Julian Busch

I'm a PhD student in computer science at the Database Systems and Data Mining (DBS) group at LMU Munich, working on various topics in machine learning. My research focuses on learning representations of complex data, including graphs and high-dimensional data.

My areas of expertise include, but are not limited to, machine learning, deep learning, data mining, data science, artificial intelligence, big data management and analytics, and algorithm design.

I have 5+ years of research experience and 2+ years of experience working in industry and with industrial partners.

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Education

04/2016 – 04/2021 (expected)

Dr. rer. nat. (PhD) Computer Science
LMU Munich, Munich, Germany
Supervisor: Prof. Dr. Thomas Seidl

10/2013 – 03/2016

M.Sc. Computer Science
RWTH Aachen University, Aachen, Germany
Minor: Mathematics
Thesis supervisor: Prof. Dr. Thomas Seidl
GPA: 3.9/4.0 (German grading system: 1.30)

10/2009 – 09/2013

B.Sc. Computer Science
University of Hamburg, Hamburg, Germany
Minor: Applied Bioinformatics
Thesis supervisor: Prof. Dr. Ulrike von Luxburg
GPA: 4.0/4.0 (German grading system: 1.12)
Awarded as best bachelor graduate

Experience

04/2016 - present

LMU Munich - Research Assistant
Database Systems and Data Mining Group
Munich, Germany

04/2019 - 09/2019

Siemens Corporate Technology - Research Intern
Research Group for Big Data and AI Technology for Business Analytics and Monitoring
Princeton, NJ, USA

11/2018 – 12/2018

George Mason University - Visiting Scholar
Department of Geography and Geoinformation Science
Fairfax, VA, USA

05/2015 – 02/2016

RWTH Aachen University - Student Research Assistant
Data Management and Data Exploration Group
Aachen, Germany

12/2010 – 03/2011

University of Hamburg - Student Teaching Assistant
Discrete Mathematics Group
Hamburg, Germany

Industry Projects

Third-party funded research projects at LMU Munich.

03/2018 – 09/2018

Explanation of Classification Results on Multivariate Time Series by Convolutional Neural Networks
Siemens AG

09/2017 – 02/2018

Data-driven Methods for Pre-Ignition Cause Analysis
IAV Automotive Engineering GmbH

Supervised external master theses at LMU Munich.

07/2020 – 01/2021

Federated ClusterGAN: Latent Space Clustering on Decentralized Datasets
Rohde & Schwarz GmbH & Co. KG

Publications

NF-GNN: Network Flow Graph Neural Networks for Malware Detection and Classification
Julian Busch, Anton Kocheturov, Volker Tresp, and Thomas Seidl
(under submission)
[pdf]

Learning Self-Expression Metrics for Scalable and Inductive Subspace Clustering
Julian Busch, Evgeniy Faerman, Matthias Schubert, and Thomas Seidl
NeurIPS 2020 Workshop: Self-Supervised Learning - Theory and Practice
[pdf] [poster] [code]

Ada-LLD: Adaptive Node Similarity for Node Classification Using Multi- Scale Local Label Distributions
Evgeniy Faerman, Felix Borutta, *Julian Busch*, and Matthias Schubert
2020 IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT'20)
Best Student Paper Award
[pdf]

Grace – Limiting the Number of Grid Cells for Clustering High-Dimensional Data
Anna Beer, Daniyal Kazempour, *Julian Busch*, Alexander Tekles, and Thomas Seidl
2020 Conference on Learning, Knowledge, Data, and Analysis (LWDA'20)
[pdf]

PushNet: Efficient and Adaptive Neural Message Passing
Julian Busch, Jiaxing Pi, and Thomas Seidl
24th European Conference on Artificial Intelligence (ECAI'20)
[pdf] [slides] [talk] [code]

Structural Graph Representations based on Multiscale Local Network Topologies
Felix Borutta, *Julian Busch*, Evgeniy Faerman, Adina Klink, and Matthias Schubert
2019 IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT'19)
[pdf]

Semi-Supervised Learning on Graphs Based on Local Label Distributions
Evgeniy Faerman, Felix Borutta, *Julian Busch*, and Matthias Schubert
14th International Workshop on Mining and Learning with Graphs at ACM SIGKDD 2018 (MLG'18)
[pdf]

Towards Learning Structural Node Embeddings using Personalized PageRank
Felix Borutta, *Julian Busch*, Evgeniy Faerman, and Matthias Schubert
2017 Conference on Learning, Knowledge, Data, and Analysis (LWDA'17)
[pdf]

Teaching Experience

Teaching assistance at LMU Munich.

Algorithm Design (Elite master's program Data Science)
Lecture
Winter 2019

Big Data Management and Analytics
Lecture
Winter 2017

Innovation Lab Big Data Science
Practical
Summer 2017

Knowledge Discovery in Databases I
Lecture
Summer 2016, Winter 2018

Knowledge Discovery in Databases II
Lecture
Summer 2020

Machine Learning
Lecture
Summer 2018

Recent Developments in Data Science
Seminar
Winter 2016, Summer 2017

Software Development Lab
Practical
Summer 2016, Winter 2016, Winter 2020

Supervised Theses

Bachelor and master thesis supervision at LMU Munich.

ongoing

Neural Hough Transform for Subspace Clustering
Master Thesis

Generalized Neighborhood Aggregation for Graph Neural Networks
Bachelor thesis

2020

Federated ClusterGAN: Latent Space Clustering on Decentralized Datasets
Master thesis

2019

Neural End-To-End Subspace Clustering
Master thesis

Spatio-Temporal Link Prediction
Bachelor thesis

Inductive Subspace Clustering
Master thesis

2018

Recommendations on Dynamic Heterogeneous Networks with Metapath-RNNs
Master thesis

Deep Conformance Checking
Bachelor thesis

Graph Classification
Bachelor thesis

2017

Dynamically Adapting Vertex Embeddings
Bachelor thesis

2016

Visualizing High-Dimensional Data with t-SNE
Bachelor Thesis

Accelerating Minimax Hierarchical Clustering
Bachelor Thesis

Academic Service

External reviews for academic conferences, journals and workshops.

- **CIKM** 2017, 2020
- **DAMI** 2021
- **DSAA** 2018
- **ECIR** 2021
- **ECML-PKDD** 2017, 2019, 2020
- **EDBT** 2018
- **ICDE** 2018
- **IDEA** 2016
- **KDD** 2019, 2020
- **Pattern Recognition** 2020

Selected Skills

Languages
C, C++, CSS, HTML, Java, Latex, Markdown, Matlab, Python, R, SQL

Frameworks
Bokeh, Keras, MLflow, Matplotlib, NetworkX, Numba, NumPy, Pandas, PyTorch, PyTorch Geometric, Scikit-Learn, SciPy, Seaborn, Spark, Tensorflow

Tools
Docker, Git, Linux, Slurm

Soft Skills
Certificate of advanced training in self-management, leadership and teaching skills awarded by the LMU Center for Leadership and People Management

Natural Languages
German (native), English (proficiency), Latin (Latinum), Mandarin (beginner), French (beginner)