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Automated Intelligence Systemfor Attendance Monitoring With Open CVBased on Internet of Things (IOT)

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ABSTRACT-In recent days the automatic intelligence system becomes very popular for smart tasks execution and easy maintenance and handling of data with the use of advanced processors. In this project Face recognition based Attendance Management System is the slightest requesting way to deal with stay educated in regards to investment for gathering relationship, for instance, school clubs, scouting units, church bundles, business affiliations and volunteer social affairs. Among the individual recognizing evidence systems, face affirmation is known not the most trademark ones, since the face philosophy is the strategy that uses to perceive people in customary lives. But distinctive systems, for instance, special imprint ID can give better execution, those are not fitting for consistent sagacious associations due to their intruding nature. This face revelation isolates faces from non-faces and is thusly essential for careful interest. The other method incorporates face affirmation for indicating the understudy's interest. The Raspberry pi module is used for face disclosure and affirmation. The camera will be joined with the Raspberry pi module. The understudy database is assembled. The database consolidates name of the understudies, there pictures and move number. This raspberry pi module will be presented at the front side of class in a way that we can get entire class. Along these lines with the help of this structure, the truth will get to be clear in the long run saved. With the help of this system, it is so invaluable to record support. We can take support on at whatever time. The list of attendance will be displayed in the webpage through IOT (Ethernet,Wi-Fi).

Keywords: Face detection, Face recognize data management, Raspberry Pi

1. INTRODUCTION

In present days the whole period participation is put away in register what's more, toward the end of the social event the reports are created. Staff are not worried in making report in the middle of the road of the session or according to the essential since it requires more investment in figuring. Face acknowledgment is utilized to stamp the participation of the understudies. Shrewd Participation utilizing Real Time Face Recognition gives adaptability to recognize understudy one by one. To expand the precision, productivity and unwavering quality of the acknowledgment, calculations are required.

In the event that the participation of an understudy of classroom address is connected to the video spilling

administration, it is conceivable to exhibit the video of the time when he was missing. It is essential to take the participation of the understudies in the classroom naturally. ID label or different recognizable pieces of proof such the record of login/out in most e-Learning frameworks are not adequate in light of the fact that it doesn't speak to understudies' connection in vis-à-vis classroom. It is likewise hard to handle the connections by the information of a solitary minute. Face discovery and acknowledgment module identifies faces from the picture caught by the camera, and the picture of the face is trimmed and put away. The module perceives the pictures of understudy's face, which have been enrolled physically with their names and ID codes in the database. Face discovery information and face acknowledgment information are recorded into the database. Expecting that a man surrounded in any irregular photos not a participant at the Renaissance Fair or Mardi grass, it can be expected that the face is not white, green, red, or any unnatural shade of that nature. While diverse ethnic gatherings have distinctive levels of melanin what's more, pigmentation, the scope of hues that human facial skin tackles is plainly a subspace of the aggregate shading space. With the presumption of atypical photographic situation, it would be obviously savvy to exploit face-shading connections to restrict our face pursuit to ranges of an information picture that have in any event the right shading parts. In seeking after this objective, we took a gander at three shading spaces that have been accounted for to be helpful in the writing, HSV and YCrCb spaces, and in addition the all the more generally seen RGB space. While RGB may be the most ordinarily utilized premise for shading portrayals, it has the negative viewpoint that each of the directions (red, green, and blue) is liable to luminance impacts from the lighting power of the environment, an angle which does not inexorably give applicable data about whether a specific picture "patch" is skin or not skin. The HSV shading space, then again, is a great deal more instinctive also, gives shading data in a way more in line how people consider hues and how craftsmen regularly blend hues. "Shade" depicts the essential unadulterated shade of the picture, "immersion" gives the way by which this unadulterated shading (tone) is weakened by white light, and "Esteem" gives a colorless idea of the force of the shading. It is the initial two, H and S that will furnish us with helpful separating data in regards to skin. Face recognition what's more, acknowledgment module identifies faces from the picture caught by the camera, and the picture of the face is trimmed and put away. The module perceives the pictures of understudy's face, which have been enlisted physically with their names and ID codes in the database. Face recognition information and face acknowledgment information are recorded into the database.

2. RELATED WORK

A) RFID: Radio Frequency Identification (RFID) methods and have been efficaciously pragmatic to different areas as miscellaneous as transportation, health-care, agriculture, and hospitality production to name a few. RFIDtechnology simplifies programmed wireless documentation using

electronic passive and active tags with proper readers.

In this paper, an attempt is made to solve frequent lecture attendance monitoring problem in developing nation state using RFID technology. The solicitation of RFID to student attendance observing as advanced and ordered in this study is capable oferadicating time wasted during manual gathering ofattendance and an opportunity for the didacticadministrators to capture strict classroom information forallocation of appropriate attendance tallies and for furtheradministrative decisions.

B) FINGER PRINT: Biometric time and presence system is one of the most effective solicitations of biometric technology. Impression recognition is an established field today, but still identifying individual from a set of enrolled fingerprints is a time taking process. Most fingerprint-based biometric systems store the finger point's template of a user in the database. It has been usually assumed that the minutiae pattern of a user does not reveal any information about the original fingerprint. This belief has now been shown to be false; several algorithms have been proposed that can renovate fingerprint images from minutiae templates. Are construct the segment image, which is then converted into the gray scale image.

3. PROPOSED WORK

Attendance Management System is the slightest requesting way to deal with the individual recognizing evidence systems, face affirmation is known not the most trademark ones, since the face philosophy is the strategy that uses to perceive people in customary lives The Raspberry pi module is used for face disclosure and affirmation. The camera will be joined with the Raspberry pi module. The understudy database is assembled.

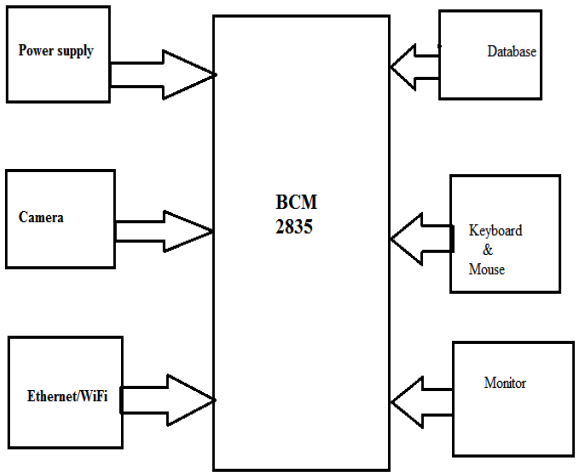

Fig 1. BLOCK DIAGRAMof BCM 2835

The database consolidates name of the understudies, there pictures and move numberthis raspberry pi module will be presented at the front side of class in a way that we can get entire class. Along these lines with the help of this structure, the truth will get to be clear in the long run saved. With the help of this system, it is so invaluable to record support. We can take support on at whatever time. Additionally, the inconspicuous components of the understudy will be sent to the contrasting office and their watchmen using GSM advancement. Despite this we will complete video spilling mode. In this mode the system records the video and move in online and viably open to understudies.

4. FACE RECOGNITION ALGORITHM

This section describes the software algorithm for the System.

The algorithm consists of the following steps

- Image acquisition
- Noise removal
- Face detection
- Face recognition
- Attendance

In the first step, image is captured from the CCTV camera. There are illumination effects in the captured image because of different lighting conditions and some noise which is to be removed before going to the next steps. Histogram normalization is used for contrast enhancement in the spatial main. Wiener filter is used for removal of noise in the image. There are other techniques like FFT and low pass filter for noise removal and smoothing of the images but Wiener filter gives good results.

a) LOCAL BINARY PATTERN

Face recognition has recently received momentous attention, especially during the past several years. At least two reasons account for this trend: the first is the eclectic range of commercial and law enforcement applications, and the second is the accessibility of feasible technologies after 30 years of research. Straight though up-to-date machine recognition systems have reached a certain level of maturity; their success is imperfect by the circumstances imposed by many real applications.

In theLBP approach for surface classification, the happenings of the LBP encryptions in an image are composed into a histogram. The ordering is then performed by computing simple histogram similarities. However, in view of a similar slant for facial image representation results in loss of altitudinal information and therefore one should codify the texture information while retaining also their locations. Such indigenous explanations have been gainininterest recently which is fathomable given the restrictions of the all-inclusive representations. Face description with local binary patterns. This histogram efficiently has an explanation of the face on three different levels of locality: the LBP labels for the histogram contain information about the patterns on a pixel-level, the labels are summed over a small region to produce information on a regional level and the regional histograms are concatenated to build a global description of the face. It should be noted that when using the histogram based methods the regions do not need to be rectangular. Both do they need to be of the same size or shape, and they do not necessarily. Have to shelter the whole image. It is also possible to have incompletely overlapping regions. The two-dimensional face description method has been extended into spatial-temporal domain. Admirable facial expression recognition performance has been obtained with this approach. Since the periodical of the LBP based face description, the system has already attained an established position in face analysis research and applications.

b) WIENER FILTER

In Image processing, the Wiener filter is a filter used to produce an estimate of a desired or target random process by linear time-invariant filtering of an observed noisy

process, assuming known stationary signal and noise spectra, and additive noise. The Wiener filters minimize the mean square error between the estimated random process and the desired process. The goal of the Wiener filter is to filter out noise that has corrupted a signal. It is based on a statistical approach, and a more statistical account of the theory is given in the MMSE estimator article. However, the design of the Wiener filter takes different approach. One is assumed to have knowledge of the spectral properties of the original signal and the noise, and one seeks the linear time-invariant filter whose output would come as close to the original signal as possible. Wiener filters are characterized by the following:

1. Assumption: signal and (additive) noise are stationary linear stochastic processes with known spectral characteristics or known autocorrelation and cross correlation

2. Requirement: the filter must be physically realizable/causal (this requirement can be dropped, resulting in a non-causal solution)

3. Performance criterion: minimum mean-square error (MMSE)

c) VIOLA-JONES ALGORITHM

The Viola–Jones object detection framework is the first object detection framework to provide competitive object detection rates in real-time proposed in 2001 by Paul Viola and Michael Jones. Although it can be trained to detect variety of object classes, it was motivated primarily by the problem of face detection. This algorithm is implemented in OpenCV. The object detection framework employs a variant of the learning algorithm to select the best features and to train classifiers that use them. The evaluation of the strong classifiers generated by the learning process can be done quickly, but it isn't fast enough to run in real-time. For this reason, the strong classifiers are arranged in a cascade in order of complexity, where each successive classifier is trained only on those selected samples which pass through the preceding classifiers. If at any stage in the cascade a classifier rejects the sub-window under inspection, no further processing is performed and continues on searching the next sub-window. The cascade architecture has interesting implications for the performance of the individual classifiers. Because the activation of each classifier depends entirely on the behavior of its predecessor, the false positive rate for an entire cascade is: Similarly, the detection rate is: Thus, to match the false positive rates typically achieved by other detectors, each classifier can get away with having surprisingly poor performance.

d) OPEN CV

Advance vision research by providing not only open but also optimized code for basic vision infrastructure. No more reinventing the wheel and disseminate vision knowledge by providing a common infrastructure that developers could build on, so that code would be more readily readable and transferable. Advance vision-based commercial applications by making portable, performance-optimized code available for free with a license that did not require being open or freeing themselves.

One of Open CV's goals is to provide a simple-to-use computer vision infrastructure that helps people build fairly sophisticated vision applications quickly. The Open CV library contains over 500 functions that span many areas in vision, including factory product inspection, medical imaging, security, user interface, camera calibration, stereo vision, and robotics. Open CV is written in C++ and its primary interface is in C++, but it still retains a less comprehensive though extensive older C interface. There are now full interfaces in Python, Java and MATLAB/OCTAVE (as of version 2.5). The API for these interfaces can be found in the online documentation. Ruby has been developed to encourage adoption by a wider audience. All of the new developments and algorithms in Open CV are now developed in the C++ interface.

e)AT&T FACE DATABASE

The AT&T Face database, sometimes also referred to as *ORL Database of Faces*, contains ten different images of each of 40 distinct subjects. For some subjects, the images were taken at different times, varying the lighting, facial expressions (open / closed eyes, smiling / not smiling) and facial details (glasses / no glasses). All the images were taken against a dark homogeneous background with the subjects in an upright, frontal position (with tolerance for some side movement).

f) YALE FACE DATABASE A

It is also known as Yale faces. The AT&T Face database is good for initial tests, but it's a fairly easy database. The Eigen faces method already has a 97% recognition rate on it, so you won't see any great improvements with other algorithms. The Yale Face database A (also known as Yale faces) is a more appropriate dataset for initial experiments, because the recognition problem is harder. The database consists of 15 people (14 male, 1 female) each with 11 grayscale images sized pixel. There are changes in the light conditions (center light, left light, right light), facial expressions (happy, normal, sad, sleepy, surprised, wink) and glasses (glasses, no-glasses).

g) EXTENDED YALE FACE DATABASE B

The Extended Yale Face database B contains 2414 images of 38 different people in its cropped version. The focus of this database is set on extracting features that are robust to illumination, the images have almost no variation in emotion/occlusion.I personally think that this dataset is too large for the experiments I perform in this document. You better use the AT&T Face database for initial testing. A first version of the Yale Face database B was used in [BHK97] to see how the Eigen faces and Fisher faces method perform under heavy illumination changes. [Lee05] used the same setup to take 16128 images of 28 people. The Extended Yale Face database B is the merge of the two databases, which is now known as Extended Yalefacedatabase B.

5. RASPIBERRI PI AND PYTHON

The Raspberry Pi is the super low cost computer with credit card size single board.It is the perfect tool for aspiring computer scientists because it is affordable and difficult to break.It has developed in

the UK by the Raspberry Pi foundation in 2009, with the intention of promoting the study of basic computer science in schools and to develop interest among kids and adults.Raspberry Piboard is a miniature marvel, packing considerable computing power into a footprint no larger than a credit card. It's capable of some amazing things, but there are a few things you're going to need to know before you plunge head-first into the bramble patch.

A) ARM vs. x86

The processor at the heart of the Raspberry Pi system is a Broadcom BCM2835 system-on-chip (SoC) multimedia processor. This means that the vast majority of the system's components, including its central and graphics processing units along with the audio and communications hardware, are built onto that single component hidden beneath the 256 MB memory chip at the centre of the board (see Figure 1-1). It's not just this SoC design that makes the BCM2835 different to the processor found in your desktop or laptop, however. It also uses a different instruction set architecture (ISA), known as ARM.

The BCM2835 SoC, located beneath a Hynix memory chip Developed by Acorn Computers back in the late 1980s, the ARM architecture is a relatively uncommon sight in the desktop world. Where it excels, however, is in mobile devices: the phone in your pocket almost certainly has at least one ARM-based processing core hidden away inside. Its combination of a simple reduced instruction set (RISC) architecture and low power draw make it the perfect choice over desktop chips with high power demands and complex instruction set (CISC) architectures. The ARM-based BCM2835 is the secret of how the Raspberry Pi is able to operate on just the 5V 1A power supply provided by the onboard micro-USB port. It's also the reason why you won't find any heat-sinks on the device: the chip's low power draw directly translates into very little waste heat, even during complicated processing tasks. It does, however, mean that the Raspberry Pi isn't compatible with traditional PC software. The majority of software for desktops and laptops is built with the x86 instruction set architecture in mind, as found in processors from the likes of AMD, Intel and VIA. As a result, it won't run on the ARM-based Raspberry Pi. The BCM2835 uses a generation of ARM's processor design known as ARM11, which in turn is designed around a version of the instruction set architecture known as ARMv6.

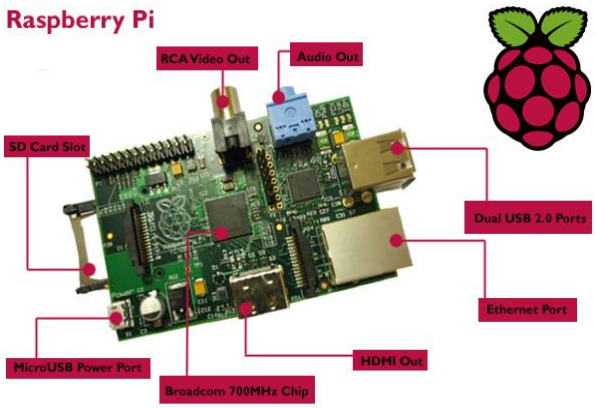

Fig 2. ON-CHIP RASPBERRY PI

B) Introducing Python

Flexible and powerful, Python was originally developed in the late 1980s at the National Research Institute for Mathematics and Computer Science by Guido van

Rossum as a successor to the ABC language. Since its introduction, Python has grown in popularity thanks to what is seen as a clear and expressive syntax developed with a focus on ensuring that code is readable.

Python is a high-level language. This means that Python code is written in largely recognizable English, providing the Pi with commands in a manner that is quick to learn and easy to follow. This is in marked contrast to low-level languages, like assembler, which are closer to how the computer "thinks" but almost impossible for a human to follow without experience. The high-level nature and clear syntax of Python make it a valuable tool for anyone who wants to learn to program. It is also the language that is recommended by the Raspberry Pi Foundation for those looking to progress from the simple Scratch.

This line tells the operating system to look at the $PATH environment variable—which is where Linux stores the location of filesthat can be executed as programs—for the location of Python, which should work on any Linux distribution used on the Pi. The$PATH variable contains a list of directories where executable files are stored, and is used to find programs when you type theirname at the console or in a terminal window.To achieve the goal of printing out a message, you should use Python's print command. As its name suggests, this commandprints text to an output device—by default, to the console or terminal window from which the program is being executed. Itsusage is simple: any text following the word print and placed between quotation marks will be printed to the standard outputdevice. Enter the following line in your new project:

print "Hello, World!"

The final program should look like this:

#!/usr/bin/env python
print "Hello, World!"

If you're creating the example program in IDLE rather than a plain text editor, you'll notice that the text is multicolored (seeFigure 11-2, where colors are represented as differing shades of grey in the print edition). This is a feature known as syntaxhighlighting, and is a feature of IDEs and the more-advanced text editing tools.

6. FLOW STATE

First we have to selects the attendance mode or video spilling mode. If attendance mode is activated then capture faces and recognizes the image faces and maintains the attendance, after the given time period the attendance is posted to authorities through internet, If video spilling mode activated the captured video uploaded to internet through LAN cable.

7. CONCLUSION

In this paper to achieve an artificial intelligence system for data management and processing system using small gadgets. In this Raspberry is connected to web camera that can be used to take high-definition video, as well as stills photographs.The user wants to know the modulethat has a five megapixel fixed-focus camera that supports 1080p30, 720p60 and VGA90 video modes, as well as stills capture.

This raspberry pi module will be presented at the front side of class in a way that we can

get entire class. Along these lines with the help of this structure, the truth will get to be clear in the long run saved. With the help of this system, it is so invaluable to record support. We can take support on at whatever time. Additionally, the inconspicuous components of the understudy will be sent to the contrasting office and their watchmen using GSM advancement. Despite this we will complete video spilling mode. In this mode the system records the video and move in online and viably open to understudies. . This raspberry pi module will be presented at the front side of class in a way that we can get entire class. Along these lines with the help of this structure, the truth will get to be clear in the long run saved. With the help of this system, it is so invaluable to record support. We can take support on at whatever time. The list of the attendance will be displayed on the webpage through IOT (Ethernet,Wi-Fi).

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