

Title: Moving object recognition and processing in infrared video images

Industrial Applications □Intelligent Manufacturing □Intelligent Driving □Intelligent Life □Smart Medicine ■Smart City

[Overall background]

With the popularization and application of video technology and computer, video recognition technology based on video image processing has also been widely studied and applied. The technology of moving target detection, target classification, occlusion processing and multi target tracking in video has become a hot topic in the field of computer vision, and has a broad application prospect.

[Problem description]

The advanced optical video image processing and analysis technology is used to realize the small targets in complex environment, and achieve independently, quickly and effectively recognition for the fuzzy images in the infrared video image, and automatically calibrate the classification information. It should support identification and processing of infrared images with various formats and sharpness.

[User expectations]

- 1) It can realize small target recognition in complex environment;
- 2) It can achieve intelligent recognition and classification of maneuvering targets in moving scenes, and automatic calibration of classification information.
- 3) According to the position of the input camera (the latitude and longitude information), the speed (0-60km/h) and the moving direction, the relative position, distance information, size and speed of the target in the video can be calculated
- 4) It can search the specified class target and give the frame location information of the target's scene.
- 5) It can mark the moving track of the selected target in the view field.
- 6) It can evaluate the video quality and predict the accuracy of target recognition.
- 7) It can realize the recognition and processing of infrared video with various formats and multiple qualities.

[Expected economic effect]

Infrared video target recognition technology has very broad prospects for application in many fields of civil and military, including intelligent monitoring, visual based human-computer interaction, intelligent traffic, robot vision navigation, precision guidance system and so on. This scheme can be applied to navigation search, road traffic monitoring, subway security, video monitoring and so on, which has huge economic effects.

[Technical path]

Based on WINDOWS/ Android /linux and other computer operating systems.

[Technical indicators]

(required detailed data indicators and requirements)

- 1) It can effectively deal with the infrared video images with the movement speed of 0-60km/.
- 2) It can effectively identify small targets less than 10m \* 5m \* 3M.
- 3) Based on the target data of more than 100, the accuracy of classification and calibration is more than 80%.
- 4) The response time of target recognition is less than 5S;

#### [Submission standard]

Participants need to design and implement a software system based on project description and task requirements. While the exhibition begins, the participants should bring their own computers as well as the organizers provide the test video (U disk storage). The participants should introduce the system plan and demonstrate the scene.

#### [Task list]

Task time requirement: The specific time may be adjusted, and will be notified later.

Issue published before the end of May and participants entering into the competition;

Application for training set before June 10th;

Application for verification set before June 29th;

Task list submission before July 29th;

The site review and results published in July 31st.

Application for training set and validation set: after the entry is successful, the applicant will receive the application by answering the mailbox.

The task list includes, but is not limited to, the executable installation package and software documentation of the product.

The software document should include "outline design and detailed design", "test report" and "user manual". The "outline design and detailed design" should include algorithm model and software module.

The participants will bring their own computers to the scene, and the participants will provide the test video. The participants will introduce the system plan and carry out field tests. The judges awarded the winning teams according to the scoring criteria for the competition.

The scoring criteria are described below in the annex "scoring rules for moving target recognition in infrared video images".

#### Reference information [Reference tool]

Mixed Gauss model

#### [References]

(Relevant technical information that can be referenced in the tournament solution.)

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[Data interface]

None