RAMKRISHNA MAHATO GOVT. ENGINEERING COLLEGE, PURULIA

A

Project Report

On

Automatic Target Tracking Machine

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Introduction:

- Automatic target tracking is a system, based on radar, photo-optical, infrared, laser, acoustic, magnetic and other principles for the sending and receiving of signals which are processed by computers according to a specified program.
- In this study, a real-time fully automatic target detection and tracking method is introduced which is capable of handling variable number of targets.
- The purpose of tracking system is to determine the location or direction of a target on a near continuous basis.

Objective:

The main objectives of this project are:

- Monitoring the moving object
- Detect the particular target by distinguishing between main target object and any other objects (e.g. birds, street animal etc.)
- Tracking the target by minimizing special distance between the selected targets in consecutive frames.
- When microcontroller gets signal, it sends signal to the firing system to attack the target.

Unique Features:

- Image Detection and Tracking
- Automation
- Higher accuracy & Less Expensive

Applications:

- Automatic target discrimination
- Navigation
- Passive range estiminasion
- Fire control system
- Automatic tracking of suspicious objects in army and navy
- Home security
- Smart city

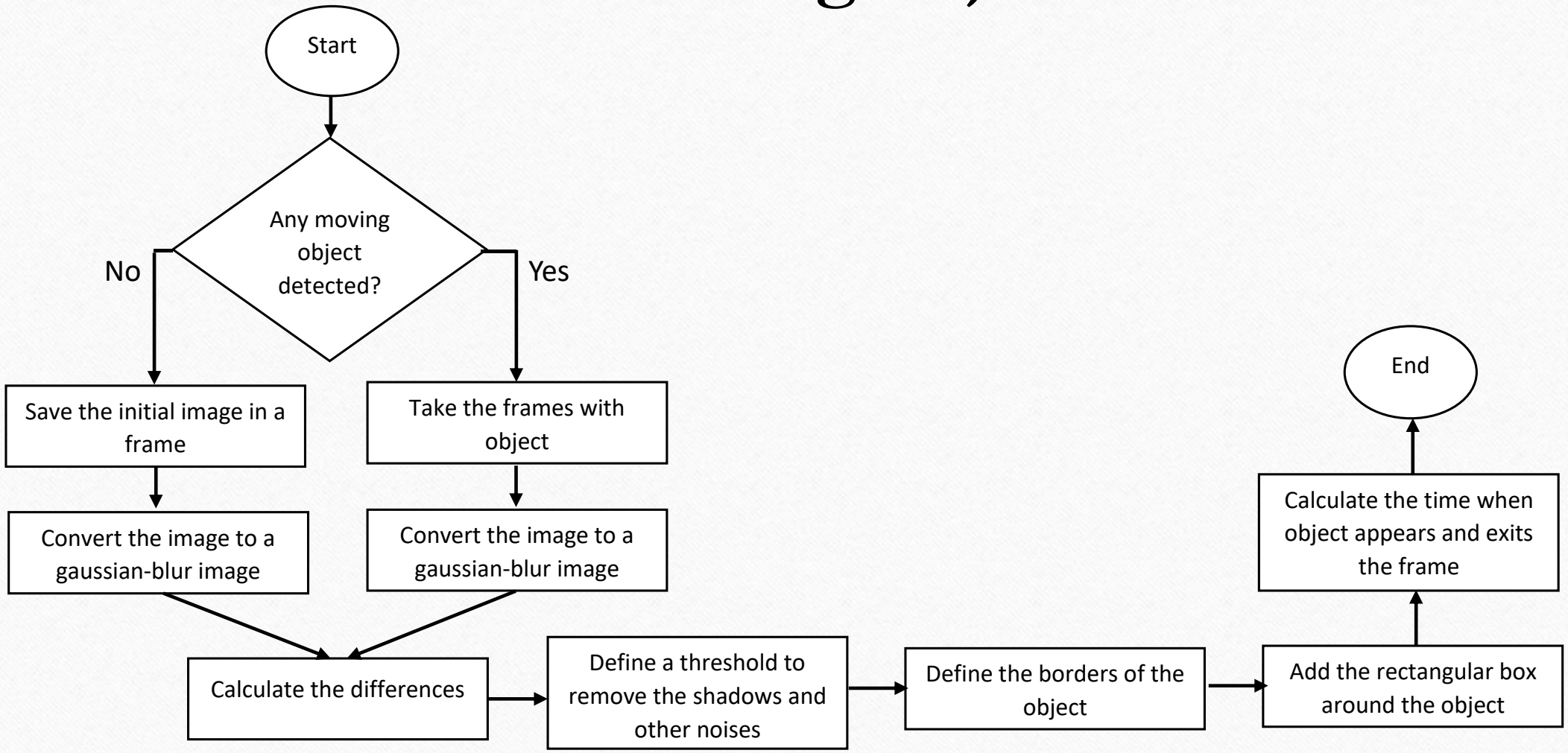
Proposed Method:

- The following model takes into consideration image detection and Tracking algorithm with the help of Computer Vision and python 3.7
- It incorporates deep learning algorithm to differentiate b/w objects to find the actual object of interest for tracking purposes.
- It is also an efficient way for security tracking
- Without any external media it can be used as a security system

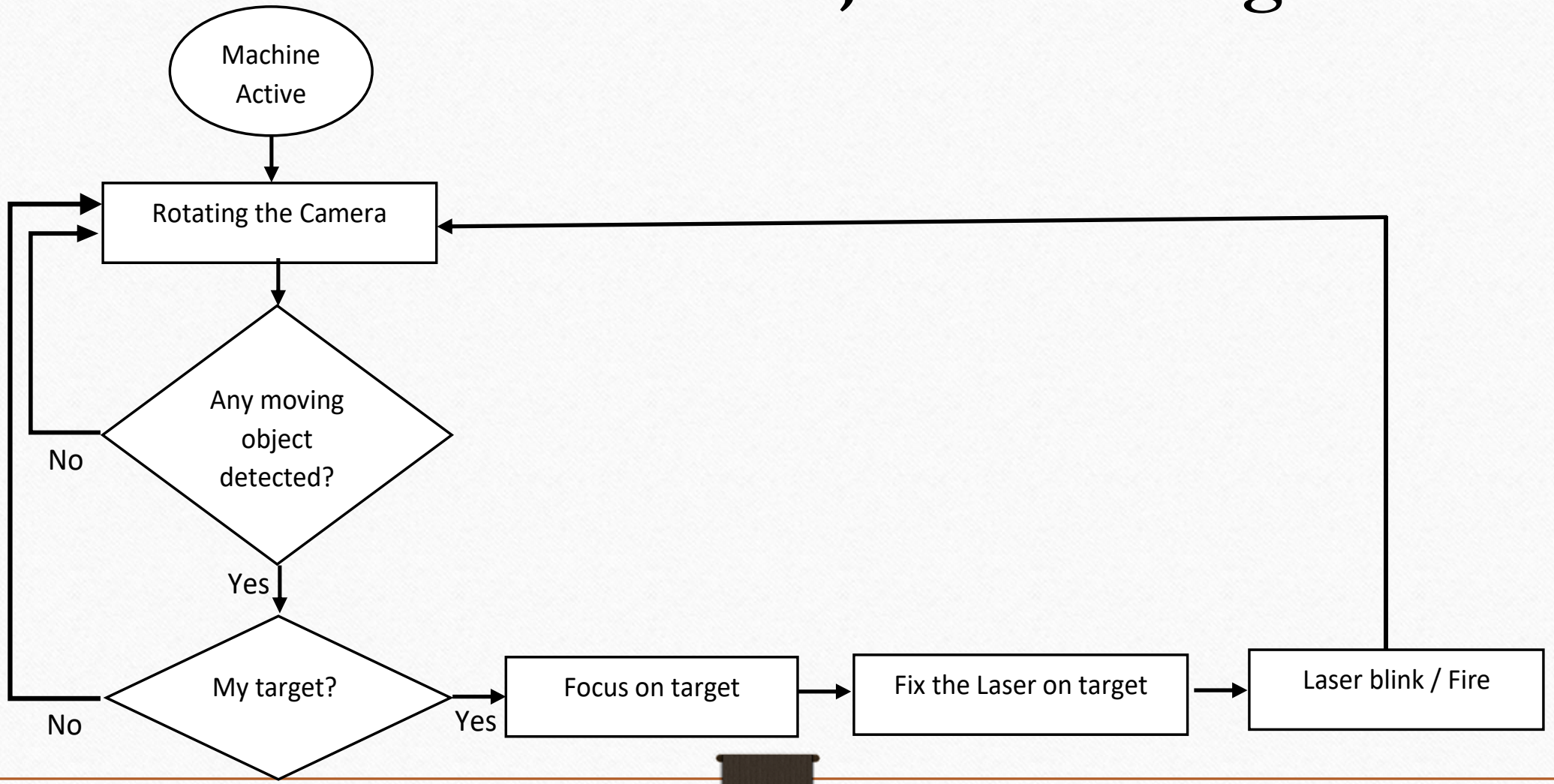
Procedure:

- At first, the video image is captured in real time by camera on the screen.
- When the target information is known, tracking algorithm is adopted to track the target.
- Then the sensor is used to rotate with the target, when the target is in the center of the image, the laser ranging module is opened to obtain the distance between the machine and the target.
- Finally, through the target location algorithm we calculate the coordinates of the target.
- The ultimate task of automatic target tracking is reliability in damaging the target by increasing the probability of a hit.
- The results show that the system is stable for real-time tracking of targets and positioning.

Flow Chart of Moving object detection:



Flow Chart of Object Tracking:



Requirements:

Hardware components:

1. Raspberry pi
2. Webcam
3. Laser
4. Stepper motor
5. Jumper wires
6. Acrylic sheet
7. Battery

Software Components:

1. Python 3.7
2. OpenCV python library
3. Tensor Flow library
4. Raspberry pi 4

Conclusion:

- In this study, automatic target detection and tracking method designed for real-time systems is introduced.
- The experiments showed that the proposed algorithm achieves a sufficient true positive rate with a relatively low false discovery rate on the utilized test sets.
- Moreover, it is also seen that, usage of a successful detection scheme reduces the complexity of tracker
- For the purpose early attack detection systems, controllable rockets, high power lasers are used.

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Thank You