Interactive Presentations (IP)
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PANORAMA GENERATION OF LUNAR SURFACE

Abstract

In the process of working on the moon surface, it is very important to know the panoramic view of the moon around the rover, which can guide the rover to walk and avoid driving into the moon pit and hitting rocks.

The rover Rover camera uses a single lens to take photos of the surrounding environment, which is limited by the size of the field of view, so it is difficult to reflect the panoramic situation of the surrounding. In view of this situation, it is necessary to splice several images of the surrounding scene to form a panoramic image of the surrounding, so as to facilitate the perception of the surrounding terrain or scene.

The traditional method uses the feature point neighborhood gray correlation method to match the feature points, uses the optimization algorithm to estimate the point transformation relationship between the images, and finally uses the color interpolation to carry on the color transition at the junction to form the panorama. The disadvantage of these methods lies in the complexity of calculation, which is difficult to meet the requirements of real-time.

According to the characteristics of the lunar surface image (single texture and color, not easy to extract feature points), this paper proposes a panorama generation algorithm with high mosaic accuracy, small image distortion, soft transition of overlapping areas and fast mosaic speed. This mosaic algorithm uses the method of self-calibration coefficient solution, according to the image automatically completes the calculation of the image pitch angle and the angle between different lenses, and then completes the conversion of the spherical image to the cylindrical image, avoiding the object deformation caused by the spherical image of the mosaic image when the lens has pitch angle, which can be completed when the lens pitch angle is unknown and the rotation angle is unknown High precision and small distortion panorama generation. The method of image fusion and de exposure is used in the mosaic. Aiming at the exposure trace caused by different image shooting angle and exposure degree, pixel fusion is carried out in the overlapped area of the image to get the mosaic fused image, which can make the overlapped area soft transition.

The algorithm can generate panorama for any angle of the camera's pitch and rotation, different angles of view and different exposures. The generated panorama can accurately show the situation of the lunar surface around the inspector.