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DEVELOPING A HIGH PERFORMANCE REAL TIME PEOPLE DETECTION SYSTEM

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ABSTRACT

A lot of research has been conducted to detect people within images and video frames, Our goal in this research is to develop a protection system against thefts, by analyzing video frames incoming from surveillance cameras, and running early alarm to discover, detecting thieves in real time. Theft has many damages in the community. Failure in putting strategies for preventing theft has caused material, moral and psychological harm to the humans. All new technology comes to find rest and stability for the humans, by monitoring the properties especially when the owners are absent or far away. Now days the presence of cameras becomes very essential for monitoring places, it limits from theft , burglary, for this reason we have seen lot of theft occurs when a power outage. We want to prevent theft, narrowing the time for robbers and confusing them during robbery ,not only to alleviate its effects or pursuing criminals and disclosure them, this arrangements require more efforts and calling the police…etc. Our primary goal is for deterring criminals, we need achieving a preventive policy. In this research we could get a high rate of classification equivalent to 96% of detected humans in implementation time of approximately 0.5 seconds.
Within this article, we will review the previous studies which had been done for discovering, detecting the humans and the steps which performed effectively are beside what enhancements we've made for. in summary ,we will review the obtained optimal values of the used parameters and analyze them .

Keywords: *Object Detection, Real Time Human Detection, Real Time ANTI-THEFT System, SURVEILLANCE System, People Detection, Background Removal In Video*

1. INTRODUCTION

The research at automated surveillance systems aims to automate objects discovery and distinguish whether it is a target or not. Where it is possible that the moving object is human being or another organism like cats or dogs or etc. In the first case after distinguish it is a human being the system must be react by recognizing the character and a decision must be taken regarding it. Discovering people process usually related to a set algorithms and steps that is used to filters the received images and applying some image processing techniques like convert image to gray scale. Then in order to remove noisy and abnormal point, the predication of threshold to black and white colors converting is required. Next, some operations are applied by using filters and some techniques of image processing on related components which are called contours, to select some of them to be some of the inputs for the SVM classifier (Support vector machine) .The SVM takes also another inputs such as features extracted from the contours, that is resulting from studying the geometric characteristics of each contour separately .In this end, we can determine whether the image contains a human or not, and the designate their position. The first article published from this research [19] is concentrated on how we detect moving object inside a movie. Our developed system aims to include and enhance two algorithms to recognize whether the detected objects are humans or not. The first algorithm depends on a database of images (training samples). This database contains the human top parts with different sizes and positions .This algorithm based on comparing the contours with these images, and calculating the percentage of similarity to find whether this contour represents a

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person or not[18]. The second algorithm is more flexible, it depends on studying the geometric properties of the shape of the contours extracting from the first phase since the human body is characterized by ahead with the neck and shoulders [17].

Many methods used for human recognition, SVM (Support vector machine) are used to analysis and recognize pattern[7] .Other methods are used training samples likes Cascade algorithm[8]. The two later methods are suffered from the huge number of training sample, in addition to the relative slow in execution time. Template matching [11] is used in this context, but the accuracy is not enough due to color confusion. Others methods depend on hierarchical Gaussian process latent variable model [16], but it still suffers from some false positive cases.

Our research aims to develop and merge some methods basing on discovering heads and sides of humans which return the amount of the similarity with the body stored on the dedicated DB before. These models are considered as inputs for SVM which classifies the incoming sample into humans and non-humans. Some essential features of a human body recognition are calculated like the length between the center of body and some distinctive points like the head, shoulders and feet. These features are considered also as SVM inputs. Finally, in order to remove noisy mobile objects, some initial Classification and filtering operations are made to reduce complexity and achieve a enhanced processing speed rate.

The reset of this article is structured as follow. Within this article after this introduction, we will review the previous studies which had been done for discovering, detecting the humans, in addition for developing several ways and methods for achieving these purposes . Then, we will explain the general lines of our research and what the steps which performed effectively are beside what enhancements we've made .After that , in summary ,we will review the obtained results and Analyzes them .which we have got . Finally we end by a conclusion and perspectives.

2. LITERATURE REVIEW

Researchers have suggested in [15] a method for the detecting people and estimating the number of people in the supermarket via surveillance cameras using background abstraction , then extracting the moving objects . Thus they applied template matching for testing whether the body is a human or not. The results of the experiment have shown that the proposed method has a good performance in the detection of people, but in some cases these results were not accurate in detecting of a human body when he moves in a similar color environment. In this case, the color of the body is similar to the color of background . Or if the moving man was away from the camera (the distance between the person and the camera is too far). The researchers suggested in [16] another method to detect the moving human and to follow him through building model by using human walking cycle which is called HGPLVM (hierarchical Gaussian process latent variable model), they built a multiple models for the movement of a human in different positions , then they compared these models with the detected moving bodies, to determine if it was similar to the pedestrian. The results of this experiment showed good performance, but it has suffered from false positive cases many times , it may pick up some counterfeit objects .Researchers presented in [3] a model with many training samples, these samples were classified using (Support vector machine) SVM[7]. It classifies offered samples to return a number of these types, as the possible object might be one of them. Then the types that have got the highest number of votes are further classified using a another classification depending on Cascade [8] that is used to choose the best one among the selected objects. Tests' results have shown a high percentage of success of identifying objects. Still, problems encountered in the last research were the relative high implementation time, as a result of classifying many models; in addition to, the need for a large number of training samples to be trained regularly. As for [4] researchers submitted their models in real-time, relying on Average of Synthetic Exact Filters (ASEF) [9]. This is among the fast algorithms in implementation time; it depends on conducting some mathematical processes over the object to be compared with previously stored models. Based on such calculations it can know whether the object is identical to one of such models or not The problem is that it is greatly sensitive to lighting and disruption , and also used filter ASEF, is not efficient enough on changing the angle of the camera view, and its inability to handle several moving objects simultaneously in different sizes in the same image and at the same time.

3. METHODOLOGY

What has been implemented previously is to delete the background, and just keeping the moving object in the images. These images may

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contain some non-real objects , resulting from disruption so that, initially some processes are applied to get rid of faked objects in the image and retaining only the real moving objects in the image (Foregrounds). Then the resulting image is converted to black and white in comparison with the threshold to facilitate the processing and reduce the complexity resulting from colored images.

Then we will look for the objects or relating points which represent one object called (contours) .In order to discover the contours we will apply Blob Counters [10] , which finds linked and related chain of the number one (1) within the image. Each chain forms an independent body. Now we will determine whether the captured body is a human or not. So we need to build a classifier whose input is the classified object and its output is (Person, Non-person).

As we know, the neck of a man is one of the narrowest parts of the body, as for the shoulders are the widest parts of the human body. We can get benefit from this successive difference in dimensions between neck and shoulders to distinguish by using two methods :

3.1 Head-Shoulder Detection Using Normalized Cross-Correlation

This method depends on a comparing a group of stored models(templates) for curves of the human head with objects in the image. These objects were obtained from the discovery of the moving objects. After that calculating the percentage of similarity between them, by applying the NCC. NCC returns the amount of similarity (Y) between the moving object and stored models " see Fig. 1 "

3.2 Geometrical Properties Algorithm

This method depends on using different models for human neck and shoulder in different positions . this model is flexible and accept some minor mistakes in measuring the height of the head, then finding the center of gravity for the body. By depending on the distance between the center of the body and the edges of the studied body , we can identify the head, shoulders and foot. Therefore, we can determine whether object is a human being or not. " see Fig 2 "

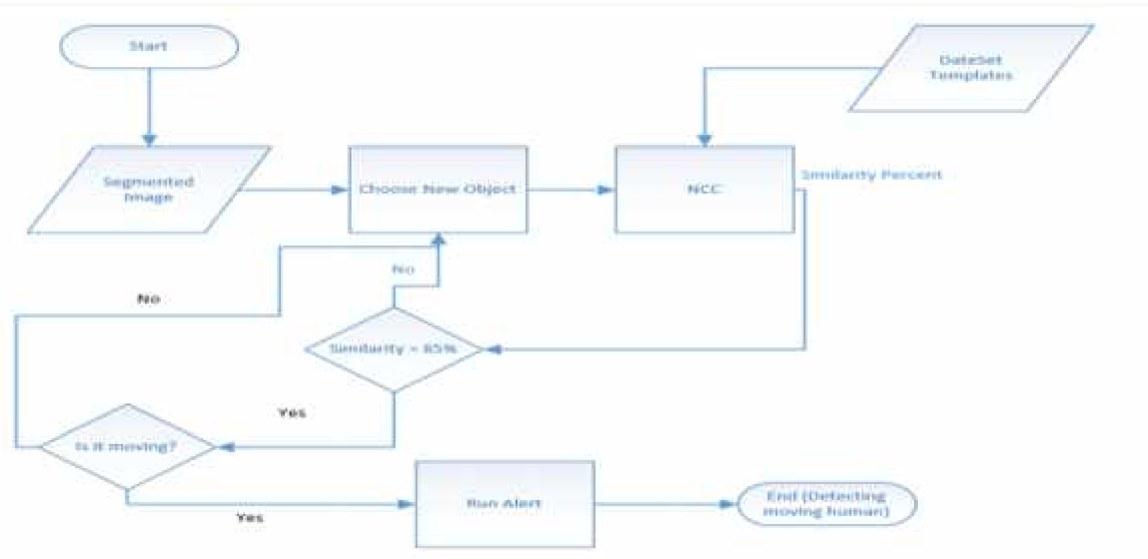

Fig 1: Flow Chart Of The Algorithm.

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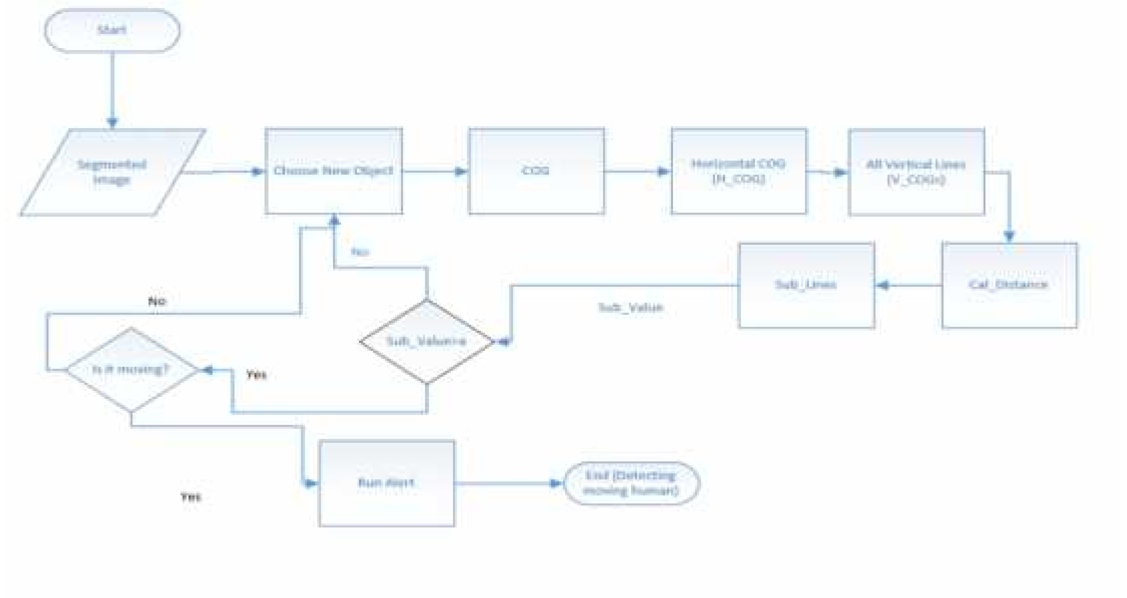

Fig 2: Flow Chart Of The Second Algorithm

3.3 Implementing plan &initial results

We got the resulting image from removing the background , which is represented the first phase, in other words, this image contains only the moving objects and some faked objects resulting from disruption. we'll convert the resulting image to black and white by predicting threshold. So all pixels that have a value less than this threshold are considered black (logical zero), and all pixels that have value more than this threshold will be white (logical 1).

In the beginning we decided that each moving pixel resulting from the phase of removing the background is white, and all static pixels will be black . Therefore all moving objects will be in white in the resulting image. Due to differences in lighting, and disruption which come from the camera itself , some moving faked objects may appear in the resulting image as we mentioned before. Here we will try to get rid of these faked points by converting the colored image to gray. After that the gray image will be converted to black and white. By finding the threshold value (Dynamic Threshold), we can get the threshold value by calculating the Histogram of the resulting image from the removing the background .

At this point (threshold value) a sudden change occurs in colored edge , so we will consider all colored points that come before this edge (threshold value) are in black and all the colored points that come after this edge are in white. We should reduce noise in the image , because some of the objects will be intermittent and distorted as a result of the conversion process. We can improve the shape of the objects via dilation, by increasing the size of the white objects in the images. So we get rid of all doubted objects, that they don't belong to shapes the humans being. At this stage ,storing will be done for all related components in the image ,after that we will conclude areas of related components in the image, that form what is called the contour .So each contour expresses a set of pixels ,every pixel has value of the logical one, (with white color), these pixels are connected with each other to form one body. Then we expand the white spaces enough, to avoid overlapping the convergent objects with each other. At the same time ,this expansion must fill all spaces resulting of cutting the body into many parts. Late ,we will calculate the characteristics of each of the generated contour such as; area , which reflects the number of related pixels that manufacturers it . After that we will find the rectangle surrounding the contour, and we will find center of this rectangle and calculate its length, width and area. By benefiting of this information, we can initially rank and classify each contour . we can determine whether the body is likely humans being or not, by comparing the characteristics of the current contour with a number of the stored templates which contain different stored parts of the human. After these comparisons, the algorithm can initially determine the candidate objects to be Man and objects which are not eligible to be a Man .

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Suppose we are analyzing a video in a room ,as in " Fig. 3-1 " Then after several frames we will get a new image containing two men as in " Fig. 3-2". When the first phase of our research is applied (removing background) we will get "Fig 3-3", we note through the "Fig 3-3" the algorithm picked up moving objects in the image, but it also picked up some foreign objects that are not basically moving.

Fig(3-1) Shows The Image Resulting From Cutting Video As It Is Real Time

Fig(3-2) Shows Moving Objects In The Current Image

Fig (3-3) Shows The Extracting Of Moving Objects With Some Disruption

We will calculate the Histogram of the image in "Fig. 3-3" We can predict the threshold value of converting to the black and white colors, we can see the value of threshold as in" Fig 3-4 ".

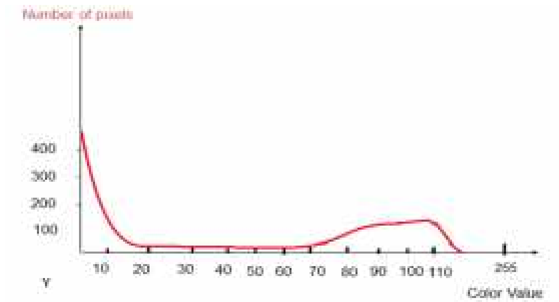
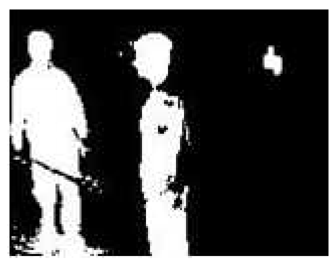


Fig 3-4 Shows The Threshold Value

The horizontal axis represents the colored values which belong to the range [0-255],while the vertical axis represents the number of pixels that take these values . The curve reveals the number of pixel increase quickly when colored value is zero or close to zero ,these pixels represent the color of background in the image practically .At the value near to 10 the curve extremely decreases until value 20 then stays steady until value proximately equals 80 ,the curve slowly jumps to indicate actually the number of moving pixels in the image . So we can determine the value, the curve begins to rise, which is the threshold, see "Fig.3-4" .That means each pixel has a colored value of less than 80 will be in black and each pixel has a colored value greater than 80 will be painted white as in " Fig. 3-5"



"Fig. 3- 5 " Shows The Converting Of Extracted Objects Into White And Black Color .

Now we will create the contours , in another words we will find the white related components together, which form one body, that means one contour .

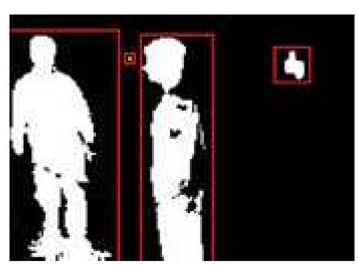


Fig 3-6 Shows Detecting The Objects Which Represent The Number Of Detected Contours

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Finally. we will get the three major components (3 contours) and one single faked point as in as shown in "Fig. 3-6" . We will examine the three obtained contours, Let's assume that the ratio of the length to width of the normal Man is from 20% to 40%, Let's start contours from left to right side, we will test the length and width of the surrounding rectangle for the first contour , we found ratio of the length to the width is about 36,9% (the length of the rectangle equals 109 and 40 for the width), this percentage is reasonable and logical value . In other words, the first contour is candidate to be Man, and it will as an input for the next classification stage. The second contour has length equals 3 and width 3 ,so the ratio of the length to the width is about 50%, so this contour is not qualified to be a Man , especially if we compare its size to the actual size of a man , so this contour will be deleted . As for the third one the percentage is 28% (107 to 30) . It is within the range , so it will be as an input to the classifier for the coming process .The last contour will be deleted as we mentioned earlier. With this development, we alleviated the processing of the classifier. Because , we don't pass the objects which have characteristics that are not relevant to the characteristics of humans . In this case, processing speed increases and complexity decreases. We use a classifier , that has an input (nominated objects) and output (human , non-human). The classifier separates the sample by using a separated single line into two classes; for instance white circles are not humans and dark circles are humans. As in "Fig .3-7".

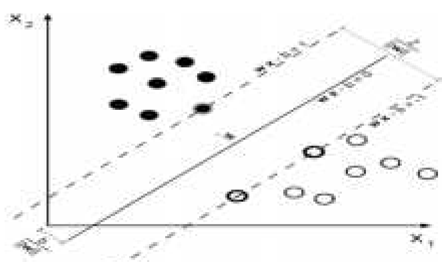

Fig 3-7 Shows Exemplary Separation Line Between Colored Pixels

But, to make the classifier more efficient, we do not pass the nominated contours (qualified) to the classifier directly ,but we extract some of the characteristics (Features) of each contour, which describe the detected and resulting object . Then, these features are passed to the SVM to identify whether it was human or not . One of the most important extracted features is the degree of curvature of the upper section of the contour that expresses the head. If the curve was not round enough, it will not give the true shape of the head. All that occurs by comparing it to a number of stored curves of the head. We achieve that by calculating the ratio of the similarity between the shapes of objects we have stored, and the upper part of the studied objects using NCC , which reverts the percentage of similarity (Y) . If this ratio was little then the features will not be as an input for the classifier and will not be entered . Conversely if it is good, it will be one of the inputs of SVM .

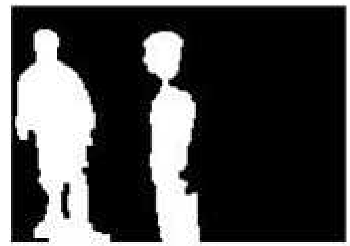

Fig 3- 8 Shows The Actual Moving Objects

One of other inputs of the SVM is the distance between the center of the body and the head ,shoulders and feet. We can calculate these inputs depending on the Geometrical Properties Algorithm. In the end, the final output will be yes or no, if it is yes this means that the moving object is a Man, therefore it must trigger an alarm. In the previous example, we have two nominated objects. These objects will be as inputs for the classifier SVM. First, deleting the abnormal points, and performing some operations to improve the resulting image to get the "Fig. 3-8".

We must find the curvature of the head of both forms through the method NCC, for getting only the value (Y) which is the similarity ratio between the two shapes in comparison with the stored templates of the head of the humans.

We note in "Fig. 3-9 " that shows the ratio of similarity between the previous shape and the natural shape of the human , and these values will be inputs of the classifier.

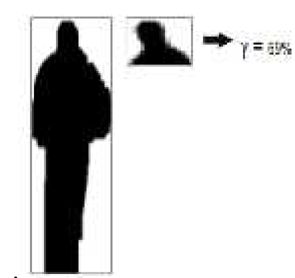

Fig. 3-9

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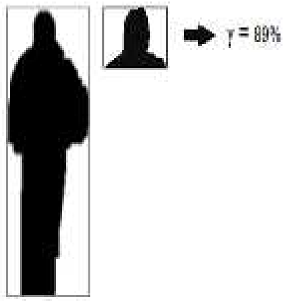

Fig. 3-10

Since the value of the similarity (Y) as shown in " Fig. 3-10 " is greater than 85%, which is the threshold that we have identified it, so this shape is definitely a Man, therefore, in this case, we have a moving person in the video clip . If the value is less than 85% as shown in "Fig. 3-9", In this case, we will find a center point of the body, Then we calculate the distance between the center point of the body and the highest point in this figure, which represents the head.

Also we will calculate the distances between the center point of the body and the lowest point, which represents the feet and the highest point of the upper parts of the shape, which represents the shoulders as in "Fig. 3-11" below.

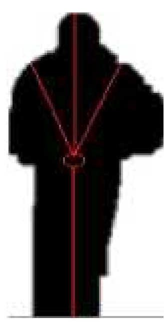

Fig 3-11 Shows The Required Dimensions For Calculating

In this case, we must calculate the distance between the highest point and shoulders, this value represents the length of the head with the neck (in our example here it equals (11), also, we must calculate the distance between the shoulders and the center of the body, in this case of torso ,the distance approximately should be 3 * head length ,as in the figure (3-11) , it was 30 ,which is nearly 3 * 11, the last distance is between the center of the body and feet: which is in the natural state, this distance must be 4 * head length. In our example it was 39 . All these values will be as inputs to classifiers SVM. Finally, the classifier reveals that shape is a Man, then the algorithm must run the warning.

4. RESULTS AND ANALYSIS

Experience is applied on 50 moving object, 25 of them were actually a Man , and 25 were strange objects (non-Man), different shapes. We'll examine the impact of parameter Y, this parameter results from the ratio of the resulting similarity from NCC. In other words, our goal is not only capturing and classification of 50 objects , but we will determine that the 25 objects are human being and the rest are not. Otherwise we will get the False positive cases. Let's suggest that the number of training sample (templates) are 10 ,and lets study the impact of the parameter (Y) which may take values ranging between 0 and 100, according we can change the value of this parameter from 0 to 100. We can notice that when its values are approximately 0, most human and non- humans objects are classified as human. This means that we get 50 % false positive cases and 50% were correctly classified. After that we gradually increase the value of parameter to become 30 .At this value 41 of 50 objects are classified as human and 9 objects are classified as non- human, despite the fact that all these 9 objects are moving objects and are non-human, on the other hand, 41 objects that are classified as a human are divided into two parts: 25 humans and 16 non-human, This means that 16 objects are classified wrongly and 25 are classified correctly. In addition to that 9 objects are shown as correctly non-human. The number of objects that are correctly classified are 25+9=34 which means the correct percentage is 68% .We continue increasing the value Y till it becomes Y= 60 . Here we notice that 31 objects are classified as humans ;(among them there are 25 real humans and the rest are wrongly classified), 19 objects are classified as non–humans and truly

They are. In other words, there are 19 objects that are not humans and they are truly classified, in addition there are 25 objects that are truly classified as human. In conclusion the numbers of objects that are correctly classified are 19+25=44, which means the correct percentage is 88%. We continue increasing the value Y till it becomes y= 80 .We notice 23 objects are classified as humans ,and they are humans in fact .however other 27 objects are not classified as humans , 25 are not really humans ,but only 2 of them are real humans, which are wrongly classified). That means 23+25=48 are correctly classified in a percentage about 96% of objects. On the other hand, 4% are wrongly classified. That is the best result we could reach in our research.
With regard to the time of execution within the real time, we notice the average of implementation time

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is about 0.5 second from the beginning of processing till classification.

Generally speaking ,the more we can classify samples more accurately, the more execution period increases , but the increasing does not exceed 0.1 second .For example , for the value Y=0 , we notice the execution time is about 0.4 second , in general ,gradually the increasing percentage of the correct classification to take value 0.569 second ,when the classification finished 96% of sample ,that means when the value was Y=80 ,this value is the average execution time of our work .

See "Table 1" and "Fig .4.1"

"Table 1": shows the impact of parameter Y

The horizontal axis represents the values of studied parameter, while the vertical axis represents both the ratio of classified samples correctly and the cost of performance with milliseconds

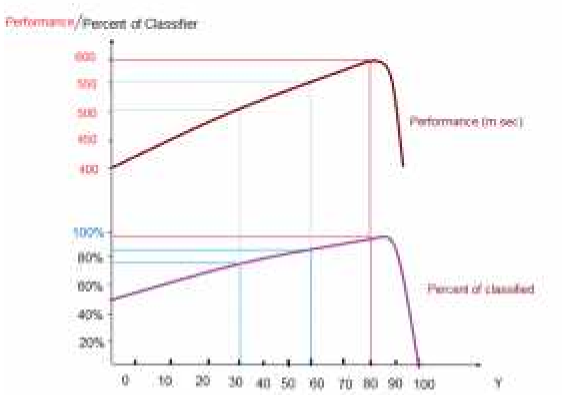

Fig 4.1 : Two Curves : Show The Changing Of The Values Of Parameter Y To The Cost In Millisecond , & Percentage Of Classifying .

We notice the curve takes value 50% when Y equals to zero whereas the parameter Y reflects the minimum accepted samples, which achieved the percentage of similarity, consequently if we want to calculate similarity rate of any objects in comparison with the head stored templates, surely the similarity will be equal or more than zero and this value is greater than the minimum of Y=0.Thus every classified objects will have probability of 50% to be humans because we have only two types (person – non person), this value is the lowest value of classification , it needs the lowest time of processing equally 0.4 seconds. Then the curve gradually increases as the result of classifying many objects correctly. Whenever the value of Y increases, the correct classified objects increase, till we reach to the maximum value of classification rate which is 96% when Y approximately equals 80. That means every object gets value very close to value 80 , the classifier will consider it as a Man and time of implementation in this case is 0.6 seconds which is the maximum obtained time for processing .When the value of Y raises over 80 , the curve rapidly falls , because over value 80, the restrictions on similarity rate become harder and more accurate to achieve, so when Y equals 100 the percentage of similarity takes zero because it is almost impossible to get an object having 100% matching with the stored templates of head .This explains the decline of curve when y takes values greater than 80 and the time of implementation returns to 0.4 second. See cart A

We'll examine the impact of another parameter which is called "adaptiveThresholdBlockSize" This parameter is useful for converting a gray type to black and white colors.

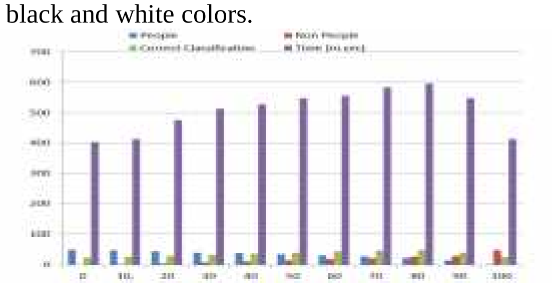

Chart A: Shows The Results Of The Parameter Y Of Each Category And The Correct Percentage Of Classification To The Used Processing Time.

It reflects the number of adjacent pixels that are used for the calculating the threshold of converting into black and white colors. In other words, this parameter calculates the required size of block of converting into white and black. Example if the value of the parameter equals 1, this means that the size of the block contains only one pixel. When the value equals 3 then the size of the block will contain (3*3=9 pixels) as "Fig. 4-2" , this leads that we will calculate the average colorimetric values of these 9 pixels next we will find the threshold into black and white colors, by replacing the colorimetric value of each pixel with the resulting average of colorimetric values of 9 combined pixels.

1	4	7
2	5	8
3	6	9

Fig. 4-2

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Experimentation is applied on 80 objects, 40 of them are actually a Man and 40 of them are not (non-Man). We will fix the value of parameter (Y) and change the value of parameter adaptiveThresholdBlockSize for studying the effect of last parameter. We will increase the value of this parameter from 1 to 21. When its value equals 1, we notice that 45 objects are classified as Man but 5 of them are not a Man, 35 objects are classified as non-Man and they are in fact. This means 35+40=75 objects are classified correctly; this indicates that the correct percentage of classification is about 93%. Similarly, when the value of this parameter becomes 3 , we notice that 37 objects are classified as a Man and they are really in fact, 43 objects are classified non-humans although there are 3 objects are a Man , this means the classifier detects them wrongly ,that leads 37+40=77 are classified truly and the correct percentage of classification is 96% which is the best result for this parameter . After increasing the value of this parameter, the classification ratio will decline. when the value equals 5 , the percentage will become 95%, this percentage will equal 90% at value 5 to 7, the lowest classification percentage of this parameter is 50% when its value equals 21 , see "Table 2" and " Fig.5"

"Table 2": Shows The Impact Of The Parameter Adaptivethresholdblocksize

As shown in" Fig .5" The horizontal axis represents the values of studied parameter , while the vertical axis represents both the ratio of classified samples correctly and cost of performance with milliseconds . We notice if the value of parameter increases more than 21 then the percentage similarity of classification becomes constant about 50% and time of implementation remains the same around 4 seconds.

As we mentioned the parameter AdaptThresholdBlockSize represents the size of block. We will depend on this size for converting the image into white and black colors .So that every block must contain at least one pixel, and this explains why the curve starts from value 1. At this points we achieved a higher percentage of similarity about 93% .When the parameter takes value 3 , the percentage become 96% , which approximately 95% at value 5 , comes up to this is because of finding the size of block depending on average of all points according the (3 or 5) not one point , this helps us for deleting the abnormal points in the image . On other words, we depend on finding the medium of colorimetric values of adjacent pixels in the image ,this helps us in clarification of the objects and deleting the abnormal points , consequently higher percentage of classification is linked with higher processing time about 0.6 seconds .When the size of block increases more than 5 or 7 , we notice that the average value for block with (7*7=49 pixels) is comparatively big , so that some distortion occurs to the essential features of the image , there will be decrease in in this percentage and in the time of implementation. Whenever the size of block increases, the distortion increases and implementing time decreases. Even if the size of block becomes very large (19*19), (21*21), (23*23) then a huge distortion occurs in the image, therefore all the human bodies will classified as non-humans bodies even though the classifiers will consider all incoming objects as non-humans. Finally, the percentage will become 50% because we have only two types.

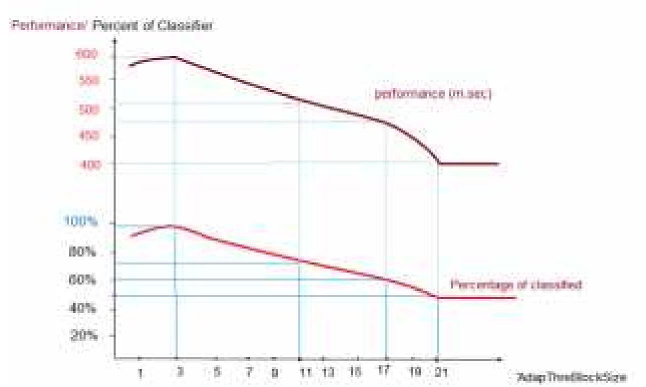

Fig 5 : Two Curves : Show The Changing Of The Values Of Parameter Adaptivethresholdblocksize To The Cost In Millisecond & Percentage Of Classifying .

The curve remains steady at the size of large blocks, with approximately 0.4 second implementation time. See cart B

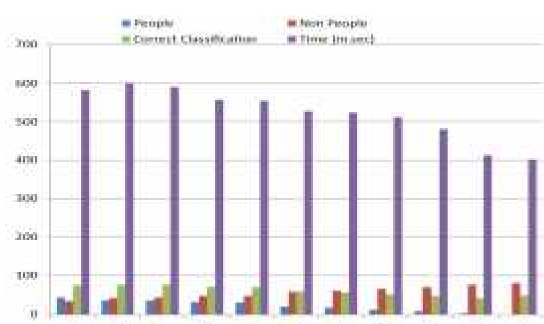

Chart B: Shows The Results Of This Parameter Of Each Category And The Percentage Of Correct Classification To The Used Processing Time.

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20th August 2015. Vol.78. No.2

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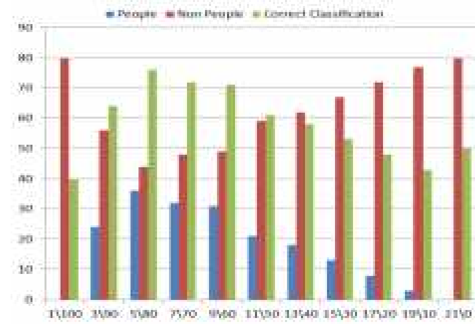
The "Table 3 " shows the impact of both parameters when working together , after testing 80 objects (40 of them are humans , 40 of them are not) .Where the value of parameter adaptiveThresholdBlockSize gradually increases from 1 to 21 ,while the value of parameter Y gradually decreases from 100 to 0. Generally, the relation between the parameter adaptiveThresholdBlockSize and the percentage of classification is reverse, while the relation between the parameter Y and the percentage of classification is discursive, as we have seen previously. We notice that when the value of Y equals 100, the percentage of classification will be 50%, regardless the value of the second parameter. That means all passed objects will be classified as non-humans, as we have discussed previously. On the other hand when the value of Y equals zero the percentage of classification will be also 50% regardless the value of the other parameter.

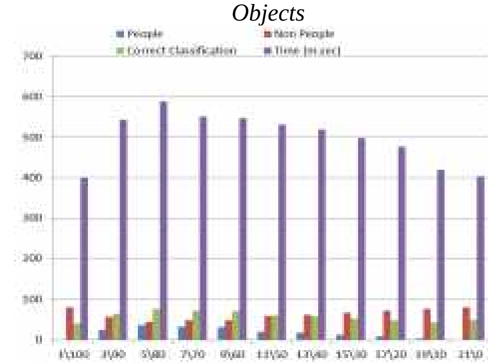
Similarly, when the value of adaptiveThresholdBlockSize becomes over than 19 ,then the percentage of classification will be approximately 50% without significance of the value of Y, due to the large distortion of resulting image from converting into white and black colors , all objects will be classified as non-humans. We will adjust the values of both parameters, we are aware that when the value of parameter Y increases, the rate of correct classification increases. From the other side, when the value of parameter adaptiveThresholdBlockSize decreases , the rate of correct classification increase .Even if the value of parameter y equals 80 and the value of adaptiveThresholdBlockSize equals 5 we will get the highest correct percentage of classification which is nearly 95% . As shown in "Table 3"

"Table 3": shows the impact of used parameters together

According testing the impact of two parameters from the above table the chart C represents the values of two previous parameters together and the percentage of the classification for each other .While the chart D represents the impact of two previous parameters with the percentage of classification and time of implementation . See charts below the results when both parameters work together



Adaptivethresholdblocksize \ Y Value
Chart C: Shows The Number Of Correct Classified Objects



Adaptivethresholdblocksize \ Y Value
Chart D: Shows The Results To The Time Of Processing.

5. FUTURE HORIZONS

Sometimes, overlapping happens in processing operation among the objects in close proximately to each other's, so the processing fails in separating the areas between two close persons, and consider them as one person .It is possible to think of practical sequence of morphological operations, applying it leads to separation of those areas accurately instead of leaving them in the resultant image.

Implementation of skin detection .This can be done through a huge colored database which contains the largest possible of number of colors of humans beings. But we will face the problem of the presence of colors in the image that similar to those in the database. Thus, it will give wrong results and we are going to be forced to use a new technology to form knowledge, whether the discovered object is a human being or not.

6. CONCLUSION

After this research, we could improve the system which could find out the moving objects in video clips, in order to decide whether these moving objects are human beings or not. This can be done through classifying the objects. we could through

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depending on applying two methods which are considered as an inputs to the classifier to find out Man. after adjustment the value of parameter y .finally we obtained a true percentage of classification equal 96% from the classified objects ,during a period of an average and complete processing 0.5 second within the real time .

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"Table 1": shows the impact of parameter Y

Y Value	People Detected			Non-People Detected			Correct Classified	Percent	Performance cost
		Real Human	Non-Human		Real Human	Non-Human			
0	50	25	25	0	0	0	25+0=25	50%	403 m.sec
10	48	25	23	2	0	2	25+2=27	54%	413 m.sec
20	45	25	20	5	0	5	25+5=30	60%	476 m.sec
30	41	25	16	9	0	9	25+9=34	68%	513 m.sec
40	39	25	14	11	0	11	25+11=36	72%	524 m.sec
50	35	25	10	15	0	15	25+15=40	80%	548 m.sec
60	31	25	6	19	0	19	25+19=44	88%	556 m.sec
70	28	25	3	22	0	22	25+22=47	94%	584 m.sec
80	23	23	0	27	2	25	23+25=48	96%	596 m.Sec
90	15	15	0	30	5	25	15+25=40	80%	547 m.sec
100	1	1	0	49	24	25	1+25=26	52%	413 m.sec

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"Table 2": shows the impact of parameter adaptive Threshold BlockSize Value

adaptiveThresh oldBlockSize Value	People Detected	Real Human	Non-Human	Non-People Detected	Real Human	Non-Human	Correct Classified	Percent	Performance cost
1	45	40	5	35	0	35	40+35=75	93%	582 m.sec
3	37	37	0	43	3	40	37+40=77	96%	599 m.sec
5	36	36	0	44	4	40	36+40=76	95%	590 m.sec
7	32	32	0	48	8	40	32+40=72	90%	557 m.sec
9	31	31	0	49	9	40	31+40=71	88%	554 m.sec
11	21	21	0	59	19	40	21+40=61	76%	528 m.sec
13	18	18	0	62	22	40	18+40=58	72%	524 m.sec
15	13	13	0	67	27	40	13+40=53	66%	512 m.sec
17	9	9	0	71	31	40	9+40=49	61%	481 m.Sec
19	3	3	0	77	37	40	3+40=43	53%	413 m.sec
21	0	0	0	80	40	40	0+40=50	50%	402 m.sec

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"Table 3" : shows the impact of used parameters together

adaptiveThreshold BlockSize Value	Y Value	People Detected			Non People Detected			Correct Classified	Percent	Performance Cost
		Total	Real Human	Non-Human	Total	Real Human	Non-Human			
1	100	0	0	0	80	40	40	0+40=40	50%	401 m.sec
3	90	24	24	0	56	16	40	24+56=64	80%	544 m.sec
5	80	36	36	0	44	4	40	36+40=76	95%	588 m.sec
7	70	32	32	0	48	8	40	32+40=72	90%	551 m.sec
9	60	31	31	0	49	9	40	31+40=71	88%	548 m.sec
11	50	21	21	0	59	19	40	21+40=61	76%	531 m.sec
13	40	18	18	0	62	22	40	18+40=58	72%	519 m.sec
15	30	13	13	0	67	27	40	13+40=53	66%	498 m.sec
17	20	8	8	0	72	32	40	8+40=48	60%	477 m.Sec
19	10	3	3	0	77	37	40	3+40=43	53%	420 m.sec
21	0	0	0	0	80	40	40	0+40=40	50%	403 m.sec