Embedding interactive maps derived from OpenStreetMap data into EPUB 3 based ebooks

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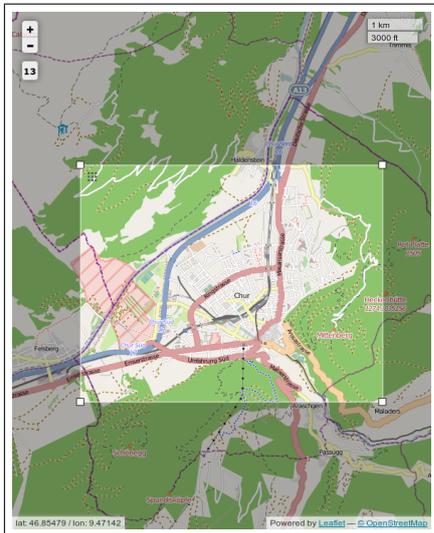Figure 1: Settings panel of the producer tool

Figure 2: Map panel of the producer tool

EPUB 3 is the widely accepted, relatively new standard for enhanced ebooks, which contain interactive elements such as quizzes or dynamic graphics. EPUB 3 documents consist of HTML files, which are packed in a single ZIP file along with different types of metadata. Optionally, CSS, JavaScipt, SVG and MathML code may be contained as well.

OpenStreetMap (OSM) is a freely available global database of crowdsourced geographical data, e.g. roads and buildings. Data can be downloaded free of charge and distributed to anyone. It is provided in raw form (key-value pairs with coordinates) or as small parts of a rendered map called *tiles*. In this thesis only the latter form was used.

In this thesis a JavaScript based software was implemented to support authors and publishers of enhanced ebooks in equipping their publications with interactive maps based on OSM data.

The software supports producers by downloading tiles of a desired region. The region can be set either by entering coordinates (Figure 1) or by using a graphical selector (Figure 2). Tiles are rendered by the OpenStreetMap project's own servers and downloaded using XMLHttpRequests. To provide easy access to the tiles, a JavaScript library (JSZip) packs the files in a ZIP archive. The archive is then made available through a link, which points to a Blob URL (a special kind of URL that points to data in the web browsers memory and not to a web server). The map tiles are accompanied by appropriate metadata (EPUB manifest entries). This metadata is necessary to inform an EPUB reading system about which files are contained in an ebook. The downloaded tiles are integrated in the EPUB archive as single PNG images by the producer and can be navigated with the aid of the Leaflet library.

To determine the needs and wants of users of maps in ebooks, a survey was developed and performed. One of the most requested enhancements was having the possibility to display the current position, which was successfully implemented using the Geolocation API.