



Brief profiles

AI TOOLS IN SPATIAL PLANNING

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Introduction

The following brief profiles present a selection of digital tools relating to artificial intelligence (AI) that may be relevant to the study, research and practice of spatial planning. The aim of this overview is to provide an initial orientation to the different types of AI tools and to highlight potential areas of application in planning and teaching.

The selection includes both general AI tools – such as large language models for text processing or generative image models – and specialised applications for research, participatory processes or knowledge management. Some of the tools presented have been developed specifically for planning tasks, whilst others originate from related fields such as research, communication or design and can be adapted for use in planning processes.

Each brief profile describes four aspects: a brief functional description of the tool, possible applications in spatial planning, potential for university teaching, and basic information on costs and access requirements. The aim of this overview is not to provide a comprehensive evaluation of the tools, but rather to offer guidance and encourage further testing.

When using AI tools in planning and research, it is essential to bear in mind that the content generated must be critically examined. AI systems may contain errors, biases or incomplete information. Furthermore, issues relating to data protection, transparency and responsible use play an important role, particularly where sensitive data or real-world planning processes are involved. It should be noted that, particularly in the case of basic versions without a subscription, user inputs are usually used as training data.

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Structure

To help classify the various functions of the tools more effectively, they are grouped according to their primary area of application.

1. KNOWLEDGE WORK, RESEARCH AND TEXT PROCESSING

- LLMs (Large Language Models: e.g. ChatGPT, Claude, Gemini, Campus AI)
- Perplexity
- Elicit
- NotebookLM

These tools are particularly useful for research, text processing and handling large volumes of information.

2. DATA ANALYSIS AND EVALUATION

- MAXQDA AI Assist

The focus here is on supporting academic analysis processes, such as in qualitative research.

3. COMMUNICATION, DOCUMENTATION AND PARTICIPATION

- Otter.ai
- Demos Plan

These applications support communication, the documentation of processes or digital participation formats.

4. VISUALIZATION AND SCENARIO DEVELOPMENT

- Midjourney
- Stable Diffusion
- UrbanistAI
- Adobe Firefly

The focus here is on generative image models and visualization tools that can be used for design and communication processes.

5. GEOINFORMATION SYSTEMS

- GIS Copilot
- GeoGPT

This category includes AI tools for geographic information systems that support spatial analysis, the processing of geodata, and GIS workflows.

6. DIGITAL LEARNING RESOURCES

- EdX

This platform is an example of AI-driven or AI-supported digital learning environments.

This structure is intended to make it easier to navigate the collection of tools. However, many applications can also be assigned to more than one category, as AI tools are becoming increasingly versatile.

LLMs (Large Language Models)

i *Beispiele:*
ChatGPT, Claude, Gemini, Mistral

The services offered by TU Dortmund University provide better protection for your personal data: Campus AI (based on ChatGPT) and ChatAI via the Academic Cloud (10 LLMs).

Access and further information at
<https://www.tu-dortmund.de/studierende/im-studium/moodle-e-learning>

1. BRIEF DESCRIPTION

Large Language Models (LLMs) are AI systems that have been trained on large volumes of text and are capable of understanding and generating natural language. They can answer questions, compose or revise texts, structure information and summarize complex content.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

LLMs can assist with text- and knowledge-intensive tasks, such as analyzing planning documents, researching specialist topics, or drafting reports, concepts and texts for public consultation processes.

3. POTENTIAL FOR TEACHING

Students can use LLMs to structure topics, summarize texts or develop initial drafts for synopses and presentations. At the same time, these tools are suitable for reflecting on the critical use of AI-generated content.

4. COSTS/ACCESS REQUIREMENTS

Many providers offer free basic versions as well as paid subscriptions with an extended range of features (e.g. around 20 USD per month).

Perplexity (LLM)

 www.perplexity.ai

1. BRIEF DESCRIPTION

Perplexity is an AI-based research assistant that works in a similar way to other large language models. A query is entered as a prompt in a chat. What sets it apart is that Perplexity searches online for sources and provides direct links to them.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

See LLMs

3. POTENTIAL FOR TEACHING

See LLMs

4. COSTS/ACCESS REQUIREMENTS

The basic version is free but has limited functionality. Perplexity Pro offers access to more powerful models and a higher number of queries per day (approx. 20 USD per month).

Literature review: Elicit

 www.tha.de/Elicit.html

A *Alternatives/similar tools: Consensus, Keenious, ResearchRabbit, Semantic Scholar*

1. BRIEF DESCRIPTION

Elicit is an AI-powered research assistant designed for literature searches and summarizing the current state of research. To carry out a search, a research question is entered. The programme searches academic databases for relevant publications, suggests citations and allows the sources to be exported to bibliographic databases.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool can help users familiarize themselves with a new topic, gain a quick overview of the state of the art, and identify whether a research question has already been addressed or where potential research gaps exist

3. POTENTIAL FOR TEACHING

The tool is suitable for independent literature research as part of seminars, student projects and dissertations, and can provide valuable support and help speed up the process. It is important to note that it does not completely replace one's own reading and reflection on relevant passages.

4. COSTS/ACCESS REQUIREMENTS

An account must be created to use the tool. A limited free version is available. Extended access currently costs around 7 USD per month (Plus) or 29 USD per month (Pro).

NotebookLM

 www.notebook.google.com

1. BRIEF DESCRIPTION

NotebookLM is an AI-powered research and analysis tool from Google. Users can upload their own documents – such as PDF-files, web pages or presentations – and have them summarized automatically or ask specific questions about them.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool is particularly well-suited for working with extensive collections of documents, such as planning concepts, expert reports or academic literature.

3. POTENTIAL FOR TEACHING

Students can analyze and summarize seminar texts or project materials. Lecturers can organize larger collections of material or prepare discussions.

4. COSTS/ACCESS REQUIREMENTS

The tool is web-based and requires a Google account. A basic version is currently available free of charge.

Qualitative data analysis: MAXQDA AI Assist

A Alternatives/similar tools:
NVivo, ATLAS.ti

1. BRIEF DESCRIPTION

MAXQDA AI Assist is an integrated AI assistant within the MAXQDA software that speeds up qualitative data analysis. Features include:

- Summaries of uncoded data
- Summaries of coded segments
- Suggestions for codes and subcodes
- Automatic coding based on code definitions
- Chat with documents or coded segments

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool is particularly suitable for qualitative research, such as the analysis of interview transcripts, documents or contributions from public participation processes.

3. POTENTIAL FOR TEACHING

MAXQDA is particularly well-suited to research projects and student dissertations involving qualitative data analysis. The AI functions can support the analysis but do not replace the researcher's own interpretation of the content.

4. COSTS/ACCESS REQUIREMENTS

A paid licence is required for MAXQDA. Lecturers can apply for time-limited, free access for students for their courses.

The basic version allows limited use of AI (AI Assist Free). The AI Assist Premium upgrade costs around €132 per year.

Otter.ai

 www.otter.ai

1. BRIEF DESCRIPTION

Otter.ai is an AI-powered meeting assistant that transcribes speech in real time and automatically generates notes and summaries.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

Otter.ai can support planners in documenting meetings, workshops or participatory events and simplify routine tasks such as drafting minutes.

3. POTENTIAL FOR TEACHING

In teaching, the tool can document lectures, interviews or discussions and make follow-up work easier. Transcripts can also be used for qualitative analysis or reflection on planning processes.

4. COSTS/ACCESS REQUIREMENTS

A basic version is available free of charge. Advanced versions ('Pro', 'Business') cost around 8–20 USD per month per user.

Demos Plan

 www.demos-deutschland.de

1. BRIEF DESCRIPTION

Demos Plan is a digital platform for public participation processes in regional planning, sectoral planning and urban land-use planning. AI functions help to structure and analyze large volumes of public participation contributions.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool can cluster, sort by theme and prioritize comments. This gives planners a quicker overview of key points of conflict.

3. POTENTIAL FOR TEACHING

Demos Plan can be used to analyze or simulate public participation processes. Students can gain an understanding of how digital participation platforms work and what opportunities and risks AI presents in democratic planning processes.

4. COSTS/ACCESS REQUIREMENTS

No specific pricing details are published on the website. Access is generally provided via institutional licenses.

Midjourney

 www.midjourney.com

1. BRIEF DESCRIPTION

Midjourney is an AI-powered image generation tool that automatically creates images from text inputs. It is primarily used to create illustrations and concept visualizations.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool can be used to visualize potential cityscapes, open-space designs or alternative development visions, and to quickly compare different options.

3. POTENTIAL FOR TEACHING

Students can use Midjourney to visualize design ideas or future scenarios. At the same time, it provides an opportunity to discuss the role of visual representations in planning processes.

4. COSTS/ACCESS REQUIREMENTS

Midjourney is available via a subscription model. Prices start at around 10 USD per month.

Stable Diffusion

 www.stablediffusionweb.com

1. BRIEF DESCRIPTION

Stable Diffusion is a text-to-image model. Images are automatically generated from short descriptions; furthermore, image content can be modified or supplemented.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool can be used to visualize design ideas or future scenarios, such as for atmospheric studies of urban spaces or initial cityscape concepts

3. POTENTIAL FOR TEACHING

Stable Diffusion can provide students with an experimental approach to visualizing planning ideas and stimulate discussions about the role of images in planning processes.

4. COSTS/ACCESS REQUIREMENTS

Free use with limited credits is available. Advanced features are offered via paid subscriptions (approx. 10–20 USD per month).

UrbanistAI

 <https://urbanistai.com>

1. BRIEF DESCRIPTION

UrbanistAI is an AI-powered visualization tool for urban and spatial planning. Users can upload photos of real locations and modify them using generative AI to illustrate alternative design or land-use scenarios.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool is particularly well-suited to visualizing potential changes in urban spaces, such as through greening, traffic calming or new land uses.

3. POTENTIAL FOR TEACHING

UrbanistAI can be used in project-based teaching modules to develop and discuss alternative design scenarios for real-world locations.

4. COSTS/ACCESS REQUIREMENTS

Access is granted upon registration; specific prices are only disclosed to a limited extent and are usually tied to institutional use.

Adobe Firefly

1. BRIEF DESCRIPTION

Adobe Firefly is an AI-powered application for creating and editing images based on text inputs (prompts). The tool also enables the generative expansion, addition or removal of image content and is directly integrated into Adobe applications such as Photoshop and Adobe Express.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool is suitable for visualizing planning and design ideas, as well as for editing and refining photographs, renderings and conceptual sketches.

3. POTENTIAL FOR TEACHING

Firefly can be used in teaching modules for the creation and editing of visualizations and supports students in the clear presentation and communication of design ideas.

4. COSTS/ACCESS REQUIREMENTS

Access is via an Adobe account. Free use with a limited range of functions is available; a paid Adobe subscription is required for advanced features.

GIS Copilot

1. BRIEF DESCRIPTION

GIS Copilot is an AI-powered assistant for geographic information systems (GIS) that provides support for spatial analysis, geoprocessing workflows and the creation of Python scripts and GIS queries.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool is suitable for assisting with the processing and analysis of geodata, as well as for the development and automation of GIS workflows.

3. POTENTIAL FOR TEACHING

GIS Copilot can be used in GIS courses to explain methods, prepare analyzes and create programme code for practical exercises.

4. COSTS/ACCESS REQUIREMENTS

Depending on the version, compatible GIS software and access to a language model may be required. Details regarding costs and the licensing model vary.

GeoGPT

1. BRIEF DESCRIPTION

GeoGPT is an AI-powered assistant for geographic information systems (GIS), remote sensing and spatial analysis. The tool provides support with technical queries, GIS workflows and the creation of Python scripts.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The tool is suitable for developing analytical concepts, selecting appropriate GIS methods and supporting spatial analysis.

3. POTENTIAL FOR TEACHING

GeoGPT can support students in learning the basics of GIS, preparing for practical exercises and working on project assignments.

4. COSTS/ACCESS REQUIREMENTS

GeoGPT is available free of charge via a web browser. Depending on the provider, registration or usage restrictions may apply.

Learning platform: EdX

 <https://www.edx.org>

1. BRIEF DESCRIPTION

EdX is a learning platform through which students and learners can take online self-study courses and obtain certificates. The content is developed both by universities – including renowned institutions such as ETH Zurich and Harvard – and by companies (including Google and IBM). The courses are predominantly designed to last several weeks. There are also Bachelor's and Master's programmes available as online degrees, though not yet for planning-related degree programmes.

The learning platform itself is not AI-based. However, an AI chatbot has been integrated: the Xpert AI Learning Assistant. The chatbot acts as a tutor and assistant and can provide technical support, explain complex concepts, summarise learning materials, test knowledge, translate content and suggest further resources.

2. POSSIBLE APPLICATIONS IN SPATIAL PLANNING

The platform is aimed at continuing professional development – both alongside work and whilst studying. Participants can deepen their knowledge in online courses and obtain certificates.

The range of topics on offer is very broad. There are already relevant courses covering topics related to spatial planning, for example under the search term

'sustainable development'. The search term 'urban' yields 180 results, of which 148 are in English and none are in German (as of March 2026).

Example: the course 'Co-creating Sustainable Cities' (TU Delft & Wageningen).

A *Alternatives/similar tools:*
Coursera – also offers courses on urban planning topics

3. POTENTIAL FOR TEACHING

Lecturers can integrate individual components of a self-developed Massive Open Online Course (MOOC) – or even an entire MOOC – into their teaching programme free of charge. If the faculty develops digital learning modules, these could be used for its own students as well as made available worldwide.

4. COSTS/ACCESS REQUIREMENTS

Open-source courses via Open edX can be used free of charge, but must be self-hosted.

Many courses can be viewed free of charge; certificates are subject to a fee. The course 'Co-Creating Sustainable Cities', for example, costs 139 USD.

The AI-based chatbot is only available for courses that have been unlocked via payment.