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ON THE OBJECT RECOGNITION IN AEROSPACE IMAGES

Abstract

The problem of automated processing of aerospace images is considered. As you know, monitoring of the Earth's surface is of great importance, both for the study of environmental problems, security problems, as well as for problems of the agricultural productivity. Due to the large scale of the Earth's surface and the development of technical means, including satellites, aircraft, UAVs, etc., there are many aerospace images. Therefore, the relevance of automated processing of such aerospace images is growing every day. The research considers some aspects of the task of identifying objects in aerospace images, namely, different scales, viewing angles, different degrees of illumination of the same part of the Earth's surface under consideration. Therefore, there is a need to develop an algorithm for recognizing an object in images that is invariant with respect to the observation point. Identification of objects in images obtained using aerospace surveys occurs mainly under conditions of photographing at an angle of approximately zero degrees to the normal drawn to the image plane, and identification is carried out by comparing the obtained images with a database of object patterns. However, when photographing at a non-zero angle and with an arbitrary direction of the photographing satellite this approach of identifying objects requires some refinement. This situation arises when, due to partial cloudiness, one has to use photographs taken with different satellites (from different shooting points) and at different tilt angles, which complicates their automatic processing when recognizing objects. The paper investigates an identification algorithm which is invariant with respect to the orientation of the photographs taken and/or objects in them. The main idea of the method is that for two-dimensional objects it is possible to determine characteristics based on the concepts of static moments of the section of figures. These characteristics include the "center of gravity" and "principal axes of inertia" of flat geometric figures. These characteristics do not depend on the orientation of the object in space, they are determined only relative to the body itself. At small inclinations of the image at an angle these characteristics change little. The calculation of the corresponding characteristics of objects in various aerospace surveys makes it possible to determine their orientation, thereby reducing them to a single standard and identifying them. This approach, on the other hand, allows you to arrange the images themselves and combine them to get a detailed image of the region.