

Extended Poster Abstract: Open Source Solution for Massive Map Sheet Georeferencing Tasks for Digital Archiving

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1 Introduction

Scanned maps need to be georeferenced, to be useful in a GIS environment for data extraction (vectorization), web publishing or spatially-aware archiving. Widely used software solutions with georeferencing functionality are designed to suit a universal scenario for georeferencing many different kinds of data sources. Such general nature also makes them very time-consuming for georeferencing a large number of map sheets to a known grid. This work presents an alternative scenario for georeferencing large numbers of map sheets in a time-efficient manner and implements the approach as the MapSheetAutoGeoRef plug-in for the freely available open source Quantum GIS [1].

2 Alternative Map Sheet Georeferencing Scenario

For automating the map sheet georeferencing process several requirements have to be met. A grid reference data for the respective map series available in a vector data format is required. This data source has to contain an attribute field with map sheet names in a form that can be matched with the scanned raster file names. Coordinates for spatially referencing each map sheet raster are extracted from this source and matched with the pixel positions of the four corners representing the actual map frame in the original scan, a process known as calibration. The pixel positions in the original map sheet rasters have to be identified by a human operator. Aside from setting up the working session, this is the only step that requires operator action.

To identify the map frame corners in the original raster, the user has to click on them using the program interface. All zooming between the corners and loading of the scanned map files is an automated and a highly customizable process. After all of the corner pixel positions have been identified, the program starts the raster registration process, which assigns spatial reference system and coordinate information to the map sheet rasters. The registration process does not change the original raster – it only

writes the georeferencing information into the image header. The resulting files are written in the GeoTIFF open standard raster file format [2].

The strength of this approach lies in universality. It is suitable for spatially referencing many different types of map series, irrespective of their visual style, framing, physical state of the material, image acquisition artifacts or the target coordinate reference system, making this approach highly suitable for digital archiving. While it is possible to automate the corner recognition process with machine vision methods, such a solution is specific to certain visual characteristics of the targeted map series and therefore dependent on further customized software development [3].

3 Conclusion

The MapSheetAutoGeoRef plug-in automates most of the steps in the georeferencing process and is currently being extended to provide additional functionality such as warping, resampling the map sheet rasters to versions with fixed cell size, masking map sheet margins and mosaicking the resulting rasters into a single large mosaic. This would permit a single workflow to produce geospatial data product suitable for on-line publishing through WMS [4].

The results indicate significant time savings for the process, allowing for possibly thousands of map sheets to be georeferenced in a person day. This work should greatly extend the georeferencing capacity of small teams working towards digital map archiving, data acquisition from legacy materials or map publishing in an electronic form.

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References

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