IdP Project Proposal – Summer Semester 2017
Digitalisation and 3D-Visualisation of Land Use Plans

Background and Aim

3D Modelling of Urban Structures has advanced rapidly during the last decades. While digital 3D models of cities were considered new 25 years ago, they are now common tools in both private and public urban planning offices. Services like Google Earth have made urban 3D models accessible also for a wide non-technical audience and even enabled users to contribute to the models.

But while we already have excellent 3D datasets of existing built structures at the moment, architecture and urban planning still lack digital geolocated data on the legally and physically possible built environment.

During the last decade, many European cities experienced a strong “trend back to the urban centres”, a reverse or at least counterbalancing of the suburbanisation of the 1960s-1990s with more people looking for an urban lifestyle. Living space in cities is scarce, especially in Munich, and urban planners need better tools and visualisations of the available building space to create more homes.

For this, a (3D) model of a city that shows the difference between the actually built city and the current legally allowed construction would be of great help as a first step. Later, the tool could be extended to identify densification potentials beyond the current legal environment. Planners and architects could then identify under-used spaces, approach landowners and incentivise them to build. This would also help to make our cities more sustainable, through an improved use of public facilities and increased urban density.

Task and Potential Outcomes

The task of the course is to redevelop a semi-automatic, potentially cloud-based tool that automatically digitalises and geolocalises zoning plans.
Zoning plans (“Bebauungspläne”) are the main instrument in Germany to determine admissibility of construction for each plot of land. They are bylaws decided upon by the municipalities. The degree to which municipalities digitalise their zoning plans, and make them accessible via the internet, varies greatly, however. Some zoning plans are more than 50 years old and only accessible in printed form. From May 2017 on, all municipalities are legally obliged to publish their zoning plans online.

Thus, students should think of ways how these formalised plans, especially the raster images, could be transformed to digital geocoded information in an automated way, similar to the way OCR works with texts. A GML-based language standard for zoning plans called XPlanung has been developed in the past, but its application in practice is weak so far. Still, XPlanung could be a target format of the conversion tool.
A group of Informatics students has worked on the challenge before, using plans from the city of Garching, and has created a basic, functioning application. While this application can already handle regular zoning plans, it still needs upgrading to deal with numerous exceptions and specialties that can occur when digitalising the plans.

**Outlook**

Primarily, Garching should continue to serve as a case study first, but the developed tool will be useful for all zoning plans in Germany, since their layout and signage is harmonised nationwide. A long-term possibility would be the adoption for other countries as well. Besides the research output, the data generated could potentially be highly valuable, for example to online real estate brokers like ImmobilienScout.

The proposal is suitable for single students or work groups of up to five people. The associated lecture courses ensure that students acquire a general understanding of the German building laws and regulations.

**Relations**

This project proposal complements a tool developed by the chair of Architecture Informatics at the department of Architecture, “Urban Strategy Playground”. The tool is able to visualise construction potentials, but still lacks systematic information on legal building limits. More Information can be found at https://www.ai.ar.tum.de/forschung/usp-urban-strategy-playground/.

An overview of the zoning plans in Munich with access to all individual plans can be found at http://maps.muenchen.de/plan/bebauungsplan.