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Title	テンプレート追跡による光学タグ認識
Author(s)	田浦，善弘
Citation	
Issue Date	2004-03
Type	Thesis or Dissertation
Text version	author
URL	http://hdl.handle.net/10119/504
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Description	Supervisor:藤波 努，知識科学研究科，修士

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Optical Tag Detection using Image Template Tracking

Yoshihiro Taura (250034)
School of Knowledge Science,
Japan Advanced Institute of Science and Technology
March, 2004

Keywords : Optical Tag, Template Tracking, Video Camera, Object Recognition and Position Tracking

A number of researches using optical tags have been developed for object recognition and position tracking. The optical tag is an equipment which transmits ID information using the blink pattern of light. The optical tag contains LED and a micro processor. Blinking of light is controlled by the micro processor. When the optical tag is moving, it is difficult to detect ID information. Therefore, it is necessary to track the position of the optical tags for at least two frames of the captured images. We applied the method of tracking and detecting an optical tag using image templates tracking near the tag and removing the lighting of an optical tag. The method has two features. The first feature is to detect and track the optical tags of a mobile object without using special device. Another feature is to capture a scean as an ordinaly camera dose.

We implemented this method using the ordinary camera. We measured the tracking speed of optical tags and the detection rate. As the resault, when the distance of an optical tag and a video camera is 4m and the angular velocity of a video camera is about 15 [deg/sec], the detection rate is 80 %. When the distance of an optical tag and a video camera is 8m and the angular velocity of a video camera is about 10 [deg/sec], the detection rate is 75 %. Furthermore, it is also possible to capture the image in which thelighting of an optical tag is not reflected with a single video camera. In fact, it is shown that there is a performance which can fully detect the moving object (about 4 km/h) during decoding optical tags.

Implementation and evaluation of the method showed that the moving optical tag (in People's walking speed), can be detected and tracked and it can also caputure a scean as an ordinaly camera dose.

The method is applicable to other augmented reality systems or to a robot's camera. It is also applicable to small robots because the miniaturization of a camera can be attained. Since our method is based on tracking processing, it is also possible to apply it to the motion capture device equipments.

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