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Face recognition using different imaging modalities, particularly infrared imaging sensors, has become an area of growing interest. The use of thermal IR images can improve the performance of face recognition in uncontrolled illumination conditions. In this paper, we presented a new technique for face recognition using data fusion based on statistical calculations of component-based thermal images. Local representations offer robustness against variability due to changes in localized regions of the faces. The proposed system exploits the advantages and the characteristics of thermal images, a component-based approach, the statistical features and fusion. The proposed feature vector consists of first moment, second moment, and the thermal image histogram, where the calculation of these features is implemented at the component level, beside the whole face image. We have found that the recognition rate increases as the number of histogram bins increases. The best obtained success rate was 96.4% when the number of bins was equal to 500.	http://ijcit.com/archives/volume2/issue5/Paper020526.pdf	Kindly take the reference of the source inside your paper to avoid plagiarism complain.
The recognition rates for the different number of bins are recorded in Figure 15. As can be seen from the figure, the rank-1 recognition rate was at its lowest when the number of bins was 20, with a success rate of 85.2%. The recognition rate increased as the number of bins increased and reached 96.4% when there were 500 bins. We have noticed that the success rate saturates as the number of bins becomes greater than 500. Another method to	http://ijcit.com/archives/volume2/issue5/Paper020526.pdf	Kindly take the reference of the source inside your paper to avoid plagiarism complain.

evaluate the potential performance of the recognition system is the Cumulative Match Score curve (CMS). The CMS illustrates the trade-off of true positive versus false positive results. The Y-axis represents the true positive rate, and the X-axis is the cumulative rank. We can think of the X-axis as the maximum number of images that the system is allowed to report when giving an alarm for a given probe. If the system is allowed to report a larger number of possible matches, the true positive rate generally increases. The results of the CMS evaluation are shown in Figure 16, where the performance statistics are reported as cumulative match scores. Identification is regarded as correct if the true object is in the top Rank n matches, with Rank 1 being the best match.		
a whole face image for one subject (class) for different number of bins: 20, 50, 100, 200, 300, 400, and 500 bins. Figure 5 shows the corresponding histograms for another subject. The distinctive and discriminant features between the two figures (subjects) are obvious. In Figure 6, we show the histogram distribution for four different images for the same person (same class) in the case of 20 bins. As can be seen from the figure, the	http://ijcit.com/archives/volume2/issue5/Paper020526.pdf	Kindly take the reference of the source inside your paper to avoid plagiarism complain.
of thermal images from the AIAOU database for different subjects 5. EXPERIMENTAL RESULTS AND ANALYSIS Before conducting our experiments, we took several pre-processing steps: Integer to float conversion: After the image is read from a file, it is converted to double precision floating point for subsequent image calculations. Geometric normalization: This aligns images such that the faces are the	http://ijcit.com/archives/volume2/issue5/Paper020526.pdf	Kindly take the reference of the source inside your paper to avoid plagiarism complain.

same size, in the same position, and at the same orientation. Specifically, the image is scaled and rotated to make the eye coordinates coincident with pre-specified locations in the output. Masking: This is used to eliminate less important parts of the image, ensuring that the face-recognition system does not respond to features corresponding to background, hair, clothing, etc.		
We have built a database of 570 images for 19 different subjects taken in different sessions. The database consists of males and females from various ethnic backgrounds. Acquisitions were held at different times and most subjects participated in multiple sessions across a number of different weeks. Infrared images were acquired in the 7.0–14.0 μm range and consist of an uncooled focal plane array incorporating a 320×240 matrix of microbolometer detectors. Examples of thermal images from the AIAOU database for different subjects are shown in Figure 3. Each face-recognition experiment is characterized by three image sets: a) The training set is used to form a face space in which the recognition is performed. This set consists of five images per subject (class). These images were chosen randomly among the 30 available images for each subject. b) The gallery set contains the set of	http://ijcit.com/archives/volume2/issue5/Paper020526.pdf	Kindly take the reference of the source inside your paper to avoid plagiarism complain.
local parameters are more powerful in preserving the discriminant features in a neighborhood of a pixel in an image. If (x, y) denote the coordinates of any pixel in a given image, and if S_{xy} denotes a neighborhood (component) of a specified size, centered on (x, y), then the mean value of the pixels in this neighborhood is given by (5)	http://ijcit.com/archives/volume2/issue5/Paper020526.pdf	Kindly take the reference of the source inside your paper to avoid plagiarism complain.

where is the histogram of the pixels in region S_{xy} . Similarly, the variance of the pixels in the neighborhood is given by (6) As before, the local mean is a measure of average temperature in neighborhood S_{xy} , and the local variance is a measure of temperature spread in that neighborhood. We propose the following scheme in dividing the face image: First, we take the whole image as one component. We denote this component as Second, we take only the center part of the face that consists of the eyes, nose, and mouth. We denote this component of the face as Third, we divide the thermal image into four different equal-sized components, and denote them as Fourth, we divide the thermal image into 16 different equal-sized components, and denote them as Then, we find the average temperature, the variance, and the histogram distribution for every component as described above. Finally, the feature vector for every component is formed as follows: (7) where T denotes the transpose, is the average temperature for the corresponding component as defined in equation (5), and is the corresponding variance as defined in equation (6). is defined by equation (1). The Euclidean distance (L2 norm) is used as the system classifier, and is given by (8) for vectors a and b both of d dimensions.