Moataz Abdelaal

RESEARCH SCIENTIST (HE/HIM)

VISUALIZATION RESEARCH CENTER (VISUS)

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📍 Stuttgart, Germany
🗛 Arabic (Native), English (Professional),
Deutsch (Intermediate)

SHORT BIO

I am a research scientist at the Visualization Research Center (VISUS) at the University of Stuttgart, Germany. During my PhD, I designed scalable techniques for visualizing dynamic networks and built visualization tools to aid architects in exploring design possibilities. I utilized various technology stacks, including D3.js-JavaScript, C#-WPF, Java-Servlets, and, more recently, TypeScript-Vue.js. In the past, I have worked professionally as a Java and .NET developer. When I'm not working, I enjoy traveling, hiking, watching movies, and playing sports.

EDUCATION

🎓 MSc in Computer Science, 2017
University of Stuttgart, Germany
Grade: **1.8** (1.0 is the best possible)

🎓 BSc in Software Engineering, 2010
Helwan University, Egypt
Grade: **3.8** (4.0 is the best possible)

INTERESTS

🔖 Visualization
🔖 Network Visualization
🔖 Empirical User Evaluation
🔖 Visualization Tools

EXPERIENCE

FEBRUARY 2018 – PRESENT
RESEARCH SCIENTIST, VISUALIZATION RESEARCH CENTER (VISUS), UNIVERSITY OF STUTTGART, GERMANY
Conducting scientific research in the field of data visualization, particularly focusing on designing, developing, and evaluating techniques for network visualization and building interactive tools to support architects exploring the design space within the cluster of excellence (IntCDC). See the research projects below.

AUGUST 2022 – NOVEMBER 2022
VISITING SCHOLAR, VISUALIZATION DESIGN LAB (VDL), UNIVERSITY OF UTAH, USA
Developing novel techniques to facilitate the detection of patterns in genealogies and geographies datasets.
✗ Vue.js, D3.js

MARCH 2017 – SEPTEMBER 2017
.NET WEB DEVELOPER (PART-TIME), STORESERVER, STUTTGART, GERMANY
Optimizing the performance of the company's web-based e-commerce system.
✗ ASP.NET, C#, HTML, JavaScript, SQL Server 2012

SEPTEMBER 2011 – APRIL 2015
TEACHING ASSISTANT, HELWAN UNIVERSITY, HELWAN, EGYPT
In addition to tutoring, developing and maintaining the computer science faculty's learning management system (LMS). ✗ PHP, MySQL

JANUARY 2011 – MARCH 2012
JAVA WEB DEVELOPER, HARF, CAIRO, EGYPT
Developing and maintaining the company's LMS (Tadarus).
✗ JAVA, Servlets and JSP, SQL Server 2005

RESEARCH PROJECTS

COMPARATIVE EVALUATION OF NETWORK VISUALIZATIONS

Quantitative evaluation of different network visualization techniques with special focus on bipartite graph layout. One main outcome of this project is the comparative evaluation we conducted to compare the performance of node-link diagrams, adjacency matrices, and bipartite layouts across five different analysis tasks in crowdsourced setup (N=150). Read more.

Abdelaal, Moataz, Nathan D. Schiele, Katrin Angerbauer, Kuno Kurzhals, Michael Sedlmair, and Daniel Weiskopf. "Comparative evaluation of bipartite, node-link, and matrix-based network representations." IEEE Transactions on Visualization and Computer Graphics 29, no. 1 (2022): 896-906.

R, D3.js, HTML, JavaScript (vanilla), jsPsych, PHP, MySQL

VISUALIZATION TOOLS FOR ARCHITECTS

Building visualization tools to support architects in shaping our future built world. This project entails identifying user needs and requirements, developing visualization prototypes to meet these needs, and subsequently evaluating these prototypes with architects. One of the main highlights of this project was the development of a visualization framework tailored to explore fitness landscapes within the context of architectural design optimization. Read more.

Abdelaal, Moataz, Marcel Galuschka, Max Benjamin Zorn, Fabian Kannenberg, Achim Menges, Thomas Wortmann, Daniel Weiskopf and Kuno Kurzhals. "Visual Analysis of Fitness Landscapes in Architectural Design Optimization." The Visual Computer, 2024, Springer (conditionally accepeted).

Abdelaal, Moataz, Felix Amtsberg, Michael Becher, Rebeca Duque Estrada, Fabian Kannenberg, Aimée Sousa Calepso, Hans Jakob Wagner et al. "Visualization for architecture, engineering, and construction: Shaping the future of our built world." IEEE Computer Graphics and Applications 42, no. 2 (2022): 10-20.

WPF, C#, Rhino/Grasshopper

VISUALIZATION TECHNIQUES FOR (DYNAMIC) NETWORKS

Developing techniques for visualizing dynamic networks. In this project, we extended the state of the art by developing two alternative representations (stacking and striping) for dynamic networks based on bipartite graph layout. Read more.

Abdelaal, Moataz, Antoine Lhuillier, Marcel Hlawatsch, and Daniel Weiskopf. "Time-aligned edge plots for dynamic graph visualization." In 2020 24th International Conference Information Visualisation (IV), pp. 248-257. IEEE, 2020.

Abdelaal, Moataz, Marcel Hlawatsch, Michael Burch, and Daniel Weiskopf. "Clustering for Stacked Edge Splatting." In VMV, pp. 127-134. 2018.

JAVA, Servlets, HTML, JavaScript (vanilla), D3.js, SVG, Canvas

TUTORING

- Information Visualization, University of Stuttgart, Germany
- Scientific Visualization, University of Stuttgart, Germany
- Theoretical Foundations of Visual Computing, University of Stuttgart, Germany
- Seminar on Visualization of Graphs and Networks, University of Stuttgart, Germany
- Image Synthesis, University of Stuttgart, Germany