

Spherical Photography and Equirectangular Projection

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Abstract

Panoramic images have increasingly interesting applications and they are extensively used for cultural heritage documentation and virtual 3D environments. Moreover, 3D model visualization in virtual reality has been recognized as an efficient, fast, and easy way of representing a variety of objects worldwide for present-day users, who have stringent requirements and high expectations.

The presentation focuses on equirectangular projection of panoramic images. It is shown that such images are produced in a special type of cylindrical projection known from the theory of map projections as simple cylindrical projection or Plate Carée projection. The reason of using that projection is in the simplest form of its equations. Furthermore, we remind that simple cylindrical projection is equidistant along meridians, but not equal-area nor conformal. It is shown that the form of the image of a great circle on the sphere will be a sinusoid in the plane of projection, as well as in the panoramic image.

The application of panoramic photography is illustrated by several examples. These are an overview of water supply facilities as part of the water supply network records, revision of utility fee calculation with the help of panoramic photos from the aircraft, dynamic display and marking of damage to facilities, determination of building height, 360Theo web application for viewing panoramic photos and measuring vertical and horizontal directions, obtaining point clouds based on panoramic photos from a quick walk around a room.

Keywords: spherical photography, panorama, equirectangular projection