Bachelor's Thesis / Research Internship (Forschungspraxis) / Research Assistant (HiWi)
Visualization of information about digital transformation using dynamic network graphs (joint project between TUM and bidt)

Background

The *Bavarian Research Institute for Digital Transformation (bidt)* and Prof. Dr. Alexander Pretschner from *Technical University of Munich* are developing a "knowledge map" ("Wissenslandkarte") of the digital transformation. It is intended to present and explain information about different phenomena of digital transformation, with a focus on the relations and mechanisms between these phenomena.

Articles on essential digital phenomena (e.g. "Augmented Reality", "Cyber Crime", "Nudging") are already accessible on the website of bidt (https://www.bidt.digital/glossar/). Those will be represented as nodes in the visualization to be developed. Further phenomena, which are related to those nodes, will be represented between these nodes as edges.

We already developed a draft visualization as a dynamic force directed graph with D3.js. It currently includes:

- Color-coding of nodes (indicating that they belong to a certain domain)
- Highlighting of edges and nodes (the corresponding subcluster) when hovering over them
- Clickable nodes, with forwarding function to articles on the bidt website
- Possibility to drag nodes where the user wants, dynamic rearrangement of graph afterwards
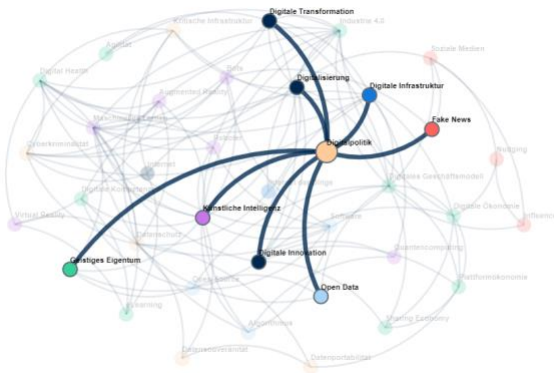
Current version of the network graph with content
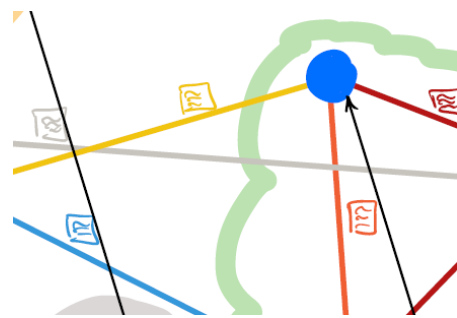
Sketch of several, colored edges

Goals of this work

We want to take our first visualization to the next level and extend its functionality, both concerning the presentation of content (especially content on the edges) and ways of how users can interact with the visualization. The "knowledge map" is supposed to address a broad audience, be easily accessible, usable and interactive. We want to implement the following features:

- Clickable edges, with forwarding to website articles
- Showing basic information of the phenomenon when hovering over an edge (pop-up)
- Finding a way to implement several phenomena on one edge

- Filter functions for nodes and edges
- Zoom functionality (some edges might only be visible at a certain zoom level)
- Usability, the graph should be clear and easy to use
- Commentary function for visitors of the website

We are looking for a person who not only works off given specifications but who is also interested in participating in our conceptual process – contributing own ideas on how content could be displayed, how alternative visualizations could look like etc.

It is also important for us to have a clear separation and proper interaction between backend (data) and frontend (visualization). For this purpose, suitable data structures have to be defined and tools set up that enable continuous maintenance, adjustment and enhancement.

Requirements

- Reliable knowledge and experience in working with JavaScript and ideally D3.js or similar visualization libraries
- Preferably knowledge in the conception and maintenance of data structures, as well as in the use of suitable software tools
- Interest in digital transformation and in working in an interdisciplinary environment
- Motivation to actively participate and contribute own ideas to a dynamic project which is still under development – frank and frequent communication is important
- Understand German at least on a basic level, since both the content of the "knowledge map" as well as our team discussions are held in German

Application

Please apply via email (michael.stehling@bidt.digital) with your CV, grade report, a short motivation, why you are interested in this topic and your preferred timeline.

Contact

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