Alexander Dockhorn | Curriculum Vitae

adockhorn.github.io/

Education

Otto von Guericke University — **Magdeburg**
PhD, Final Grade: Summa Cum Laude — *2016–2020*

Otto von Guericke University — **Magdeburg**
M.Sc. Computer Science, Final Grade: 1.0 — *2014–2015*

University of Abertay — **Dundee**
Term abroad — *2012–2013*

Otto von Guericke University — **Magdeburg**
B.Sc. Computer Science, Final Grade: 1.2 — *2010–2014*

Working Experience

Queen Mary University, Game AI Research Group — **London**
Postdoc Research Associate — *2020–ongoing*
- Decision-making in Exponentially Growing Decision Spaces
- State and Action Abstractions

Otto von Guericke University Magdeburg, University Bremen and Salzgitter AG — **Salzgitter**
Research Project — *2019*
- Time Series Analysis
- Forecasting Demand

Otto von Guericke University Magdeburg, Faculty Computer Science, CI Group, Supervisor Prof. Dr. Rudolf Kruse — **Magdeburg**
PhD Student, Research and Teaching Associate — *2016-2019*

ISC Gebhardt — **Wolfsburg**
Working Student — *2014*
- Forecasting Demand
- Bayesian Modeling

SAP Innovation Center — **Potsdam**
Bachelor Internship — *2013–2014*
- Medical Data Analysis for Cancer Treatment
- Bayesian Modeling

British Telecom Research — **Ipswich**
Research Internship — *2013*
- Frequent Item Set Mining
- Correlation and Causation Analysis

Publications

Bookchapters

Dockhorn, A., & Kruse, R. (to be published). Balancing Exploration And Exploitation in Forward Model Learning. In V. Sgurev, V. Jotsov and J. Kacprzyk (Eds.), Advances in Intelligent Systems Research and Innovation. Elsevier.

Dockhorn, A., Saxton, C., & Kruse, R. (2020). Association Rule Mining for Unknown Video Games. In M.-J. Lesot and C. Marsala and (Eds.), Fuzzy Approaches for Soft Computing and Approximate Reasoning: Theories and Applications, (pp. 257-270). Studies in Fuzziness and Soft Computing, Springer Cham.

Journal Papers

Dockhorn, A., & Kruse, R. (2020). Predicting Cards Using a Fuzzy Multiset Clustering of Decks. *International Journal of Computational Intelligence Systems*, 13(1), (pp. 1207-1217). Atlantis Press

Apeldoorn, D.,& **Dockhorn, A.** (2020). Exception-Tolerant Hierarchical Knowledge Bases for Forward Model Learning. *IEEE Transactions on Games*, (pp. 1-14).

Held, P., **Dockhorn, A.**, & Kruse, R. (2015). On Merging and Dividing Social Graphs. *Journal of Artificial Intelligence and Soft Computing Research*, 5(1), (pp. 23–49).

Conference Papers

Dockhorn, A., & Kruse, R. (2020). Forward Model Learning for Motion Control Tasks. *Proceedings of the IEEE Intelligent Systems IS'20*, (pp. 1-5). IEEE.

Dockhorn, A., & Lucas, S. (2020). Local Forward Model Learning for GVGAI Games. In: *Proceedings of the 2020 IEEE Conference on Games*. (pp. 1-8). IEEE.

Dockhorn, A., Lucas, S. M., Volz, V., Bravi, I., Gaina, R. D., & Perez-Liebana, D. (2019). Learning Local Forward Models on Unforgiving Games. *In: Proceedings of the 2019 IEEE Conference on Games* (pp. 1–4). IEEE.

Lucas, S. M., **Dockhorn, A.**, Volz, V., Bamford, C., Gaina, R. D., Bravi, I., Perez-Liebana, D., Mostaghim, S., & Kruse, R. (2019). A Local Approach to Forward Model Learning: Results on the Game of Life Game. *In: Proceedings of the 2019 IEEE Conference on Games*, 1–8. IEEE

Dockhorn, A., Schwensfeier, T., & Kruse, R. (2019). Fuzzy Multiset Clustering for Metagame Analysis. *In Proceedings of the 2019 Conference of the International Fuzzy Systems Association and the European Society for Fuzzy Logic and Technology (EUSFLAT 2019)*, (pp. 1-8). Paris, France: Atlantis Press.

Dockhorn, A., Tippelt, T., & Kruse, R. (2018). Model Decomposition for Forward Model Approximation. *In 2018 IEEE Symposium Series on Computational Intelligence* (pp. 1751–1757). IEEE.

Dockhorn, A., & Apeldoorn, D. (2018). Forward Model Approximation for General Video Game Learning. *In Proceedings of the 2018 IEEE Conference on Computational Intelligence and Games* (pp. 425–432). IEEE.

Dockhorn, A., Frick, M., Akkaya, Ü., & Kruse, R. (2018). Predicting Opponent Moves for Improving Hearthstone AI. *In 17th International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems*, IPMU 2018 (pp. 621–632). Springer International Publishing.

Sabsch, T., Braune, C., **Dockhorn, A.**, & Kruse, R. (2017). Using a Multiobjective Genetic Algorithm for Curve Approximation. *In 2017 IEEE Symposium Series on Computational Intelligence*, (pp. 1-6). IEEE.

Dockhorn, A., & Kruse, R. (2017). Combining cooperative and adversarial coevolution in the context of pac-man. *In 2017 IEEE Conference on Computational Intelligence and Games*, CIG 2017 (pp. 60–67). IEEE.

Dockhorn, A., Doell, C., Hewelt, M., & Kruse, R. (2017). A decision heuristic for Monte Carlo tree search doppelkopf agents. *In 2017 IEEE Symposium Series on Computational Intelligence* (pp. 1–8). IEEE.

Dockhorn, A., Braune, C., & Kruse, R. (2016). Variable density based clustering. *In 2016 IEEE Symposium Series on Computational Intelligence* (pp. 1–8). IEEE.

Dockhorn, A., Braune, C., & Kruse, R. (2015). An Alternating Optimization Approach based on Hierarchical Adaptations of DBSCAN. *In 2015 IEEE Symposium Series on Computational Intelligence* (pp. 749–755). IEEE.

Held, P., **Dockhorn, A.**, Krause, B., & Kruse, R. (2015). Clustering Social Networks Using Competing Ant Hives. *In 2015 Second European Network Intelligence Conference* (pp. 67–74). IEEE.

Held, P., **Dockhorn, A.**, & Kruse, R. (2014). On Merging and Dividing of Barabasi-Albert-graphs. *In 2014 IEEE Symposium on Evolving and Autonomous Learning Systems* (Vol. 444, pp. 17–24).

Held, P., **Dockhorn, A.**, & Kruse, R. (2014). Generating Events for Dynamic Social Network Simulations. *15th International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems*, IPMU 2014. Communications in Computer and Information Science, vol 443 (pp. 46-56). Springer, Cham

Workshop Papers

Dockhorn, A., Jeurissen, D., Hurtado, J, & Pérez-Liébana, D. (2020). STRATEGA - A General Strategy Games Framework. In *Artificial Intelligence for Strategy Games Decision, AIIDE 2020 Workshop*, (pp. 1-7). AAAI

Gaina, R., Balla, M., **Dockhorn, A.**, Montolio, R., & Pérez-Liébana, D. (2020). TAG - Tabletop Games Framework. In *Experimental AI in Games (EXAG), AIIDE 2020 Workshop*, (pp. 1-7). AAAI

Dockhorn, A., & Kruse, (2018). Detecting Sensor Dependencies for Building Complementary Model Ensembles. *In Proceedings. 28. Workshop Computational Intelligence*, Dortmund, 29.-30. November 2018 (pp. 217–234).

Preprint Papers

Perez-Liebana, D, **Dockhorn, A.**, Hurtado Grueso, J., & Jeurissen D. (2020). The Design Of "Stratega": A General Strategy Games Framework, (pp. 1–7). `https://arxiv.org/abs/2009.05643`

Gaina, R. D., Balla, M., **Dockhorn**, A., Montoliu, R., & Perez-Liebana D. (2020). Design and Implementation of TAG: A Tabletop Games Framework, (pp. 1–24). `https://arxiv.org/abs/2009.12065`

Dockhorn, A., & Mostaghim, S. (2019). Introducing the Hearthstone-AI Competition, (pp. 1–4). `http://arxiv.org/abs/1906.04238`

Theses and Dissertation

Dockhorn, A. (2020). Dissertation: Prediction-based Search for Autonomous Game-Playing, (pp. 1–231). Otto von Guericke University of Magdeburg.

Dockhorn, A. (2015). Master Thesis: Hierarchical Extensions and Cluster Validation Techniques for DBSCAN, (pp. 1–101). Otto von Guericke University of Magdeburg.

Dockhorn, A. (2014). Bachelor Thesis: Computergestützte Analyse onkologischer Daten mithilfe Graphischer Modelle, (pp. 1–80). Otto von Guericke University of Magdeburg.

Talks and Presentations

Keynote — Predictive Search: Algorithms and Applications — **Zagreb (online)**
International Symposium on Signal and Image Processing (ISSIP) — *2020*

Plenary Lecture — Forward Model Learning for Motion Control Tasks — **Varna (online)**
IEEE Intelligent Systems (IS) — *2020*

STRATEGA - A General Strategy Games Framework — **Worcester (online)**
AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE) — *2020*

Local Forward Model Learning for GVGAI Games — **Osaka (online)**
IEEE Conference on Games (COG) — *2020*

Fuzzy Multiset Clustering for Metagame Analysis — **Prague**
11th Conference of the European Society for Fuzzy Logic and Technology (EUSFLAT) — *2019*

Learning Local Forward Models on Unforgiving Games — **London**
2019 IEEE Conference on Games (COG) — *2019*

Generalisation of Simulation-Based Search for Autonomous Gameplaying — **QMUL London**
Invited Talk - Game AI Research Group — *2019*

Generalisation of Simulation-Based Search for Autonomous Gameplaying — **OVGU Magdeburg**
Doktorandentag der Fakultät für Informatik — *2019*

Detecting Sensor Dependencies for Building Complementary Model Ensembles — **Dortmund**
28. Workshop Computational Intelligence — *2018*

Forward Model Approximation for General Video Game Learning — **Maastricht**
Conference on Computational Intelligence and Games (CIG) — *2018*

Predicting Opponent Moves for Improving Hearthstone AI — **Cádiz**
International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems (IPMU) — *2018*

A decision heuristic for Monte Carlo tree search doppelkopf agents — **Hawaii**
2016 IEEE Symposium Series on Computational Intelligence (SSCI) — *2017*

Using a Multiobjective Genetic Algorithm for Curve Approximation — **Hawaii**
2016 IEEE Symposium Series on Computational Intelligence (SSCI) — *2017*

Combining cooperative and adversarial coevolution in the context of pac-man — **New York**
Conference on Computational Intelligence and Games (CIG) — *2017*

Variable density based clustering — **Athen**
2016 IEEE Symposium Series on Computational Intelligence (SSCI) — *2016*

An Alternating Optimization Approach based on Hierarchical Adaptations of DBSCAN — **Cape Town**
2015 IEEE Symposium Series on Computational Intelligence (SSCI) — *2015*

Generating Events for Dynamic Social Network Simulations — **Montpellier**
2014 International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems (IPMU) — *2015*

Awards and Honours

Best Paper Award
IEEE Intelligent Systems 2020 for the paper *2020*
"Forward Model Learning for Motion Control Tasks"

Best Dissertation Award
Department of Computer Science at the Otto von Guericke University *2019/20*

Distinguished Student Paper
EUSFLAT 2019 for the paper *2019*
"Fuzzy Multiset Clustering for Metagame Analysis"

Best Presentation Award
Doctoral Symposium at the Otto von Guericke University *2018/2019*

Nominee for the "Otto von Guericke Teaching Award" 2018
Otto von Guericke University *2018*

Runner-Up Teaching Award "Held der Lehre" for the seminar "Classification Algorithms"
Students council of the Department for Computer Science *2017/2018*

Runner-Up Teaching Award "Held der Lehre" for the tutorial on "Intelligente Systeme"
Students council of the Department for Computer Science *2015/2016*

Best Computer Science Master Graduate
Department of Computer Science at the Otto von Guericke University *2015/2016*

Grants and Sponsored Research Activities

Scholarship
"Graduiertenförderung des Landes Sachsen-Anhalt" *2016 – 2018*

Commitment

IEEE Computational Intelligence Society
Member of the IEEE CIS Member Activities Committee *since 2021*
Chair of the IEEE CIS Competition Sub-Committee *since 2020*
Member of the IEEE CIS Education Committee *since 2020*
Member of the IEEE CIS Games Technical Committee *since 2020*
Vice-Chair of the IEEE CIS Competition Sub-Committee *2017-2019*

Otto von Guericke University, Faculty of Computer Science
Member of the Research Commission *2016-2019*

Student Game Developer Club - Acagamics e.V.
Head of Teaching *2017-2018*
Head of Industry *2016-2017*

Faculty Student Council, Otto von Guericke University, Faculty of Computer Science
Organizer of several events *2013-2015*

Special Session and Competition Organization

IEEE Conference on Games (COG)
Organizer of the General Strategy Game AI Competition *2021*
Submitted Proposal for a Tutorial on General Strategy Game AI *2021*

IEEE Congress on Evolutionary Computation (CEC) &
Genetic and Evolutionary Computation Conference (GECCO)
Organizer of the AbstractSwarm Multi-Agent Logistics Competition *2021*

IEEE Congress on Evolutionary Computation (CEC)
Organizer of the Special Session on Games *2021*

IEEE Conference on Games (COG; former IEEE CIG)
Organizer of the Hearthstone AI Competition *2018-2020*

IEEE Conference on Games (COG; former IEEE CIG)
Organizer of the Short Video Competition *2019-2020*

Reviewer Activities

Journals

- IEEE Transactions on Games (TOC)
- IEEE Transactions on Artificial Intelligence (TAI)
- ACM Computing Surveys
- MDPI Sensors
- KI - Künstliche Intelligenz
- Elsevier Information Sciences
- International Journal of Neural Systems (IJNS)

Programme Committee Member

- The Genetic and Evolutionary Computation Conference (GECCO) 2021
- IEEE Conference on Games (COG) 2020, 2019
- AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE) 2020

Conference Reviewer

- IEEE Conference on Computational Intelligence in Games (CIG) 2018
- IEEE Symposium Series on Computational Intelligence (SSCI) 2020, 2016
- The Genetic and Evolutionary Computation Conference (GECCO) 2020
- Conference of the European Society for Fuzzy Logic and Technology (Eusflat) 2019
- International Conference on Artificial Intelligence and Soft Computing (ICAISC) 2019
- Conference on Hybrid Intelligent Systems (HIS) 2018
- Conference on Theory and Practice of Natural Computing (TPNC) 2018
- International Symposium on Intelligent Data Analysis (IDA) 2017, 2016
- Australasian Joint Conference on Artificial Intelligence (AI) 2016
- IEEE Intelligent Systems (IS) 2016

Attended Seminars

In order to learn new teaching methods and to develop personally, I regularly attend training seminars at Queen Mary University London. Recently visited courses include:

- Finding Research Funding, including small grants and travel funds
- Interactivity in asynchronous teaching and learning
- Building the UK Women into Computer Science Experience
- Intro to Project Management

Teaching Activities

Appointed Lecturer of the *Computational Intelligence* working group

Computational Intelligence in Games	*SS 2018*

Teaching Assistant of the *Computational Intelligence* working group

Fuzzy Systems	*SS 2019*
Bayes Networks	WS 2019/2020 WS 2018/2019 WS 2017/2018 WS 2015/2016
Computational Intelligence in Games	*SS 2019* *SS 2017*
Neural Networks	*SS 2018* *SS 2015*
Seminar Classification Algorithms	*WS 2017/2018*
Intelligente Systeme	*WS 2015/2016* *WS 2014/2015*
Einführung in die Informatik	*WS 2011/2012*

(Co-)Supervised Theses

2020

Neural Network-based Adaption of Rapidly Exploring Random Trees for Motion Planning — **Master Thesis**, *2020*
Maximilian Kühn

2019

DeePolation: AI-based interpolation on multi-dimensional spherical sensors — **Master Thesis**, *2019*
Martin Zettwitz

Clustering of Longitudinal Disease Progression Data — **Master Thesis**, *2019*
Aditya Nemali

Evolutionäre Agenten-Generierung für HearthStone — **Bachelor Thesis**, *2019*
Bastian Heinrich

Schaffung von Modellierungsansätzen zur Interaktionsvorhersage unbekannter Spiele — **Master Thesis**, *2019*
Tim Tippelt

Multivariate Time Series Sensor Data Clustering — **Master Thesis**, *2019*
Sourabh Dandage

Prediction of Player Moves in Collectible Card Games — **Master Thesis**, *2019*
Tony Schwensfeier

2018

Multikriterielle Wegfindung für Agentengruppen — **Bachelor Thesis**, *2018*
Maurice Hoffmeister

Classification of Differently Trained Larvae based on Changes in their Trajectories using Artificial Neural Networks — **Bachelor Thesis**, *2018*
Jonathan Spiegel

Robust and Transferable Reflectance Reconstruction Using Deep Neural Networks — **Master Thesis**, *2018*
Cornelius Styp von Rekowski

Regression Analysis for Power Consumption of a Production Plant — **Master Thesis**, *2018*
Sujan Adhikari

Ermitteln der Siegbedingung unbekannter Spiele durch Assoziationsanalyse — **Bachelor Thesis**, *2018*
Chris Saxton

Optimising All-Shortest-Path Dictionaries using Machine Learning — **Master Thesis**, *2018*
Jannis Becke

Designing an Interface between Data System and Root Cause Evaluation to enhance analysis strategy utilizing a larger Database for Tire Design, Manufacturing and Evaluation Process — **Master Thesis**, *2018*
Pankaj Narula

2017

Entscheidungsheuristische Erweiterung des UCT-Algorithmus für Doppelkopf — **Master Thesis**, *2017*
Matthias Hewellt

Kursverlaufvorhersage von Wertpapieren mit Hilfe von Ensemble Classification — **Bachelor Thesis**, *2017*
Leopold Ryll