Moving Target Detection and Locking With Laser Gun

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Chapter 1

1. ABSTRACT

We are using an effective algorithm of motion detection and distance estimation of the detected object while locking the aim with the laser gun is delineated. Motion detection is widely applied in security applications in banks, homes and especially in army for the suspicious activity detection in unmanned regions. Motion detection has been a topic of constant consideration for the researchers to develop an accurate and time efficient technique. After detecting the motion, the distance estimation algorithm will judge the position of the object constantly and then sends information to the controller to act accordingly. The action body has been configured to operate under different circumstances like if you are using the device for the army purposes or for the home security.

***Keywords*—image processing, motion detection, distance estimation, security system.**

Chapter 2

2. INTRODUCTON / PURPOSE

Motion detection mechanism starts from the determination of a reference image. The reference image is considered as the normal condition of a room. Afterward, the subsequent image is compared with the reference one. The capturing process is carried out at regular intervals in accordance with the requirements of the system.

According to a study conducted by Mishra et al. [1], there are three methods commonly used to detect a motion. Those are background subtraction, optical flow and temporal differences. Background subtraction is performed by comparison of an image with the referenced one. This technique employs a static reference image [2][3][4].

Study in [5][6][7][8] used optical flow for motion detection. The application of optical flow requires additional hardware to support the performance and monitoring systems.

Method of temporal differences is also known by the name of the frame differences. This method is performed by comparison of captured image frames. Another study by Kenchannavar et al. [9] describes the algorithm of background subtraction and frame differences by applying the concept of Sum of Absolute Difference (SAD). SAD is used to determine whether there is a movement within an image pair.

Frame difference method uses specific technique to choose which reference image is used for motion detection. The technique is known as template matching. There are two methods of template matching: static template matching (background subtraction) and dynamic template matching (DTM). This study uses a dynamic template matching method in determining the reference image.

Furthermore, the dynamic template matching is enhanced to be adaptive to environmental changes. The new method is referred as the dynamic and adaptive template matching. In this study, the algorithms were implemented as web-based applications.
Now as far as the distance estimation is concerned, we use the Interpolations technique to check whether the object is coming toward the camera or it is going away from it.