Using interactive StoryMaps for presenting the work of an 18th century architect

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Abstract:

More and more knowledge is being transported through the ever-growing digital world. Physical visits to libraries and archives are becoming less important and many topics are forgotten. This is also the case with the work of the great architect Balthasar Neumann (1687 – 1753). He created buildings that are still part of world architecture today. His masterpiece, the residence in Würzburg, has been declared a World Heritage Site. We took up this aspect and developed a web application for Würzburg, in which Neumann's construction activity was brought into a spatial context with interactive maps.

For the implementation of these applications, we used Esri's ArcGIS platform. The desktop app ArcGIS Pro was used for editing, georeferencing, and the creation and preparation of layers. Overall, 12 layers were created for five different maps that were hosted on ArcGIS Online (see Figure 1). The entire application consists of a nesting of individual web maps, web apps and StoryMaps on the ArcGIS Online platform.

In the following, particular attention is paid to the processing and presentation of the five map applications.

Figure 1. Excerpts from the five different maps of the web application

In the first application (Historical Map), a plan developed by Balthasar Neumann, which is considered the first city map of Würzburg, can be compared with a current aerial view. To create this application, the historical map had to be georeferenced using ArcGIS Pro and a 1:10,000 scale base map. The georeferencing was calculated using 15 connecting points, which mostly represent corners of churches or city walls, and a third order polynomial transformation. Subsequently, the two maps were inserted into a StoryMap using the design element "Swipe."

Figure 2. Map section with pop-up

The second map application, "City tour", features Balthasar Neumann's buildings, culinary breaks and three possible city tours. To create this application, several steps had to be taken. First, the building surrounds had to be extracted from OpenStreetMap and attributed. In the application, the user can click pop-ups with attributes (e.g. name, description, address) for the individual buildings. In addition to the polygons, which are displayed according to scale, the buildings are also represented by point symbols with a corresponding icon to simplify operation. The break opportunities (point-shaped) are categorized according to the types of cafe, wine and food. We digitized three city tours, between which the user can choose. The location of the users is tracked during the individual tours to provide users with suitable information based on their location.

In order to show the chronology of the construction activities, in a further application the buildings are represented in different colours according to their condition (under construction – blue / finished – red). To create a time-dependent representation, clear spatio-temporal values are required. Therefore, 770 unique combinations had to be generated for the 22 buildings in Neumann's 35 years of activity. Practically explained: One data set was created for each building every year. This was done using an Excel datasheet and features from ArcGIS Pro. After the transfer to a web map, an app was generated in which the years run automatically.

To show the course of the historical water supply, we first georeferenced an old paper plan. In a next step, pipes, springs, wells and the water tower were manually digitized and colored. This map was then embedded in a StoryMap, in which further information about the supply can be found.

In the last map application, the nearest culinary break options are displayed via the user's location. For this purpose, locations of cafes, restaurants and typical wine bars were digitized and supplemented with attributes. These values can also be retrieved via pop-ups. After transferring the map to an app, the users can find the next opportunity to take a break based on their locations and a specified distance.

With this feature, further information about the buildings, and an appealing design, we invite visitors to take an entertaining city tour in the footsteps of Balthasar Neumann in Würzburg with this application.

Due the availability of world-wide base maps and configurable web application templates, the method presented in this paper can easily be transferred to historical city tours in different cities all over the world.

The complete web application is available at the following link: https://arcg.is/1uOaL9