecture based on websockets, to remotely control electrical devices
- Deployed energy monitoring system at AAU, cut dev costs by 70% using open hw&sw

MONERGY: ICT solutions for energy saving in smart homes

Oct. 2012 - March 2015

- Gathered >1 year active power measurements at 1 Hz in Italy and Austria to analyze appliance usage
- Designed persuasive energy advisor potentially yielding 34% of energy savings
- Evolved neural controllers for optimization of renewable energy usage
- Designed ontology for device and data interoperability of household appliances

Student Researcher, CADIA lab, Reykjavík, Iceland Aug. 2011 - June 2012
 Research on reinforcement learning and general game playing

- Designed context representation and reasoning framework
- Implemented TD-learning agent to provide early warning notifications
- Assessed the effectiveness of notifications and users' satisfaction, on real users

🎓 Education

Ph.D. in Informationstechnik - Information Engineering Oct. 2012 - Sep. 2016
 Institute of Networked Embedded Systems, Smart Grid group
 Alpen-Adria Universität Klagenfurt, Klagenfurt (Austria)
 Focus on building energy management systems Advisor: Wilfried Elmenreich

Meistaragráða í tölvunarfræði - M.Sc. in Computer Science Aug. 2011 - June 2012
 Reykjavik University, Reykjavík (Iceland)
 Focus on artificial intelligence and HCI Advisor: Hannes Högni Vilhjálmsson

M.Sc. cum Laude in Computer Science Oct. 2010 - July 2012
 University of Camerino, Camerino (Italy)
 Focus on multi-agent and distributed systems Advisor: Emanuela Merelli

B.Sc. cum Laude in Applied Computer Science Oct. 2007 - Oct. 2010
 "Carlo Bo" University of Urbino, Urbino (Italy)
 Focus on embedded systems and multimedia data processing

Technical High School in Electronics and Telecommunications Sept. 2002 - June 2007
 I.T.I. "M. L. Cassata", Gubbio (Italy)

🎓 Graduate courses

School of Energy Engineering - Aalborg Universitet (Denmark). Nov. 2012
 PhD courses attended: "AC Microgrids" and "Power Quality in Microgrids"

🏆 Academic Honors

Italian Ministry of Education & Research	3k €	"Cooperlink" scholarship	2011
Camerino University	1.98k €	Erasmus scholarship	2011
Camerino University	0.75k €	Merit scholarship	2012
Marche Region (Italy)	2k €	MS Thesis award	2014
Alpen-Adria Universität Klagenfurt	6.51k €	Forschungsstipendium ¹	2015

📚 Computing Skills

<u>Languages</u>	Extensive knowledge	Java, Python, PHP3, XML, HTML, CSS, L ^A T _E X
	Intermediate knowledge	C, Bash shell, SQL, Ladder, VHDL, UML
	Basic knowledge	C++, Haskell, Javascript, R, Prolog
<u>Big Data Engineering</u>	Kafka, Kafka-connect, Kafka Streams, Hadoop, Spark, Spark Streaming, Oozie, Hive, Impala, HBase	
<u>Virtualization and Operations</u>	Ansible, Vagrant, Docker	
<u>DBMS</u>	MySQL, PostgreSQL, MongoDB	
<u>AI & ML</u>	Jade, Frevo, Protege, Neuroph, Keras/Tensorflow	
<u>Data analysis</u>	Weka, libSVM, Netica, SPMF, Numpy/Matplotlib/Sympy/Pandas, Jupyter, Scikit-learn, nltk, gensim	
<u>M2M interoperability</u>	REST/JSON, Websockets/WAMP, CoAP, RDF/Sparql, XMPP, RabbitMQ	
<u>Versioning tools</u>	Gradle, Maven, SVN, Git	
<u>Graphic design</u>	Gimp, Adobe InDesign, Fireworks, SwishMax	
<u>3D Game Engines</u>	JMonkey, Panda 3D	
<u>Android</u>	GCM, GMaps, MPChart, SQLite, Realm.io, Retrofit, Butterknife, Glide, Anyline, PanicAR, Fabric.io	
<u>Operating systems</u>	ArchLinux, Debian/Ubuntu, MacOSX	
<u>Embedded OSes</u>	Contiki OS, FreeRTOS	
<u>Embedded systems tools</u>	Xilinx ISE, Mentor Graphics Modelsim, MPLab, AVRStudio	

🌟 Project Management

Experience in leading projects and international teams (MS students and interns), Adaptability to new environments, Good communication skills, Research management (proposal and deliverable co-writing), Research methodology, Human-factors and

¹Suspended for working reasons at the end of Jan. 2016

research methods in HCI (A/B testing, usability, surveys), experience with Design Patterns and Agile processes (Scrum/XP), concerned on performance and documentation.

🌐 Languages

Italian (mother tongue), English (C1), German (B2/a²), Icelandic (A1³)

🚲 Other Activities

Released open-source projects (selected)

- DLM Sensitive, DLM Messenger, OpenMotion
- AcidRain game, WikiStar wiki
- Mjölñir: the open-source energy advisor

Smart Microgrids Munich Meetup

- Founded Meetup with ~250 Members: students, researchers and professionals
- Sought host and sponsors to organize multiple free events.

Free time

Photography, cooking, chess, painting, futsal, table soccer, hiking, horse riding

²Last examined level at AAU Klagenfurt in Jan 2015

³Last examined level at Reykjavik University in Dec 2011

Publications

Book chapters

- W. Elmenreich, A. Monacchi. Configuration and Management of Networked Embedded Devices, In Industrial Communication Technology Handbook, Second Edition, CRC Press, Boca Raton, FL 33431, USA, August 2014
- D. Egarter, A. Monacchi, M. Rabl-Pöchacker, K. Schweiger, B. Steinwender. Smart Grid: Visionen & Herausforderungen, In Energie - Interdisziplinäre Perspektiven auf eine knappe Ressource. Klagenfurter Interdisziplinäres Kolleg, pp. 15-53, 2014
- W. Elmenreich, T. Khatib, A. Monacchi. Smart Microgrids: Optimizing Local Resources toward Increased Efficiency and a More Sustainable Growth, In Research and Development Evolving Trends and Practices - Towards Human, Institutional and Economic Sectors Growth. InTech 2017.

Journals

- A. Monacchi, W. Elmenreich. Assisted Energy Management in Smart Microgrids. Springer Journal of Ambient Intelligence and Humanized Computing. 2016.
- A. Monacchi, F. Versolatto, M. Herold, D. Egarter, A. M. Tonello, W. Elmenreich. An Open Solution to Provide Personalised Feedback for Building Energy Management. IOS Journal of Ambient Intelligence and Smart Environments. 2016.
- D. Egarter, A. Monacchi, T. Khatib, W. Elmenreich. Integration of Legacy Appliances into Home Energy Management Systems. Journal of Ambient Intelligence and Humanized Computing. Springer. August 2015.
- A. Monacchi, S. Zhevzyk, W. Elmenreich. HEMS: A Home Energy Market Simulator. Computer Science - Research and Development. Springer. 2014.
- T. Khatib, A. Monacchi, W. Elmenreich, D. Egarter, S. D'Alessandro, A. M. Tonello. European end-user's level of energy consumption and attitude toward smart homes: A case study of residential sectors in Austria and Italy. Energy Technology & Policy, Taylor & Francis. 2014.

International workshops and conferences

- A. Monacchi, D. Egarter, W. Elmenreich. Integrating Households into the Smart Grid. In Proceedings of the IEEE Workshop on Modeling and Simulation of Cyber-Physical Energy Systems, Berkeley, CA, May 2013.
- A. Monacchi, W. Elmenreich, S. D'Alessandro, A. M. Tonello. Strategies for Domestic Energy Conservation in Carinthia and Friuli-Venezia Giulia. In Proceedings of the 39th Annual Conference of the IEEE Industrial Electronics Society (IECON), Vienna, Austria, 2013.
- A. Kercek, W. Elmenreich und A. Monacchi. Energieverbrauch in den Regionen Kärnten, Österreich und Friaul-Julisch-Venetien, Italien - Ein Vergleich. In 13. Symposium Energieinnovation. Graz, Austria, Februar 2014.
- S. D'Alessandro, A. M. Tonello, A. Monacchi, W. Elmenreich. Home Energy Management Systems: Design Guidelines for the Communication Infrastructure. In Proceedings of the IEEE International Energy Conference (ENERGYCON 2014). Dubrovnik, Croatia, May 2014.
- A. Monacchi, D. Egarter, W. Elmenreich, S. D'Alessandro, A. M. Tonello. GREEND: An Energy Consumption Dataset of Households in Italy and Austria. In Proceedings of the IEEE International Conference on Smart Grid Communications (Smart-GridComm 14). Venice, Italy, November 2014.

Posters & Demos

- A. Monacchi, W. Elmenreich. Insert-coin: turning the household into a prepaid billing system. In Proceedings of the 5th ACM Workshop on Embedded Systems for Energy-Efficient Buildings (BuildSys'13), Roma, Italy, 2013.

Theses

- A. Monacchi. Assisting Energy Management in Smart Microgrids and Buildings. PhD Thesis, Alpen-Adria-Universität Klagenfurt (Austria). June 2016.
- A. Monacchi. An Early Warning System for Ambient Assisted Living. MSc Thesis, Reykjavik University (Iceland) and Università degli studi di Camerino (Italy). June 2012.
- A. Monacchi. Analisi di un sistema operativo per dispositivi a memoria limitata: applicazione alla misurazione di parametri ambientali. BSc Thesis, Università degli studi di Urbino "Carlo Bo" (Italy). October 2010.