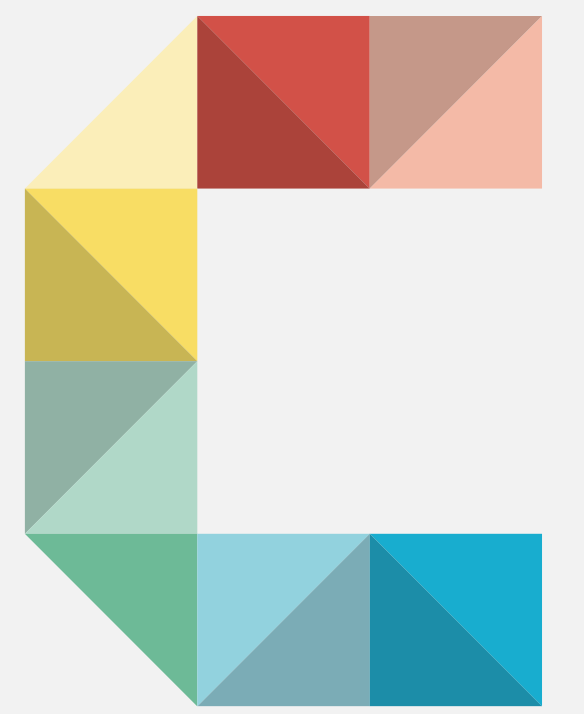


# Munich Marvel: Experience Olympiapark – 3D Printed Model with Augmented Reality Enhancements



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Step into the future with "Munich Marvel: Experience Olympiapark." Our project combines a meticulously crafted 3D printed model of Munich's Olympiapark with the uncharted possibilities of augmented reality (AR) enhancements.

Explore the Olympiapark in stunning 3D, then unlock a world of digital overlays and interactive features through AR. This innovative blend of digital craftsmanship and cutting-edge technology offers a unique and immersive exploration of Olympiapark, fostering curiosity, appreciation, and learning.



Fig. 1. The general view of the 3D-printed model of Olympiapark

## FROM CONCEPT TO REALITY

The process of crafting the map and designing the AR overlay meant the usage of many different software and tools. Most essential key points of our workflow were in the order:

1. Spatial data acquisition, orthophoto imagery and digital elevation models for the Olympiapark. Data have been acquired from the OpenData Bavarian portal.
2. The generation of a 3D DEM representation using BlenderGIS. Carving paths in the park using orthophoto data.
3. The creation of 3D models of buildings in Blender, using reference images. Integrating the geometries into a suitable file for 3D printing.
4. Using 3D printing software (Ultimaker Cura and Prusa Slicer) for fixing erroneous geometries, generation of the final files for the 3D printers.
5. Printing the model in MakerSpace, using Ultimaker S5 printers.
6. Hand-painting the model, with regards to the land use in the specific area.
7. Designing AR overlay using MyWebAR application. The pop-up cards have been designed in Canva.
8. Tests of the AR recognition, based on scanning the QR codes scattered around the model.

## PROJECT OVERVIEW

Our model represents the area of an approximately 1375 m by 855 m slice of the Olympiapark area. The print itself has dimensions of 694 mm by 432 mm, which results in a scale of 1:1978.

Sharply raised geometry over the terrain symbolizes paths and is painted dark gray. 3D - imprinted are the most significant landmarks such as the Olympic Tower or the Olympic Stadium as well as several sports facilities such as tennis courts or Werner von Linde Halle.

The model has an AR overlay, based on the MyWebAR engine. The AR layer displays cards featuring information about selected landmarks from the Olympiapark.

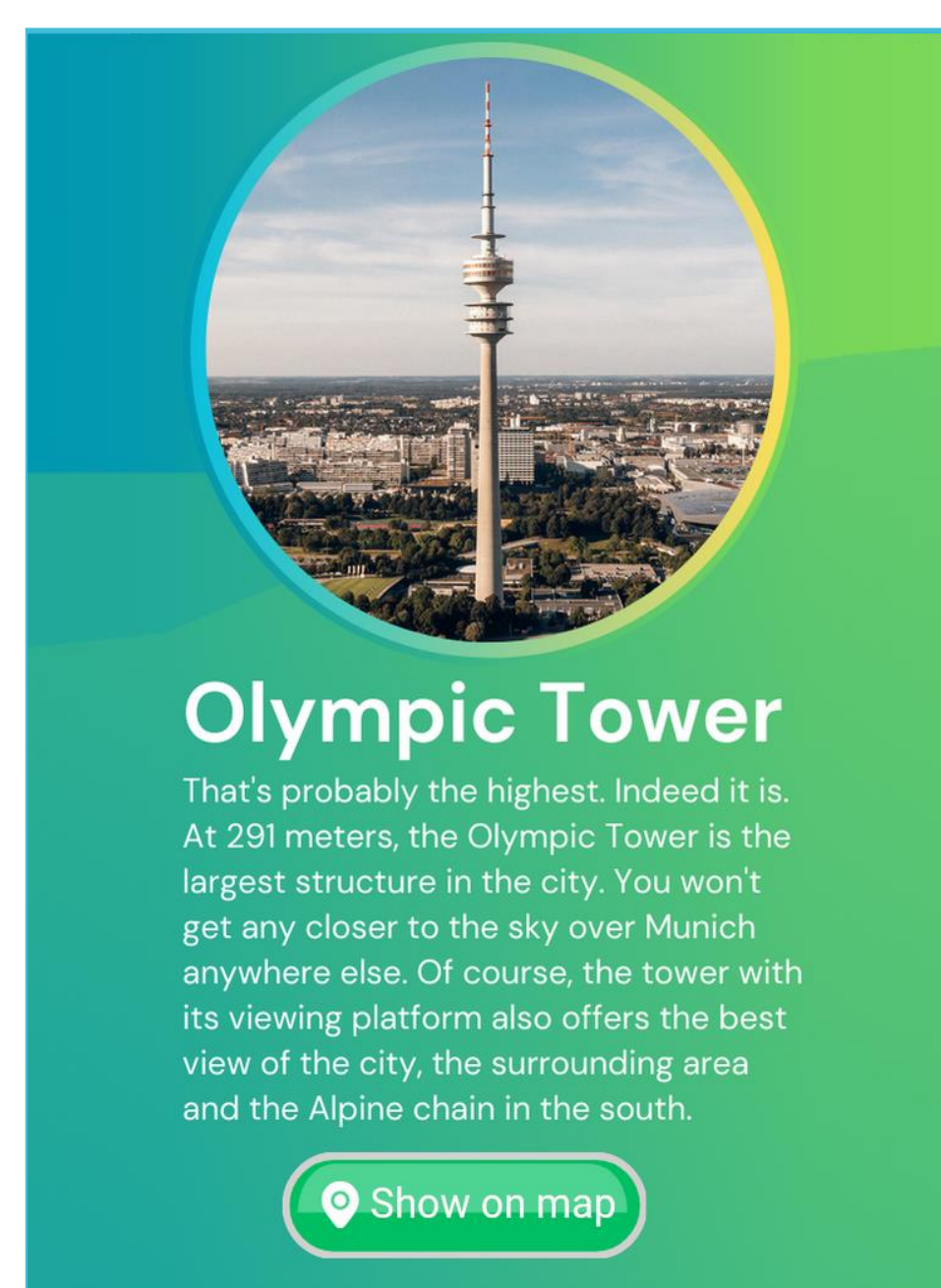


Fig. 2. An AR information overlay card

## HOW TO INTERACT

You can find QR codes throughout the model. In order to access the AR overlay, scan one of those with your phone and then follow the instructions on the screen.

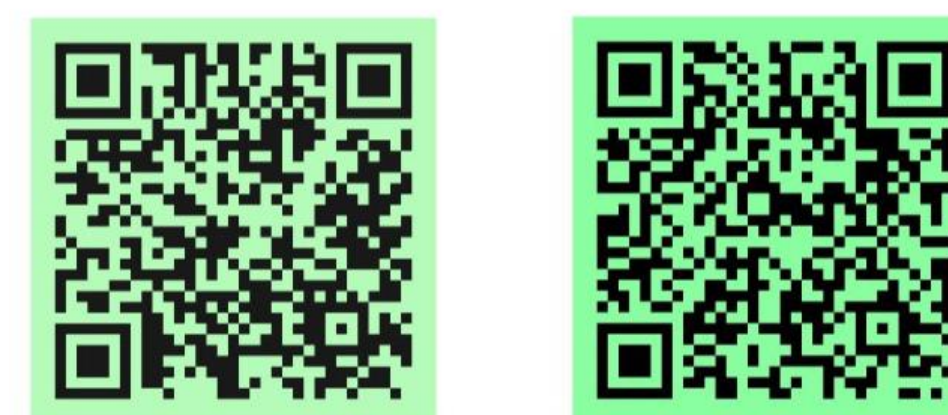


Fig. 3. Example QR codes from the model

Due to software limitations only five such objects have been chosen to feature digital information. These are:

1. Olympic Tower
2. Olympic Stadium
3. Olympic Hall
4. Sea Life
5. The Mountain

## CONCLUSIONS

Our project is a successful integration of the geodata input into 3D printing with additional and informative AR layer. Despite the software limitations, prospects for the extension of the virtual information layer exists. Hence, the model can be displayed, used interactively and prospectively become an even more sophisticated way of discovering wonders of the Olympiapark in Munich.

## IMPRINT

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## KEYWORDS

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