Massimiliano Ruocco, PhD

CONTACT INFORMATION

Mobile: +47-99104568
E-mail: massimiliano.ruocco@ntnu.no
WWW: http://www.idi.ntnu.no/ ruocco/
Linkedin: https://www.linkedin.com/in/massimilianoruocco

RESEARCH INTERESTS

- Machine Learning and Deep Learning
- Information Retrieval and Text Mining
- Spatial and Temporal Statistics

EDUCATION

PhD, Computer Science July 2009 - May 2014

Department of Computer and Information Science,
Norwegian University of Science and Technology

- Thesis Topic: *Geo-Temporal Mining and Searching of Events from Web-based Image Collections*, (defended on May 2014)
- Supervisor: Prof. Heri Ramamapiaro
- Area of Study: Information Retrieval, Machine Learning, Web Mining, Social Media, Spatio-Temporal Statistics

- Implementing/Improving supervised learning algorithm for extraction of Event-Related pictures from social media applications, by considering textual, geographical and temporal dimensions.
- Exploring/Visualizing novel spatio-temporal features from social media data for spatio-temporal patterns detection.
- Implementing novel query expansion model by investigating/implementing machine learning algorithms for combining heterogeneous information, (temporal geographical and textual) for the selection of the best expansion terms.

M.Sc., Computer Science June 1999 - Sept. 2005

Department of Computer Science,
University of Verona

- Thesis Title: *Multicamera Head-Tracking*
- Advisor: Prof. Andrea Fusiello
- Area of Study: Pattern Recognition, Computer Vision, Image Processing

- Developing of a realtime system to follow head tracking with reduced computational costs, robust also in low video resolutions.

PROFESSIONAL EXPERIENCE

Telenor Research, Trondheim, NORWAY
Senior Research Scientist August 2015 to present
Researcher in the areas of Deep Learning, Machine Learning, Information Retrieval and Recommender Systems in the Analytics and AI group at Telenor Research.

NTNU, Trondheim, NORWAY
Adjunct Associate Professor January 2015 to present *Senior Research Scientist* August 2015 to present

Telenor Digital, Trondheim, NORWAY
Software Engineer October 2013 to July 2015
I am in the Global ID group, involved in handling the ID datastore and various infrastructure components. User facing parts of the Global ID system is handled by the API team.

NTNU, Trondheim, NORWAY

Lecturer August 2014 to December 2014
Lecturer for the Information Retrieval Master course (TDT4117).

NTNU, Trondheim, NORWAY
Research Fellows July 2009 to September 2013
PhD candidate in the Computer and Information System Department at Norwegian University of Science and Technology.

RGI S.r.l., Verona, ITALY
Software Engineer July 2007 June 2009
We manage the Gruppo Cattolica Assicurazione, the third most important ensurance of Italy and delivers it solutions and personalization of PASS (web application). I was responsible for bug fixing, and of the implementation of new business part on specific request of the client. In my case I was involved in re-engeneering some part of the business logics too.

InfoCamere S.p.a., Padova, ITALY
Software Engineer Jan. 2006 - June 2007
I've worked in National Business Registry division developing a project aimed at renewing the Copernico system which deals with telecommunication files of the Chambers of Commerce. The target was to develop a client/server system for xml database data download in J2EE environment using XML for data exchange and JSP and Javascript technologies for client system. I was renewing the server system too, using EJB 3.0. technologies.

FBK, Fondazione Bruno Kessler, Trento, ITALY
Research Intern Sept. 2004 - Dec. 2005
I worked in collaboration with the Vision Technologies Team developing a project regarding head tracking. I created a real time application to study how to follow the attention focus of a user in a museum. I studied the monitoring of people head position during a round table in a multi-camera environment, examining also the distributed software architecture.

Teaching Experience

NTNU, Department of Computer and Information Science, Trondheim, NORWAY
Teaching Assistant

- Machine Learning (TDT4173) Fall 2017, Fall 2018, Fall 2019, Spring 2019
- Web Intelligence (TDT4215) Fall 2016, Fall 2017, Fall 2018, Fall 2019
- Information Retrieval (TDT4117) Fall 2011, Fall 2012, Fall 2014
- Operating System (TDT4186) Fall 2011, Fall 2012

Attended Courses and School

University of Plymouth, Plymouth, UK

- ***ISSPR** 2010, International Summer School on Pattern Recognition* Sept. 2010

The 8th International Summer School on Pattern Recognition covered the following topics:

- statistical pattern recognition and multivariate statistics
- neural networks and reinforcement learning
- evolutionary computation and optimization
- classification, and data mining
- machine learning systems for real applications

The summer school speakers were ones of the leading international practitioners of pattern recognition technology, with exceptional track record of publishing, book writing and research work.

NTNU, Department of Computer and Information Science, Trondheim, NORWAY

- *Web Intelligence* (PhD Course) Spring 2010
- *Topics in Information Technology* (PhD Course) Spring 2010
- *Advanced Information Retrieval* (PhD Course) Fall 2009
- *Web Mining* (PhD Course) Fall 2009

FBK, Fondazione Bruno Kessler, Trento, ITALY

- VISMAC 2004 *, Machine Vision School* Nov. 2004

Supervised Students

Espen Haugsdal, Main Supervisor, *From September 2019*, *PhD Student*

Sofia Aftab, Co-Supervisor, *From September 2018*, *PhD Student*

Pahn, Johan, *Dual Active Sampling - A batch-mode active learning method*, Supervisor, *2019*, *Master Student*

Wiker, Erik, *Combining Monte Carlo Tree Search with NEAT*, Supervisor, *2019*, *Master Student*

Wang, Magnus Poppe, *Evovlving Knowledge and Structure through Evolution-based Neural Architecture Search*, Supervisor, *2019*, *Master Student*

Foslien, Sondre, *On optimal Ensemble Learning Using the Concept of Diversity and Negative Correlation*, Co-Supervisor, *2019*, *Master Student*

Karlsen, Aksel Lango, *Web session modelling for cluster analysis and RNN based next-interaction prediction*, Main Supervisor, *2019*, *Master Student*

Lie, Borgar Rannem; Kalmar, Alf Niklas Hkonsen, *Deep Reinforcement Learning and Generative Adversarial Networks for Abstractive Text Summarization* , Main Supervisor, *2018*, *Master Student*

Vassy, Bjrnar, *Inter-Session Temporal Modeling in Session-Based Recommendation using Hierarchical Recurrent Neural Networks*, Main Supervisor, *2018*, *Master Student*

Vikanes, Eirik, *Defining Roles in Transaction Networks Using Deep Learning*, Main Supervisor, *2018*, *Master Student*

Kvistad, Andreas Henriksen, *Active One-shot Learning with Memory-Augmented Neural Networks*, Main Supervisor, *2018*, *Master Student*

Lervik, Kristoffer, *Attention Mechanisms in Hierarchical Session-Based Recommendation*, Main Supervisor, *2018*, *Master Student*

Hoxmark, Bjrn; Wilhelmsen, Jrgen, *Domain general Active Learning strategies using inter-sample similarity and Reinforcement Learning*, Main Supervisor, *2018*, *Master Student*

Thorbjrnsen, Per Torgrim Frstrup, *Curriculum Learning for agents in pixel based 3D Environments*, Main Supervisor, *2017*, *Master Student*

Johnsrud, Simen; Christensen, Silje, *Exploring Cells and Context Approaches for RNN Based Conversational Agents*, Main Supervisor, *2017*, *Master Student*

Nylend, Mikkel Sannes, *Data Efficient Deep Reinforcement Learning through Model-Based Intrinsic Motivation*, Main Supervisor, *2017*, *Master Student*

Helgy, Dag Inge; Lund, Markus, *A Continuous Approach to Controllable Text Generation using Generative Adversarial Networks*, Main Supervisor, *2017*, *Master Student*

Skrede, Ole Steinar Lillestl, *Inter-/Intra-session Recurrent Neural Network for Session-based Recommender Systems*, Main Supervisor, *2017*, *Master Student*

Havikbotn, Eivind Tveita, *Tuning Abstractive Summarization Models Towards Increased Novelty*, Main Supervisor, *2017**, *Master Student*

Markussen, Olav Bjrnstad, *Intrinsic Motivation from Distributional Reinforcement Learning*, Main Supervisor, *2017**, *Master Student*

Invited Talks and Other Activities

NAIS Symposium, PC at First NAIS Symposium, *Trondheim*, *May 2019*

AI for Text Summarization, AILab presentation to Sygve Brekke, CEO - Telenor, *Trondheim*, *February 2019*

Reinforcement Learning and GAN for Text Summarization, guest lecture at BRAIN organization at NTNU (BRAIN Talks), *Oslo*, *November 2018*

Introduction to Machine Learning, guest lecture at HIOA ("Research Methods and Data Analysis" Master Course), *Oslo*, *November 2018*

Unsupervised Learning: Make Sense of your (not labelled) data, guest lecture at NTNU Online organization (Fagkveld med KiD: Maskinlring og Big Data), *Trondheim*, *September 2018*

Learn How to Active Learn: Metalearning approaches to (Deep) Active Learning, guest lecture at University of Modena and Reggio Emilia, *Modena, Italy*, *May 2018*

Bias in AI, panelist at Technoport 2018 (Technoport 2018), *Trondheim*, *February 2017*

Introduction to AI, guest lecture at NTNU (IT Seminar for IT avdeling), *Trondheim*, *December 2017*

Introduction to Machine Learning, guest lecture at HIOA ("Research Methods and Data Analysis" Master Course), *Oslo*, *November 2017*

Internet of Things meet ML, guest lecture at HIOA ("IoT" Master Course), *Oslo*, *April 2017*

First Telenor-NTNU AI Lab Hackathon, Organizers and PC of the First Telenor-NTNU AILab Hackathon, *Trondheim*, *17-18 March, 2017*

Geographical Data in R - From Visualization to Analysis, guest lecture at NITH ("Big Data" Master course), *Oslo*, *October 2014*

Geospatial Data and Location-based Search, Big Data Meetup, *Trondheim*, *September 2014*

Exploring Temporal Proximity and Spatial Distribution of Terms in Web-based Search of Event-Related Images, at ACM Conference on Hypertext and Social Media, *Paris*, *May 2013*

Exploratory Analysis on Heterogeneous Tag-Point Patterns for Ranking and Extracting Hot-Spot Related Tags, at 5th ACM SIGSPATIAL International Workshop on Location-Based Social Networks, *Redondo Beach, CA*, *May 2012*

Context-aware image semantic extraction in the social web, at 21st World Wide Web Conference, WWW 2012, *Lyon*, *France*, *April 2012*

NTNU@MediaEval 2011 Social Event Detection Task (SED), at MediaEval 2011 Workshop, *Pisa*, *September 2011*

Event Clusters Detection on Flickr Images using a Suffix-Tree Structure, at IEEE International Symposium on Multimedia, *Taichung*, *December 2010*

Skills

Statistical/Mathematical and Machine Learning tools:
- MATLAB, R, Weka, Pytorch, Keras

IR tools:
- Lucene, Terrier

Computer Programming:
- C, C++, Java, JavaScript, UNIX shell scripting, GNU make, SQL, MySQL

Version Control and Software Configuration Management:
- CVS, SVN

Information/Internet Technology:
- Networking (UDP, TCP, ARP, DNS, Dynamic routing), Services (Apache, SQL, POP, IMAP, SMTP)

Productivity Applications:
- TEX (LATEX, BIBTEX), Vim, most common productivity packages (for Windows, OS X, and Linux platforms)

Operating Systems:
- Microsoft Windows family, Apple OS X, Linux

Language Skills

Italian: mother-tongue
English: fluent in written and spoken
Norwegian: intermediate in written and spoken
Spanish: beginner in spoken

Awards

TILab, Telecom Italia Lab, Torino, ITALY
Winner of TELECOM ITALIA LAB (TLab) competition Applications for mobile terminals in collaboration with the University of Verona. Jan. 2004
The project consisted of the development of a client server system for communication between a mobile terminal (mobile phone) and some household appliances connected by a router. I developed a graphic interface on a mobile terminal through J2ME for the client part, a net among the household appliances for server part and a communication

record XML that permits communication among the appliance. The system has been presented at Tlab seat in Turin and has been followed by a practical demonstration.

Partecipations in Projects

CAIM July 2009 to now

The CAIM (Context-Aware Image Retrieval and Management) project will focus on research and the development of tools for context-aware image management, where image description, query formulation, retrieval from heterogeneous distributed environments, and ranking are designed for using context information. Important application domains are those requiring image capture and multimodal retrieval in mobile environments.

CHIL Sept. 2004 - Dec. 2005

The objective of this project was to create environments in which computers serve humans who focus on interacting with other humans instead of having to attend to and being preoccupied with the machines themselves.

PEACH Sept. 2004 - Dec. 2005

The project objective was that of studying and experimenting with advanced technologies that can enhance cultural heritage appreciation by creating an interactive and personalized guide. The aim was that of developing and using innovative technology to provide an educational and entertaining experience fitted for each individual's background, needs and interests.

Publications

1. Massimiliano Ruocco and Heri Ramampiaro. Event clusters detection on flickr images using a suffix-tree structure. In *2010 IEEE International Symposium on Multimedia*, pages 41–48. IEEE, 2010

2. Symeon Papadopoulos, Christos Zigkolis, Yiannis Kompatsiaris, and Athena Vakali. Certh@ mediaeval 2011 social event detection task. In *MediaEval*, 2011

3. Massimiliano Ruocco. Context-aware image semantic extraction in the social web. In *Proceedings of the 21st International Conference on World Wide Web*, pages 179–184. ACM, 2012

4. Massimiliano Ruocco and Heri Ramampiaro. A scalable algorithm for extraction and clustering of event-related pictures. *Multimedia Tools and Applications*, 70(1):55–88, 2014

5. Massimiliano Ruocco and Heri Ramampiaro. Exploratory analysis on heterogeneous tag-point patterns for ranking and extracting hot-spot related tags. In *Proceedings of the 5th ACM SIGSPATIAL International Workshop on Location-Based Social Networks*, pages 16–23. ACM, 2012

6. Massimiliano Ruocco and Heri Ramampiaro. Exploring temporal proximity and spatial distribution of terms in web-based search of event-related images. In *Proceedings of the 24th ACM Conference on Hypertext and Social Media*, pages 248–252. ACM, 2013

7. Massimiliano Ruocco and Heri Ramampiaro. Event-related image retrieval: exploring geographical and temporal distribution of user tags. *International Journal of Multimedia Information Retrieval*, 2(4):273–288, 2013

8. C. Andreatta P M. Zancanaro R. Brunelli, A. Albertini. Detecting focus of attention. In *PEACH - Intelligent Interfaces for Museum Visits, Cognitive Technologies*, pages 45–70. Springer Berlin Heidelberg, 2007

9. Massimiliano Ruocco and Heri Ramampiaro. Geo-temporal distribution of tag terms for event-related image retrieval. *Information Processing & Management*, 51(1):92–110, 2015

10. Massimiliano Ruocco. *Geo-Temporal Mining and Searching of Events from Web-based Image Collections.* PhD thesis, Norwegian University of Science and Technology, Trondheim, Norway, 2014

11. Massimiliano Ruocco, Ole Steinar Lillestøl Skrede, and Helge Langseth. Inter-session modeling for session-based recommendation. In *Proceedings of the 2nd Workshop on Deep Learning for Recommender Systems*, pages 24–31. ACM, 2017

12. Basant Agarwal, Heri Ramampiaro, Helge Langseth, and Massimiliano Ruocco. A deep network model for paraphrase detection in short text messages. *Information Processing & Management*, 54(6):922–937, 2018

13. Silje Christensen, Simen Johnsrud, Massimiliano Ruocco, and Heri Ramampiaro. Context-aware sequence-to-sequence models for conversational systems. *arXiv preprint arXiv:1805.08455*, 2018

14. Bjørnar Vassøy, Massimiliano Ruocco, Eliezer de Souza da Silva, and Erlend Aune. Time is of the essence: a joint hierarchical rnn and point process model for time and item predictions. In *Proceedings of the Twelfth ACM International Conference on Web Search and Data Mining*, pages 591–599. ACM, 2019

15. Johan Phan, Massimiliano Ruocco, and Francesco Scibilia. Dual active sampling on batch-incremental active learning. *arXiv preprint arXiv:1905.09247*, 2019

16. Andreas Kvistad, Massimiliano Ruocco, Eliezer de Souza da Silva, and Erlend Aune. Augmented memory networks for streaming-based active one-shot learning. *arXiv preprint arXiv:1909.01757*, 2019

References Available to Contact

Prof. Heri Ramampiaro (e-mail: heri@idi.ntnu.no; phone:+47 73591459)
- Associate Professor, Department of Computer and Information Science, Norwegian University of Science and Technology
- ◇ Sem Saelands vei 7-9, NO-7491 Trondheim, Norway
- ⋆ *Prof. Ramampiaro is my PhD supervisor. I was also his Teaching Assistant of the course of Information Retrieval.*

Prof. Svein Erik Bratsberg (e-mail: sveinbra@idi.ntnu.no; phone:+47 73550382)
- Professor, Department of Computer and Information Science, Norwegian University of Science and Technology
- ◇ Sem Saelands vei 7-9, NO-7491 Trondheim, Norway
- ⋆ *I was Teaching Assistant in the Operating System course of Prof. Bratsberg.*

Prof. Andrea Fusiello (e-mail: andrea.fusiello@uniud.it; phone: +39 0432558327)
- Associate Professor, Department of Electronic and Mechanical Engineer University of Udine
- ◇ Via delle Scienze, 208, I-33100 Udine, Italy
- ⋆ *Prof. Fusiello was my MSc Advisor*

Dr. Paul Chippendale (e-mail: chippendale@fbk.eu; phone: +39 0461314513)
- Permanent Researcher, Technologies of Vision Lab Bruno Kessler Foundation - FBK-irst
- ◇ Via Sommarive 18, 38050 Povo, Italy
- ⋆ *Dr. Chippendale was my co-Advisor during MSc Thesis.*

Dr. Stefano Messelodi (e-mail: messelod@fbk.eu; phone: +39 0461314513)
- Permanent Researcher, Technologies of Vision Lab Bruno Kessler Foundation - FBK-irst
- ◇ Via Sommarive 18, 38050 Povo, Italy
- ⋆ *Dr. Messelodi was head of TeV group at FBK during my internship.*