

Automatic Target Tracking Gun

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Abstract : In these days', national security is important and it is the major issue for all over the world. The aim of the project is to design the automatic target tracking gun to track, detect and destroy target automatically. Automatic target tracking gun provide protection to the area they cover and doesn't rely on the humans to do so. By using automatic target tracking gun, our army can protect our nation with minimum life losses. Camera is mounted on the gun. Then the gun start tracking of target by moving the camera and gun by using stepper motor. Once the target is detected the gun fired automatically and destroy the target.

IndexTerms – Target racking, Target detection.

I. INTRODUCTION

This project aims at creating a system which can be automatically track, detect and destroy the predefine target. Here we are using a Raspberry Pi 3. The people of national security agencies, maritime security organization, military forces and other forces sacrifice their lives to protect our country people. The lives of forces are also very precious like other lives. The computer based security equipment's are very popular among the forces. This equipment's are more advance and safe. So, by using automatic target tracking gun, our army can protect our nation with minimum life losses.

Real time image and video processing for object detection and tracking has many important applications in the field of computer vision such as video surveillance, military purposes etc. The availability of high quality and inexpensive video cameras and the increasing need for automated video analysis has generated a great deal of interest in the areas of motion detection, object tracking and object targeted. Thus, on a very high level, it is possible to identify three key steps in video analysis: detection of interesting moving objects, tracking of the detected objects from frame to frame, and analysis of the object tracks to recognize their behavior and targeted object accordingly.

Our gun is a placed at one fixed position. The gun then automatically aimed and fired at the target which are detected by using image processing algorithms. We first select the object, and then the gun starts the tracking process according to the movement of camera. Once it aimed the tracked object then the gun fires automatically at targeted object.

II. LITERATURE SURVEY

[1] Computer vision and image processing is presented by Victor Wiley, Thomas Lucas. This paper contributes to recent development on reviews related to computer vision, Image processing, and their related studies. They categorized the computer vision mainstream into four group, example image processing, object recognition, and machine learning. They also provide brief explanation on the up-to-date information about the techniques and their performance.

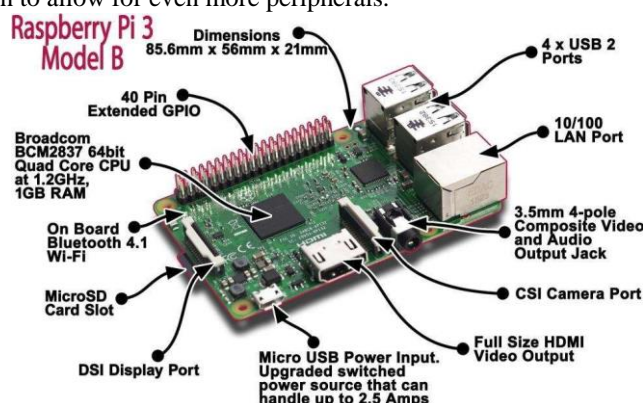
[2] A computer vision based framework for visual gun detection using harris interest point detector is presented by Rohit Kumar Tiwari, Gyanendra K. Verma. The objective of this paper is to developed a framework for visual gun detection for automatic surveillance. The proposed framework exploits the color based segmentation to eliminate unrelated object from an image using k-mean clustering algorithm. Harris interest point detector and fast retina key point (FREAK) is used to locate the object (gun) in the segmented images.

[3] Autonomous object detection and tracking using raspberry Pi is presented by Sampa Jana and Shubhsngi Borkar. In this paper, they design and implement the real-time vision base approach to detect and track features in a structures environment using and autonomous robot.

III. HARDWARE AND SOFTWARE DESCRIPTION

1. Raspberry Pi

Raspberry Pi is a tiny and affordable that you can use to learn programming to fun, practical project. The pi, with its companion memory card, is preloaded with all the software you need to jump into programming in python. The Raspberry Pi 3 model has four USB ports they are on the board in two sets of two, side by side. The USB ports are useful for connecting a keyboard and mouse to Pi. A USB hub can also be plugged in to allow for even more peripherals.



2. Web camera

The camera captures and sends the live video signal to the receiver. Webcam is used for image acquisition purpose. A web cam is a video camera that feeds all streams its image in real time to or through raspberry Pi. The quality and configure ability of the camera module are highly chief to a standard USB webcam.



3. Stepper motor

A stepper motor or step motor or stepping motor is a brushless DC electric motor that divides a full rotation into a number of equal steps. The motor's position can then be commanded to move and hold at one of these steps without any position sensor for feedback, as long as the motor is carefully sized to the application in respect to torque and speed.

4. Raspberry Pi OS

Raspbian is a Debian-based computer operating system for Raspberry Pi. There are several versions of Raspbian including Raspbian Stretch and Raspbian Jessie. Since 2015 it has been officially provided by the Raspberry Pi Foundation as the primary operating system for the family of Raspberry Pi single-board computers.

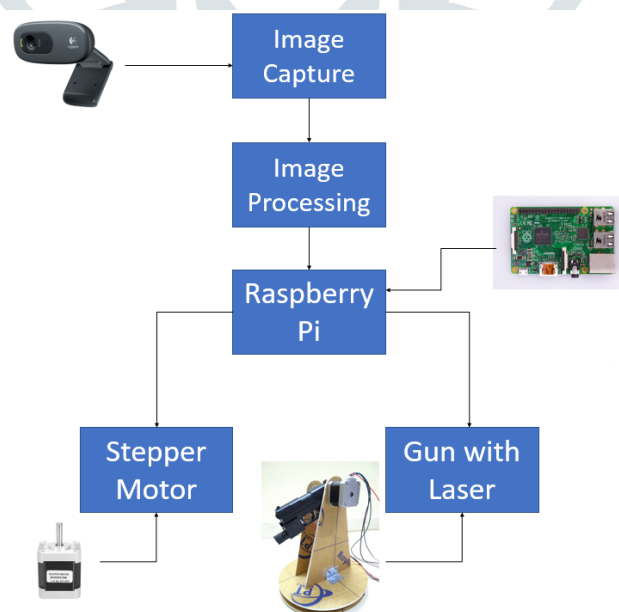
5. Python

Python is programming script language. Programing is done in hardware & display interface. Python is used as general purpose language. In this language design philosophy & its syntax allows programmer to express concept in fewer lines of codes like C++ & JAVA.

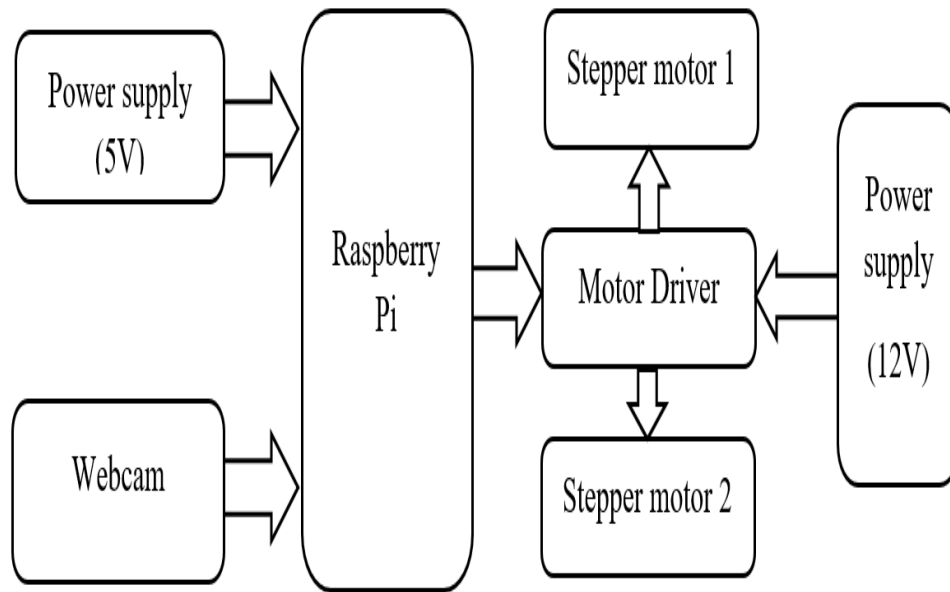
6. OpenCV

OpenCV is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage Itseez. The library is cross-platform and free for use under the open-source BSD license.

IV. SYSTEM OVERVIEW



V. METHODOLOGY



The proposed system will have camera mounted gun with raspberry Pi. With the help of camera images will be captured. The captured images will be processed to identify predefined object. Till the object is detected the gun will be searching the object by moving around it. The algorithm written on raspberry Pi will control the motors and camera mounted on gun. The webcam captures the images and send it to the raspberry Pi, raspberry Pi receives the data from webcam and control the two-stepper motor using motor driver IC's. The body of the gun is moving by two-stepper motor using motor driver circuit. Based on the variation in the input of the raspberry Pi and the program flashed into it, the controller will cause movement of the motors by giving its output to the input of the motor driver IC's which enables the movement of the motors. The motor driver required to provide the motors with 12V power supply while the controller works on 5V. The major parameters of the project are the resolution of the camera. The object detection is done based on a range of values above and below the value so that there is no hindrance in the working of the project due to external environment changes (brightness or dark) and the object can still be detected. More importantly, the distance of the object doesn't matter as long as it is in the camera resolution frame.

VI. CONCLUSION

The theme of the work is to design the automated security system for surveillance operations. The system is designed by using image processing algorithms in order to select, track and shoot the target automatically. The performance of the system can also be improved by using high resolution cameras with night vision provision.

VII. REFERENCES

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