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Image Recognition using Machine Learning for Security Surveillance System in BIT Campus

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Abstract: In this paper, we address the use of machine learning techniques for image analysis and pattern recognition. Images and pattern Analyzer based on machine learning which will build a system for automatically detecting and recognizing for the humans faces. And maintained all the recognized data in to the database simultaneously. Administrator can manage the all the data. This system which will gives us more efficient to manage and monitoring the persons for security purposes. Visual analysis and pattern recognition can be used python pip (face Recognition) for estimate the content of images. Given a data set of images with known classifications. A system can predict the classification of new images. Technology used in this research can be modified further to use in applications such as security, monitoring purposes different type of image and pattern recognition available over the field such different tools also using by its purposes.

Keywords: Face detection, open CV (Pattern Analyzer), ML algorithm, python pip (face recognition).

I. INTRODUCTION

A. Image Recognition And Analyzer

In this paper will describe, we selected human's images this is not a random selection because it is always a challenging part to collect a set of data in persons to create proper data base. Object detection and recognition based on image processing is vastly concentrating field in research. The ultimate objective of many image analysis tasks is to discover meaning of the analyzed image, (e.g. categories the objects, provide symbolic/semantic interpretation of the image or global understanding of the image scene using python pip (face recognition). In the last few years the field of machine learning using python scripts (face recognition) has made tremendous progress on addressing these difficult problems. In particular, we've found that a kind of model like to be called a deep convolutional neural network can achieve reasonable performance on hard visual recognition tasks matching or exceeding human performance in some domains. Vision/image processing incorporates human perception and intelligence which makes the field most interesting to the research community as it can mimic human behavior in the computer system by means of video surveillance system, integrating more intelligence to machines. However this project is targeted to build a system which would help for surveillances using CCTV cameras who devote their precious time for security administrator.

Image processing is the mapping several images onto a common space and results in some corrections of geometric differences between the images. Machine learning techniques or algorithm gives us efficiency result for recognition human faces. It's also work like conventional neural network algorithm (CNN).

Overview of this paper whenever someone stand in front of camera it will automatically detect who are cross over the camera and maintained the data into database. Every system have administrator so administrator can have separate login option in corresponding website .so very convenient to manage the data. Those processing are all based on historical data which mean in terms of machine learning supervised learning.

B. Web Application

Web development is a broad term for the work involved in developing a web site for the Internet (World Wide Web) or an intranet (a private network). Web development can range from developing the simplest static single page of plain text to the most complex web-based internet applications, electronic businesses, and social network services. A more comprehensive list of tasks to which web development commonly refers, may include web engineering, web design, web content development, client liaison, client-side/server-side scripting, web server and network security configuration, and e-commerce development. Most recently Web development has come to mean the creation of content management systems or CMS. These CMS can be made from scratch,

proprietary or open source. In broad terms the CMS acts as middleware between the database and the user through the browser. A principle benefit of a CMS is that it allows non-technical people to make changes to their web site without having technical knowledge. The various technologies are CSS, ColdFusion, CGI, HTML, Java, JavaScript, JSP, Visual LANSA, Lasso, Node.js, OSGI, Ajax, ASP, ASP.NET, Action Script, Perl, PHP, PSGI, Python and Ruby.

II. LITRATURE SURVEY

According to the paper “Animal Classification System Based on Image Processing & Support Vector Machine” by A. W. D. Udaya Shalika, Lasantha Seneviratne, to develop system for animal researchers & wild life photographers to overcome so many challenges in their day life today. When they engage in such situation, they need to be patiently waiting for long hours, maybe several days in whatever location and under severe weather conditions until capturing what they are interested in. Also there is a big demand for rare wild life photo graphs. The proposed method makes the task automatically use microcontroller controlled camera, image processing and machine learning techniques. Using some sensors like PIR sensor for detection animal perceptions.

From the paper “Pattern Recognition and Image Processing” by KING-SUN FU, This paper presents a very brief survey of recent developments in basic pattern recognition and image processing techniques. And also presents a very brief survey of recent developments in basic pattern recognition and image processing techniques.

According to the paper “Brief experience on journey through hardware developments for image processing and it’s applications on Cryptography” by Sangeet Saha, Chandrajit pal, Rourab paul, Satyabrata Maity , Suman Sau, Vision processing incorporates human perception and intelligence which makes the field most interesting to the research community as it can mimic human behavior in the computer system by means of video surveillance system, integrating more intelligence to machines such as robots, as well as in ecology, biometrics and medical applications.

From the paper “Color Image Processing Using Adaptive Multichannel Filters Color Image Processing Using Adaptive Multichannel Filters” by Konstantinos N. Plataniotis, New adaptive filters for color image processing are introduced and analyzed in this paper. The proposed adaptive methodology constitutes a unifying and powerful framework for multichannel signal processing. Using the proposed methodology, color image filtering problems are treated from a global viewpoint that readily yields and unifies previous, seemingly unrelated, results.

According to the paper “PASM: A Partitionable SIMD/MIMD System for Image Processing and Pattern Recognition” by HOWARD JAY SIEGEL, LEAH J. SIEGEL , As a result of the microprocessor revolution, it is now feasible to build multi microprocessor systems capable of performing image processing tasks more rapidly than previously possible. There are many image processing tasks which can be performed on a parallel processing system, but are prohibitively expensive to perform on a conventional computer system due to the large amount of time required to do the tasks.

From the paper “Digital Image Processing Using Matlab” by Haris Papasaika-Hanusch, A digital image differs from a photo in that the values are all discrete. Usually they take on only integer values. A digital image can be considered as a large array of discrete dots, each of which has a brightness associated with it. These dots are called picture elements, or more simply pixels. The pixels surrounding a given pixel constitute its neighborhood A neighborhood can be characterized by its shape in the same way as a matrix: we can speak of a 3x3 neighborhood, or of a 5x7 neighborhood.

III. EXISTING SYSTEM

Extensive research and development has taken place over the last 20 years in the areas of pattern recognition and image processing. Image recognition and pattern analyzing techniques are different type even though different requirements using depends on his research such as medical sector based images processing which will describe to classified for disease infection etc.

Botanical based image processing, filtering based pattern analyzing keep awake use of some algorithm like Bayesian techniques image classification However all the different environment try to get accuracy result for depends upon corresponding problems.

A. *Existing systems are following methodology.*

- 1) Holistic Matching Methods
- 2) Feature-based (structural) Methods
- 3) Hybrid Methods.

B. *Holistic Matching Methods*

In holistic approach, the complete face region is taken into account as input data into face catching system.

C. Feature-based (structural) Methods

In this methods local features such as eyes, nose and mouth are first of all extracted and their locations and local statistics (geometric and/or appearance) are fed into a structural classifier. A big challenge for feature extraction methods is feature "restoration", this is when the system tries to retrieve features that are invisible due to large variations.

D. Hybrid Methods

Hybrid face recognition systems use a combination of both holistic and feature extraction methods. Generally 3D Images are used in hybrid methods. The image of a person's face is caught in 3D, allowing the system to note the curves of the eye sockets

IV. PROPOSED SYSTEM

This project gives us system for automatically detecting and recognizing objects for the humans/persons detection and recognition. And maintained all the recognized data in to the database automatically. Administrator can manage all the logs. Which will gives us more efficient to manage and monitoring the persons for security purposes. As the project contains both hardware & Software, need to focus on both parts separately. But this research paper mainly focuses on classification and recognition. Considering completion of the study hardware side and Motion tracking has been focused. For the detection, camera rotation and communication

A. Face recognition (pip)

Recognize and manipulate faces from Python or from the command line with the world's simplest face recognition library. Built using dib's state-of-the-art face recognition built with deep learning. The model has an accuracy of 99.38% on the Labeled Faces in the data. Recognize the person who are crossing via entrances

B. OpenCv

OpenCV's library has many inbuilt functions mainly aimed at real time image processing. Captured persons image using system camera.

C. Admin Log in

After recognize the person data stored into the database admin can have separate login. Manage all the logs about persons who are entering into the particular place

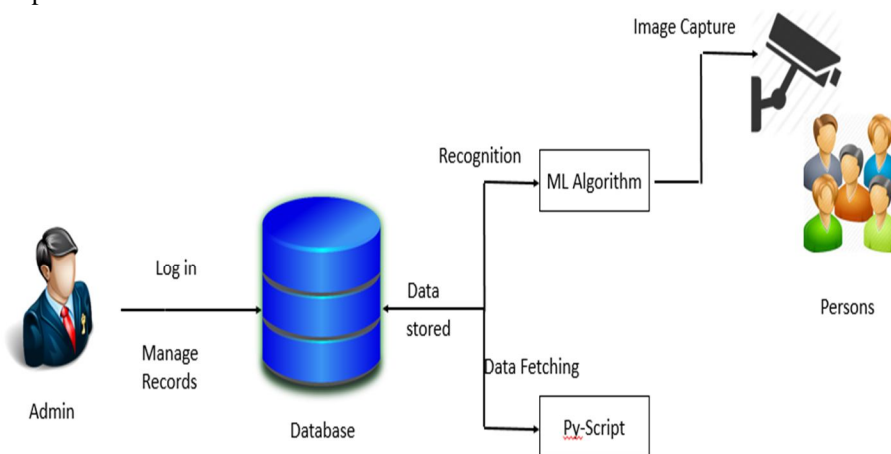


Figure 4.1 SYSTEM ARCHITECTURE

Figure 4.1 describe The System Architecture. Camera captured the persons who are entered or cross over among the camera. We already trained the machine using historical data image on particular machine .machine learning algorithm should be recognition the particular person who are entered. After that this data (which include time and date etc) automatically stored into the database. Administrator have put in his credential detail into log in page on the website and maintained all the records.

V. IMPLEMENTATION

The implementation of the web application is done in the following manner.

A. Hardware Specification

- 1) RAM : Intel core 3 (2.4GHz processor and all upgraded processors),
- 2) Memory –Hard disk - 500MB of free space.
- 3) Camera (Enabled machine).

B. Software Specification:

- 1) Python 3.3+ or Python 2.7,
- 2) MacOS or Linux (Windows not officially supported, but might work),
- 3) Opencv, Lamp server(Apache, php, mysql).

The software requirements are Operating System-Windows XP and above, Front end - HTML & CSS, Back end - Cloud storage and MySQL along with PHP, Web Browser - any web browser.

The modules are Login module admin can manage all the records e. The Login module is to check the persons when they are entered and where they want to go all the records can monitoring and recorded. Emailing option and sorting filtering option also available over the admin panel.

C. Usecase Diagram

The Use case diagram is a graphic depiction of the interactions among the elements of a system. The use case diagram for the application is,

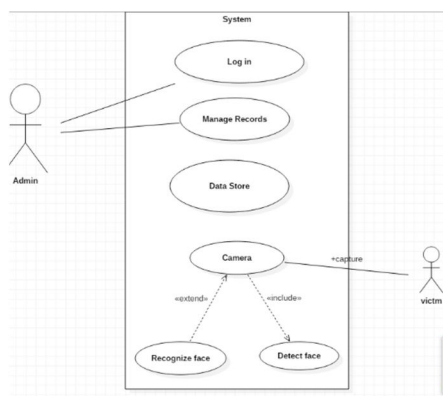


Figure 5.1. USECASE DIAGRAM

VI. RESULTS

The Admin log in page of the Security Surveillance website along with the option,



Figure 6.1 Login Page

Forgot Password option when admin need to forget or change password this menu will help to process on it. Credential directly send to admin accessible mail address.



Figure 6.2 Forgot password

Dashboard for admin panel all the user interface option will show up the logs about the person who are entering into the places. Filtering option help up to show particular date wise view the logs.

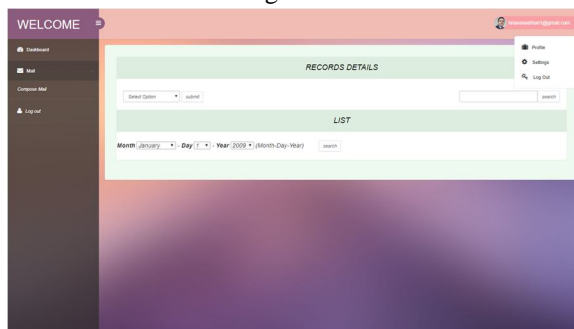


Figure 6.3 Admin Panel

VII. CONCLUSION

Image recognition using machine learning for security surveillance tries to overcome the dependencies and issues of the occurring on security surveillances and security monitoring sector automatically monitoring the human's inference without any physical interaction. Web administrator can be maintained all the data this project will reduces the work load of the officials and also makes a well-versed application for security surveillances.

VIII. ACKNOWLEDGEMENT

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