

RESEARCH ARTICLE

Study on the Application of Incline Photogrammetry in Rural Real Estate Surveying and Mapping

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Abstract: Tilt photogrammetry is a new technology developed in the field of international Photogrammetry in recent years. Through advanced positioning, modeling and fusion technology, it can generate real three-dimensional model of urban features, so as to obtain high-precision texture information. Because tilt photogrammetry technology has the characteristics of high authenticity, high efficiency and fast access to spatial data. Therefore, it is widely used in homeland security, emergency command, urban management and other industries. This paper mainly introduces and discusses the application of tilt Photogrammetry in rural real estate mapping.

Keywords: Oblique photography; Rural real estate; Surveying and mapping; Application

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1. The Composition of Tilt Photogrammetry Technology

Tilt photogrammetry technology is mainly composed of three parts: POS system, flight vehicle and tilt camera. Among them, POS system refers to the aerial camera, which corresponds to each group of exposed images and uses X, Y, Z, O, P, K and other external azimuth information to describe the flight attitude during the shooting in real time. The flight vehicle refers to carrying the tilting aerial camera to complete the aerial photographing of the flight path. The tilting camera is divided into three, five and ten parts to collect ground image information through synchronous exposure^[1].

2. Application of Tilt Photogrammetry Technology in Surveying and Mapping of Rural Real Estate

2.1 Image Acquisition of Rural Real Estate

Real property registration in the country, in this rural real estate have room, large size and complicated internal crisscross keep out wait for a characteristic, if use the traditional measuring method (RTK + total station) field measurements, can make the workers along with the increase of the field work of surveying and mapping work

efficiency will be very low, and oblique photography by 5 sensors pick up flying in a unified platform, The images were collected from four oblique angles and one vertical Angle. Then, in the process of taking photos, the navigation height, heading, coordinates, speed and lateral overlap parameters were recorded together. Meanwhile, the oblique image data were sorted out and analyzed, so as to shoot several groups of overlapping images. In this way, the workload of surveying and mapping workers is greatly reduced, and the rural housing structure can be easily analyzed. Oblique photogrammetry technology is based on the traditional measurement technology, equipped with four different angles of the lens, namely through five different angles of the surface data all-round synchronous acquisition^[2].

2.2 Rural Real Estate Layout Image Control Point

Tilt photogrammetry as the main part of the setting control points, and as the locus of control of the precision of the layout of the late empty three encryption and 3 d model has a certain influence, so in the process of layout as the locus of control, want to combine the features of the region, topography, route design, etc., and then every 400 meters setting like a locus of control, setting a total of 19 as control points.

3. To Build a Three-dimensional Model of Rural Real Estate

(1) Establish a THREE-DIMENSIONAL model. Three key aspects are mainly involved in the establishment of 3d model of this area by oblique photography. First, image preprocessing; Second, automatic space-three encryption, through three-dimensional mapping technology, the evenly distributed image control points in the area to match the elevation and plane coordinates; Third, intensive matching, matching the same feature point on multiple images, and then carefully calculating the spatial transformation model between images, and establishing a flow chart of the three-dimensional model of tilt photogrammetry.

(2) Three-dimensional mapping. Real estate registration work in the rural areas, the most basic requirement is that the rural houses one by measurement, by 3-d mapping system (EPS3Dserver) of the 3 d model with the actual location data to load, and combining the two 3 d interactive editorial acquisition integration, to map collection of rural features directly, without an excessive slant correction, Thus generating real estate three-dimensional model stereo mapping

(3) 3d model accuracy analysis. After the mapping

work is completed, it is necessary to verify the accuracy of digital line drawing elements in order to verify the accuracy of the built model. In other words, 16 obvious ground object points were selected as test points for detection. It is found that the plane error is 0.03m and the elevation error is 0.04m, which meet the requirements of rural real estate registration and measurement.

4. Conclusions

In general, tilt photogrammetry technology as a new technology, can be omnidirectional, multi-angle three-dimensional measurement of ground objects, in order to improve the efficiency of surveying and mapping workers at the same time, but also can shorten the working time. In addition, tilt photogrammetry technology can reflect the information of each floor of the house, which is more intuitive and can also reflect the hidden area well.

References

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