PROJECT PROPOSAL

Title	Design and Simulation of Sentinel Gun Assisted by Image Processing for Defense Application
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Abstract

Every year our Indian soldiers have lost their lives due to sudden terrorist ingress and natural calamities. It should be a great lose to our nation. In order to save the life of our soldier, an autonomous guarding system is to be developed which should save the lives of the soldiers. In this project, a versatile gun holder and automatic aiming sentinel gun is to be designed with the assistance of image processing technology. Web Camera is used along with the gun holder to capture the live videos. This video is then further analyzed for face detection and tracking. Precise coding is made for face detection and tracking algorithms using OpenCV, Spyder software. The output of the face detection and tracking of the captured image sequences is then fed to Arduino microcontroller. In Arduino, the face tracking is coupled with the servo motors which directly controls the Firing Gun for tilting, rotation and triggering. Thus, it could fire the enemies automatically when they come into the range of the camera. This work will be useful for our country in Defense Sectors.

KEYWORDS: Image Processing, OpenCV, Face Detection, Sentinel Gun, Face Tracking.

LITERATURE SURVEY

Author and Year	Description
Yang and Huang (1994)	In this paper a new method to locate human faces in a complex background is proposed.
Hjelmas and Low (2001)	In this paper the author presented a comprehensive and critical survey of face detection algorithms.
Li *et al* (2011)	In this paper the author presented a novel boosting cascade-based face detection framework using SURF features.
Sethi and Aggarwal (2011)	In this paper the author have presented a face detection and tracking algorithm in real time camera input environment.
Faux and Luthon (2012)	In this paper the author have predicted a method of face detection and tracking by computer vision for multimedia applications.
Yan *et al* (2013)	In this paper the author have found that the state-of-the-art face detectors still have problems in dealing with images in the wild due to large appearance variations.
Tripathy and Daschoudhury (2013)	In this paper the author have implemented a real time Face detection and tracking the head poses position from high definition video using Haar Classifier through Raspberry Pi CM2835 CPU processor which is a combination 13 of SoC with GPU based Architecture

Problem Identification

- Periodic death of soldiers.
- Guarding in unsafe environment.
- They are monitoring the border 24×7 without sleep.
- During any natural calamities like snow slides or landslides they may have chance to stuck in it
- The health of the soldiers sometime being abnormal due to continuous work.
- If any sudden terrorist attack happen some soldiers may injure heavily.

Project Objective

- To design an autonomous sentinel gun which should be implemented along the Indian borders to guard the nation 24x7.
- To detect the face of the enemies who is crossing the border using Face detection and tracking algorithm and to shoot them immediately using the Gun with the support of servo motors and microcontrollers.
- To avoid the soldiers suffering from over hotness and coldness due to winter and summer season.
- To reduce the monitoring work of the soldier from morning to night.
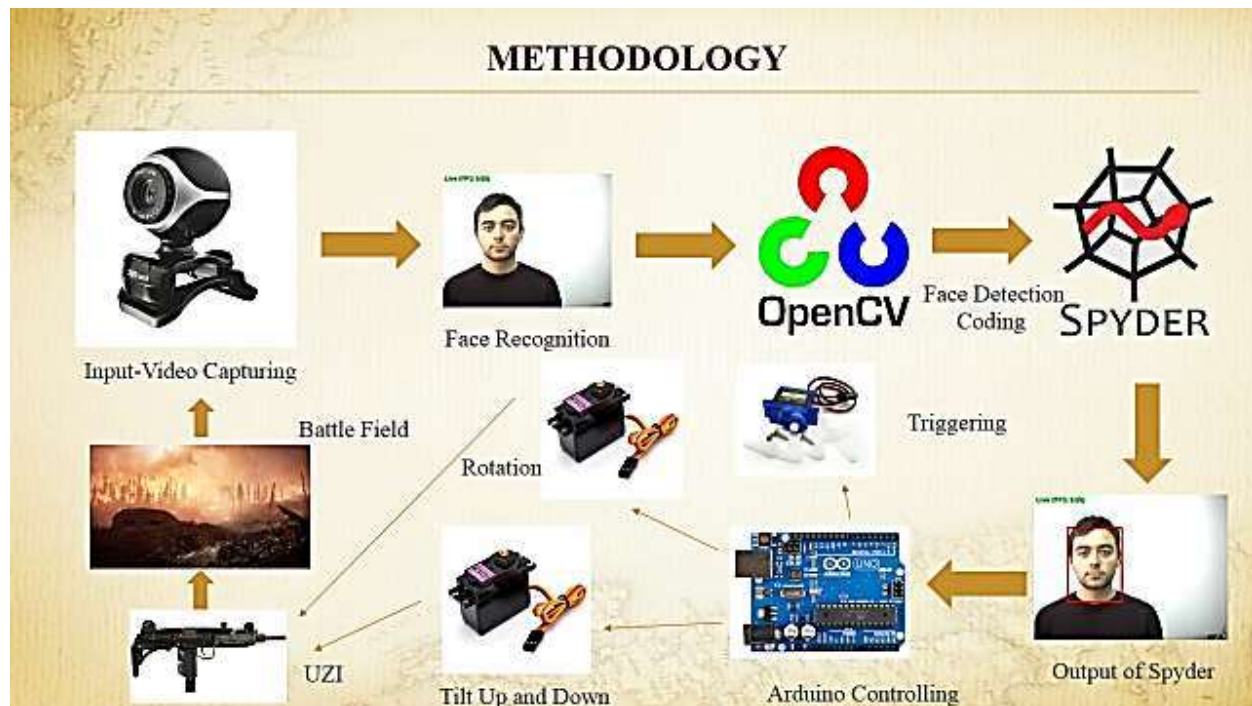- To avoid the periodic alteration of soldiers from borders.

Methodology

Figure 1. Schematic Diagram of the project

Web Camera will be used along with the gun holder to capture the images. It acquires the live videos which should be then further analyzed for face detection and tracking. Precise coding is to be made for face detection and tracking algorithms. The captured video from the web camera is fed to spyder software where the coding should be compiled in OpenCV platform. It gives the output of face detection and tracking of the captured image sequences and it is then fed to Arduino microcontroller. In Arduino, the face tracking will be coupled with the servo motors which directly controls the Gun for tilting, rotation and triggering. Thus, it could fire the enemies automatically when they come into the range of the camera. This work will be useful for our country in Defense Sectors. It could save the Indian soldiers from natural calamities, sudden terrorist attacks and reduces guarding difficulties

Proposed Budget

S.No	Particulars	Quantity	Amount in Rs
1	Arduino Microcontroller	1	900
2	Servo Motor	3	2500
3	Electric ball bullet gun	1	3500
4	Nylon rod	1	200
5	Flange	1	100
6	Acrylic sheet	1	2000
7	Raspberry pi 3	1	3500
8	Web cam	1	3000
9	Jumper wires	40	300
Total			**16000**

Advantages & Applications

Advantages

- ➢ It protects our soldiers from enemy attack.
- ➢ It reduces the count of death in borders.
- ➢ It avoids the periodic alteration of soldiers in the borders.
- ➢ It enhances easy tracking of enemies in borders.
- ➢ It guards the border for whole day.
- ➢ The man power is highly reduced.
- ➢ No need of soldiers for operating the equipment.
- ➢ It avoids enemy attack in public places.
- ➢ It can detect and track the multiple faces at the same time.
- ➢ It headshots the enemy exactly.
- ➢ It can be operating at night mode by using infrared camera.
- ➢ It continuously shot the enemy in a single trigger.

Application

- ➢ It is suitable in any places in the border.
- ➢ It is placed near to the army camp for surveillance.
- ➢ It replaces the soldiers in the border.
- ➢ Single sentinel gun can cover the battle field at a range of 120 degree.
- ➢ It can kill flying enemy.
- ➢ It can hold any gun by its versatile gun clamp.

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