

Dr.-Ing. Mateusz Malinowski

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Objective

Building responsive machines that understand surrounding environment, natural language, human intentions, and can act accordingly.

Positions

2017–now



Research Scientist, *Google DeepMind*, London, U.K.

Description: Working towards holistic machines.

Webpage: mateuszmalinowski.com (Personal)

2011–2016



Research Student, *Max Planck Institute for Informatics*, Saarbrücken, Germany.

Group: Scalable Learning and Perception

Advisor: Dr. Mario Fritz

Description: Built first deep learning architectures that answer questions about images.

Created foundations of Visual Question Answering.

Conducted research on Deep Learning, Spatial Reasoning, and Retrieval.

2010



Research Assistant, *Cluster of Excellence on Multimodal Computing and Interaction*, Saarbrücken, Germany.

Group: Probabilistic Machine Learning and Medical Image Processing

Advisor: Prof. Matthias Seeger

Description: Developed methods that reconstruct MR images from incomplete measurements.

2009–2010



Research Assistant, *Max Planck Institute for Informatics*, Saarbrücken, Germany.

Group: High Dynamic Range Imaging and Perception Issues in Graphics

Advisor: Prof. Karol Myszkowski

Description: Implemented methods that take advantage of human perceptual system.

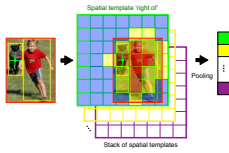
Research Projects [\(Google Scholar profile\)](#)



Towards a Visual Turing Challenge (NIPS, ICCV, ICMR, BMVC, IJCV),

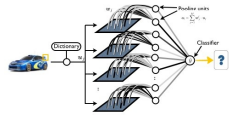
[project page](#).

In this line of research, we build machines that answer questions about the content of images as well as we develop automatic performance metrics that monitor progress on this subjective task. We introduce the first dataset for the visual question answering task with about 1.5k real-world indoor images and 12.5k natural language questions. We also develop and investigate symbolic and neural approaches to handle the task. Both methods are trained only on image-question-answer triples. Moreover, our new performance metrics embrace word ambiguities and many interpretations of a question and a scene in benchmarking different architectures. Most recently, we show a human-like performance of a question answering architecture on a synthetic CLEVR dataset. Various parts of this research are covered in Bloomberg Business, MIT Technology Review, Science, and Two Minute Papers.



Learning Spatial Relations, [project page](#).

This project investigates a data-driven approach to learn spatial representation for image-to-text retrieval. For this purpose we have collected 53 structured queries that augment SUN09 dataset. The method improves over the state-of-the-art on the image-to-text retrieval task, and is very competitive to hand-engineered spatial features.



Learning Smooth Pooling Regions (BMVC), [project page](#).

In this project, we argue for a data-driven approach to learn spatial pooling stage - an important part of the popular recognition architectures. Our formulation enables joint and discriminative training of the spatial pooling operator together with a classifier. The experimental evaluation shows that our approach significantly improves over similar recognition architectures with hand-designed spatial pooling stage.

Education

2011–2017



Doctor of Engineering, *Saarland University*, Saarbrücken, Germany.

Department of Computer Science

Grade: Summa cum laude (with highest honor)

Thesis: Towards Holistic Machines:

From Visual Recognition To Question Answering About Real-World Images

Advisor: Dr. Mario Fritz, Reviewers: Prof. Trevor Darrell, Prof. Manfred Pinkal

2009–2011



Master of Science, Honor's degree, *Saarland University*, Saarbrücken, Germany.

Department of Computer Science

Grade: Excellent, 1.3 in German Scale, 128 ECTS

Thesis: Optimization Algorithms in the Reconstruction of MR Images: A Comparative Study

Advisor: Prof. Matthias Seeger, Reviewer: Prof. Matthias Hein

2008–2009



Erasmus Student, *Saarland University*, Saarbrücken, Germany.

Department of Computer Science

2004–2009



Undergraduate Studies, *University of Wrocław*, Wrocław, Poland.

Department of Computer Science

Talks

2018 **Towards Complex Reasoning**, *AI Congress O2*, London, U.K.

2018 **Towards Holistic Machines**, *University of Cambridge*, Cambridge, U.K.

2017 **Relation Networks on CLEVR**, *Max Planck Institute*, Saarbrücken, Germany.

2016 **Towards a Visual Turing Challenge**, *Microsoft Research*, Cambridge, U.K.

2016 **Towards a Visual Turing Challenge**, *DeepMind*, London, U.K.

2015 **Ask Your Neurons: A Neural-based Approach to Answering Questions about Images**, *ICCV*, Santiago, Chile.

Awards and Scholarships

2017 **Outstanding Reviewer Award**, *CVPR*, Honolulu, Hawaii.

2017 **Summa cum laude**, *Saarland University*, Saarbrücken, Germany.

2011 **Honor's degree in Computer Science**, *Saarland University*, Saarbrücken, Germany.

2010–2011 **International Max Planck Research School Scholarship**, *Saarbrücken*, Germany.

Additional Academic and Working Experience

2015-2016 **Teaching Assistant**, *Deep Learning Seminar*, Max Planck Institute for Informatics, Saarbrücken.

2012-2013 **Teaching Assistant**, *Probabilistic Graphical Models and their Applications*, Max Planck Institute for Informatics, Saarbrücken.

2007 **Programmer**, *Wevo Developer*, University of Wrocław, Wrocław.
Supervisors: Dr. Piotr Wnuk Lipiński, Marcin Brodziak

Academic Services


Advisor I helped in advising the following students

- Ashkan Mokarian. Master's Thesis co-advisor (2016).
Main advisor: Dr. Mario Fritz
Title: Deep Learning for Filling Blanks in Image Captions
- Sreyasi Nag Chowdhury. Master's Thesis co-advisor (2015).
Main advisors: Dr. Andreas Bulling, and Dr. Mario Fritz.
Title: Contextual Media Retrieval Using Natural Language Queries
Now, she is a PhD student in MPI for Informatics

Tutor 2nd Summer School on Integrating Vision and Language: Deep Learning, Malta, 2016

Organizer NIPS Workshop: Visually Grounded Interaction and Language (ViGiL), USA, 2017
Deep Learning Reading Group, Saarbrücken, Germany, 2015

Reviewer Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2016
(Journals) International Journal of Computer Vision (IJCV), 2016, 2017
Journal of Mathematical Imaging and Vision (JMIV), 2013
Information Processing and Management (IPM), 2016
Transactions on Computational Intelligence and AI in Games, 2015
Language and Linguistics Compass, 2015

- Reviewer International Conference on Computer Vision (ICCV), 2017
(Conferences) Conference on Computer Vision and Pattern Recognition (CVPR), 2017, 2018
Neural Information Processing Systems (NIPS), 2016
European Conference on Computer Vision (ECCV), 2016
Asian Conference on Computer Vision (ACCV), 2016
The European Chapter of the ACL (EACL), 2016
International Conference on Pattern Recognition (ICPR), 2016
NIPS Workshop: Visually Grounded Interaction and Language (ViGiL), 2017
- Other BiznesMysli interviewee on Visual Turing Test and AI, 2017. 
IEEE member, 2016, 2017, 2018.
BMVA member, 2014, 2017.
GCPR R3 Session. Saarbrücken, Germany, 2013.
Graduate Summer School: Deep Learning, Feature Learning. IPAM, UCLA, USA, 2012.
Microsoft PhD Summer School. MSR, Cambridge, UK, 2012.

Additional

- Languages Polish (native speaker), English (fluent)
German (basic), Russian (basic)
- Online Courses Startup Engineering, Neural Networks for Machine Learning
(Coursera) Modern & Contemporary American Poetry, Compilers

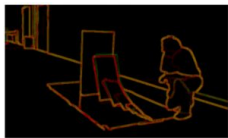
Publications ([📄 Google Scholar profile](#))



Towards a Visual Turing Challenge, [📄 project page](#).

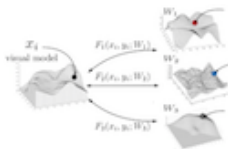
- Mateusz Malinowski, Marcus Rohrbach, and Mario Fritz
Ask Your Neurons: A Deep Learning Approach to Visual Question Answering
International Journal of Computer Vision: Best papers from ICCV'15 (IJCV), 2017 [📄 paper](#)
- Adam Santoro, David Raposo, David G.T. Barrett, Mateusz Malinowski, Razvan Pascanu, Peter Battaglia, Timothy Lillicrap
A Simple Neural Network Module for Relational Reasoning
Neural Information Processing Systems (NIPS, Spotlight), Long Beach, USA, December 04-09, 2017 [📄 paper](#)
- Mateusz Malinowski, and Mario Fritz
Tutorial on Answering Questions about Images with Deep Learning
2nd Summer School on Integrating Vision and Language: Deep Learning, Malta, March 21-24, 2016 [📄 paper](#)
- Ashkan Mokarian, Mateusz Malinowski, and Mario Fritz
Mean Box Pooling: A Rich Image Representation and Output Embedding for the Visual Madlibs Task
British Machine Vision Conference (BMVC), York, UK, September 19-22, 2016 [📄 paper](#)
- Sreyasi Nag Chowdhury, Mateusz Malinowski, Andreas Bulling, and Mario Fritz
Contextual Media Retrieval Using Natural Language Queries
ACM International Conference in Multimedia Retrieval (ICMR), New York, 2016 [📄 paper](#)
- Mateusz Malinowski, Marcus Rohrbach, and Mario Fritz
Ask Your Neurons: A Neural-based Approach to Answering Questions about Images
IEEE International Conference on Computer Vision (ICCV, Oral), Santiago, Chile, December 13-16, 2015 [📄 paper](#)
- Mateusz Malinowski and Mario Fritz
A Multi-World Approach to Question Answering about Real-World Scenes based on Uncertain Input
Neural Information Processing Systems (NIPS), Montreal, CA, December 08-12, 2014 [📄 paper](#)
- Mateusz Malinowski and Mario Fritz
Hard to Cheat: A Turing Test based on Answering Questions about Images
Beyond the Turing Test (AAAI Workshop), Austin, TX, January 25-26, 2015 [📄 paper](#)
- Mateusz Malinowski and Mario Fritz
Towards a Visual Turing Challenge
Learning Semantics (NIPS Workshop), Montreal, CA, December 12, 2014 [📄 paper](#)

Intuitive Physics.

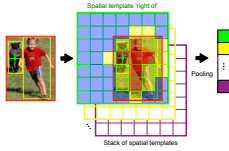


- Apratim Bhattacharyya, Mateusz Malinowski, Bernt Schiele, and Mario Fritz
Long-Term Image Boundary Prediction
Association for the Advancement of Artificial Intelligence (AAAI), February, 2018 [📄 paper](#)
- Apratim Bhattacharyya, Mateusz Malinowski, and Mario Fritz
Long Term Boundary Extrapolation for Deterministic Motion
NIPS Workshop on Intuitive Physics, December, 2016 [📄 paper](#)

Zero-Shot Learning, [📄 project page](#).



- Zeynep Akata, Mateusz Malinowski, Mario Fritz, and Bernt Schiele
Multi-Cue Zero-Shot Learning with Strong Supervision
IEEE Computer Vision and Pattern Recognition (CVPR, Spotlight), June, 2016 [📄 paper](#)



Spatial Relations in Retrieval, [project page](#).

- Mateusz Malinowski and Mario Fritz
A Pooling Approach to Modelling Spatial Relations for Image Retrieval and Annotation
Technical Report, Saarbrücken, Germany, 2014 [paper](#)

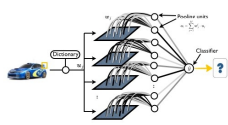


Image Recognition, [project page](#).

- Mateusz Malinowski and Mario Fritz
Learning Smooth Pooling Regions for Visual Recognition
British Machine Vision Conference (BMVC), Bristol, UK, September 09-13, 2013 [paper](#)
- Mateusz Malinowski and Mario Fritz
Learnable Pooling Regions for Image Classification
International Conference on Learning Representations: Workshop Track (ICLR Workshop), Scottsdale, Arizona, USA, May 02-04, 2013 [paper](#)

Compressed Sensing.

- Mateusz Malinowski
Optimization Algorithms in the Reconstruction of MR Images: A Comparative Study
Master's Thesis, Saarbrücken, Germany, 2011 [paper](#)

