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Automatic Camera Steering based on Person Tracking Algorithm

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Abstract
An implementation for automatic face detection and tracking on video streams from surveillance cameras in public or commercial places is discussed in this paper. Hence, a Prototype is designed to work with web-cams for the face detection and tracking system based on open source platform OpenCV. The system is based on AdaBoost algorithm and abstracts faces using Haar-Like features. This set-up can be implemented to acquire the face as well as to identify and focus on the subject with respect to the facial features and moreover track him/her when the face is turned. A code is built with the usage of OpenCV with Canny edge detectors that can identify people's faces and also track them in any direction using a web-cam or an external camera irrespective of the direction.

Keywords
Face Detection, PTZ Camera, Open-CV, Haar Like Features, Cascade function, Ada Boost Viola Jones; Red Rat wireless,PCA, Eigen Faces Recognizer .

I. Introduction

An online lecture is an instructive forum intended to be posted on the web. Sessions are recorded in video, sound or both, at that point transferred and made perceptible on an assigned site. Understudies may go to a specific assigned webpage to see the address online at once which is advantageous for them. Generally, vocal training is conceivable just when the educator and the understudy are present in the same room, where the instructor passes on the lesson to the student. Online sessions are presently conceivable with the coming of video correspondences. The advancement of the online discourses makes it conceivable with the goal that the instructor and understudy never again must be in a similar region to educate and learn, individually. With the applications of handy tools such as the movable camera and suitable application software, the aim of implementing an online lecture can be implemented based on image acquisition techniques based on the concept of face detection and recognition

II.Problem Statement

The Primary purpose of this project is to develop an approach to detect the face of the professor/instructor and track his/her movements by developing a strong algorithm based on image processing techniques and methodologies such as KLT, Viola Jones, Integral Images etc, the distinct features of the face such eyes, skin color can identified and pursued irrespective of the position of the professor which makes it easier to focus on the him/her in at all times regardless of any number of people in the room and hence lay emphasis to the instructor only irrespective of his/her position when surrounded by many people.

III.Proposed System

The base for creating the framework is to monitor the person of interest. The system described includes a PTZ camera, wireless remote controller and suitable, appropriate application software that could perform the desired operation using the specific tools and functions. The Pan Tilt Zoom (PTZ) camera performs image acquisition to capture the preferred object and processed by specific software such as Open –CV. The camera is controlled by a wireless remote that directs it to perform motion in the required direction based on that of the specimen such that all the components are synchronous with each other and the operation is performed at real time. This setup makes lays emphasis on the recognition of the facial features and patterns of the person of interest to allow the operation of detection and recognition to take place, regardless of his/her position even when the face is turned away from the camera .

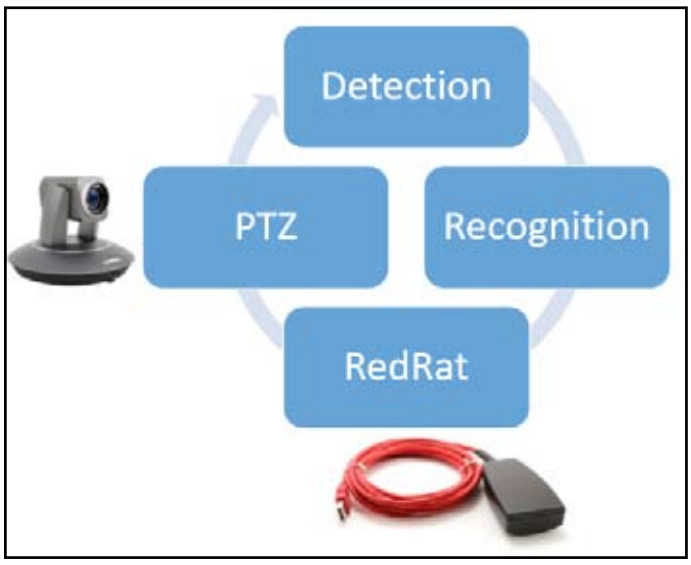

Fig 1 : Block diagram of experimental set-up

IV. Implementation Methodology

Hardware Description

A) PTZ CamerA

The PTZ is a contraction for pan, tilt, and zoom and mirrors the development alternatives of the camera. It utilizes a Ultra-low transmission capacity observation and various streaming mechanisms to stream client characterized territories in higher quality without expanding general transfer speed utilization. Reconnaissance cameras of this sort are regularly associated with an advanced video recorder which records the full field of view in full quality. high resolution ptz camera allows zoom upto18x, 9mm of focal length and can be controlled automatically or manually

B) Red Rat Wireless Remote

It is a usb based I\O device that gives IR capabilities of a PC, It

includes a windows drivers and SDK so that all hardware can be integrated using .net .

Software Description

OPEN CV:

It is an open source computer vision library. It is a collection of high speed C functions and a few C++ classes that implement some popular IP and computer image algorithms. It supports various languages including C++, python, Java, etc. It uses several concepts and mechanisms like adaboost, Haar-like features and Eigenfaces recognizer based on patterns and facial features that are distinct to every particular individual

V. Experimental Results

Fig. 2 : Face Detection and Recognition of the desired Face and Identification

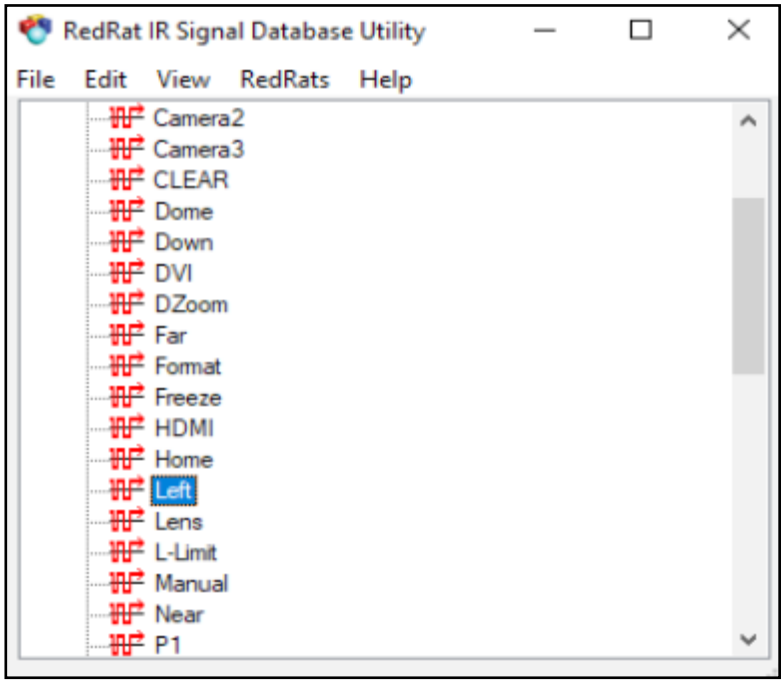

Fig. 4 : Enlisted signals generated by the remote

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Fig. 6 : Signals used for shifting left

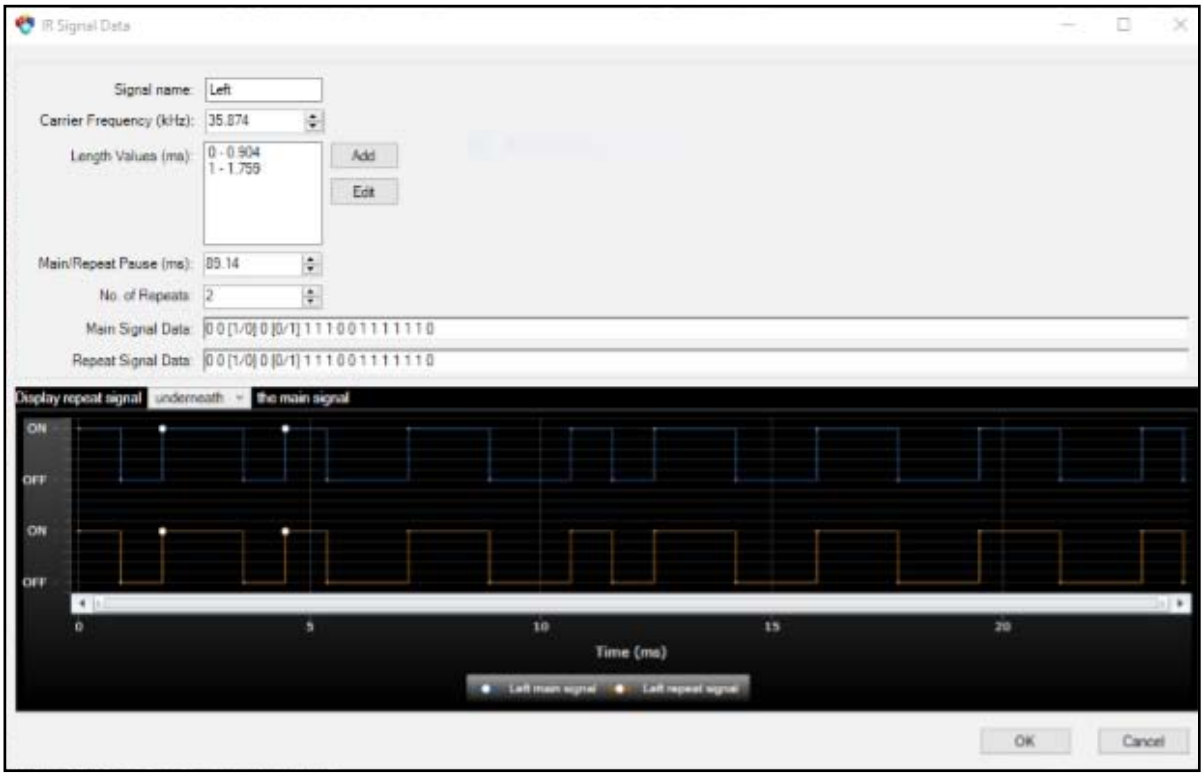

Fig.7 : Signals for shifting right

Fig. 3 : Detection and tracking when face turned

VI. Conclusion and Future Scope

An object-tracking program that can automatically track multiple objects is developed. Adding the feature of intelligence to the program to focus moving object automatically without being specified by users increases it's efficiency and performance. It detects the motion, segments moving objects, and then tracks them in the frames following the first two frames. Tracking accuracy is quite good based on the result that moving objects are correctly tracked through the whole sequence keeping in mind of physical and intangible parameters such as lighting conditions in the environment, object distance and the speed of the tracking object.

VII. Future Scope

With increase in the accuracy and the precision of the algorithm, the set-up can be implemented in other fields and avenues such as surveillance and entertainment and not just in education

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