

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Special Issue 9, May 2016

Human Detection in Still Image

Harshitha Bhat¹, Nagapriya Kamath²

Student, Dept. of Electronics and Communication, NMAM Institute of Technology, Nitte, Karkala, Karnataka, India¹

Assistant Professor, Dept. of Electronics and Communication, NMAM Institute of Technology, Nitte, Karkala,
Karnataka, India²

ABSTRACT: With a rapid speed of technology human detection in an image or in video plays a vital role in many computer vision fields. It has various applications with respect to sensitivity, security and secrecy. Because of various imaging conditions like similarity to other people, size, environmental conditions, resolution, poses and rotation human detection go through different challenges. There are many methods for detecting humans but skin color modelling, background subtraction, K-Means clustering is used here because of its effectiveness and it can be easily separated from the other objects present in the image and background.

KEYWORDS: Background subtraction, K-Means algorithm.

I. INTRODUCTION

After the completion of face detection algorithm next step is human detection. Due to variety in clothing and illumination conditions it is difficult to detect humans. People's locations and movements are used in many applications in computer vision for human detection using effective techniques. Robust, reliable and fast algorithms for object detection and tracking are required in intelligent surveillance systems. Accurate detection of human beings in an image or video has wide range of applications. It includes gender classification, abnormal event detection, fall detection for elderly people, congestion analysis, person identification etc. Due to the variations in different features like contrast level, brightness, poses, background and lighting this task become more complicated.

II. RELATED WORK

In silhouettes [1] and motion history images [2] based on extraction of space time estimation of trajectories was calculated. These methods were difficult to implement. Micro-Doppler theory [3] is used for the measurements and detection of moving objects and humans has largely been studied and experimented. Using Micro-Doppler image anyone can directly perform detection and measurements without any processing on the acquired image itself. Because of the success in object recognition and numerous types of features have been developed and tested for human activity recognition, Feature based methods [4] were used. To detect a moving target with rotating parts Hough transform [5] is used. The concept behind color segmentation is a simple one: use the color or other appearance information within the image frame to separate various objects. The task of implementing this idea, however, is more complex. One approach involves using binary skin classification [6] to locate faces within the image. A closed-loop controller is then used to maintain tracking of the person by cameras mounted on a mobile robot. A more statistical approach use clothing color to segment the image. Statistical analysis is then used to determine which color blobs belong to a person and which do not. A more sophisticated approach use color histograms to locate a person in a pair of stereo images followed by triangulation between the images to find the distance between the camera and the tracked person. One more method use color histograms, however they combine the histogram data with an edge-based detector to improve robustness of the algorithm at the expense of computation time.

Color segmentation [7] methods work well in many situations. By requiring only a small amount of information from each frame in order to function, the algorithms remain fast and efficient. Unfortunately, this efficiency comes at a price. For instance color-based methods usually require that the person to be tracked wear a different color from the

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Special Issue 9, May 2016

background or from other people in the scene i.e background subtraction [8, 9]. Most face-based trackers demand that the person face the camera during the entire tracking procedure. All of these techniques are vulnerable to changes in lighting, as different lighting can drastically change the camera's perception of color. Object tracking, shape recognition, segmentation, edge detection [10] and stereo matching are the applications of active contour [11]. K-Means algorithm [12, 13] is used because of its simplicity and it is easy to use.

III. PROPOSED METHOD

Skin color modeling: A trustworthy skin color model required and that should be alterable to segment skin portion from non-skin portion of human being. For skin color characterization regular RGB color modeling is not acceptable. In RGB color modeling, color components (r,g,b) indicates not only the color but also the luminance. Due to various lighting conditions luminance will vary thus it is not suitable to differentiate skin from non-skin portions. Therefore it is required to convert RGB image to gray scale image.

Active Contour: Specified features can be detected and automatic object segmentation is done by using an active contour. An active contour made up of a set of control points which are connected by a straight line. Control points and sequence defines an active contour. First step is to set an initial contour which is similar to proposed shape. Attractor image will be created by attracted features in an image that is extracted by internal energy.

Edge Detector: Edge detection is a process of identifying edges in an image to be used as a fundamental asset in the image analysis. It reduces unnecessary information in the image while preserving the structure of the image. In the areas like feature detection and feature extraction edge detection plays a vital role. There are many edge detectors present but here canny edge detector is used.

Background subtraction: By taking the difference between background frame and current frame in the form of block-by-block or pixel-by-pixel background subtraction method will detects the object. Background subtraction method gives accurate results by extracting the components of the target. This method is easy to understand and simple to use. But this method is sensitive to environmental changes. Here performing background subtraction by using K-Means algorithm.

K-Means algorithm: This algorithm works only on the double data type. Before applying the K-mean algorithm convert the image from RGB to LAB it gives more accurate result than the RGB. This algorithm used to group the image into specified number of clusters. Data which contains number of clusters should be pre-specified to use this algorithm. By trial and error method correct number of clusters can be found for a given set of data.

IV. RESULTS AND DISCUSSION

The Figure 1 shows the Original Image, in Figure 2 Gray scale image is represented, Figure 3 shows Initial Contour Location, Segmented Image is shown in Figure 4, Edge detection is shown in Figure 5 and Figure 6 represents Cluster 1, Cluster 2, Cluster 3 detecting face and upper body.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Special Issue 9, May 2016



Figure 1: Original Image

Figure 1 represents Original Image which is in RGB color space. Initially Original Image is loaded to process next step.



Figure 2: Gray scale image

Figure 2 shows Gray scale image. The original image is in RGB color space, but for the next step the RGB image has to be converted into gray scale image. So Gray scale conversion takes place in this step.



Figure 3: Initial Contour Location

Figure 3 shows Initial Contour Location. Mask is a binary image that specifies the initial state of the active contour. The boundaries of the object region (white) in mask define the initial contour position used for contour evolution to segment the image. Specify an initial contour position that is close to the desired object boundaries to obtain faster and more accurate segmentation results.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Special Issue 9, May 2016

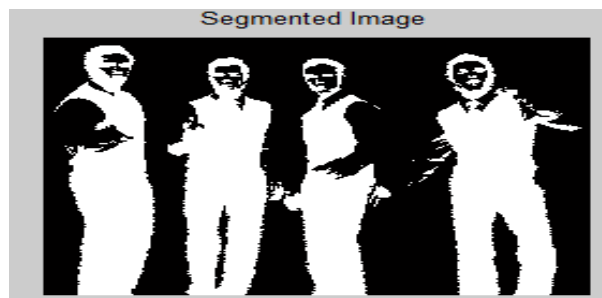


Figure 4: Segmented Image

Figure 4 represents Segmented image. Active contour based segmentation segments the 2-D grayscale image into foreground and background regions. The output image is a binary image where the foreground is white and the background is black.



Figure 5: Edge detection

Figure 5 shows Edge detection. Here Canny edge detector is used because of its simplicity. It is easy to analyse and implement. It gives accurate results compare to other edge detectors.

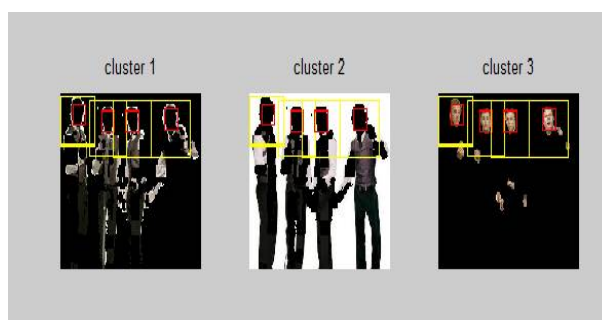


Figure 6: Cluster 1, Cluster 2, Cluster 3 detecting face and upper body

Figure 7 represents Cluster 1, Cluster 2, Cluster 3 detecting face and upper body. There are three clusters present in Figure 6, in this face and upper body of the humans is detected by using Viola-Jones algorithm. Here in cluster 3 skin detected with face and upper body detection can be seen.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Special Issue 9, May 2016

V. CONCLUSION

The proposed method was implemented using MATLAB R2013a in intel CORE i5 processor. By using Background subtraction and K-Means algorithm, human detection is carried out. K-Means algorithm is computationally faster and produces tighter clusters especially if the clusters are globular.

REFERENCES

- [1] L. Gorelick, M. Blank, E. Shechtman, M. Irani and R. Basri, "Actions as space-time shapes", IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 29, no. 12, 2010, pp. 2247–2253.
- [2] A. Bobick and J. Davis, "The recognition of human movement using temporal templates", IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 23, no. 3, 2013, pp. 257–267.
- [3] M. Wildemeersch, J. Petit and J. F. Guasch, "Doppler radar and post processing techniques for small area surveillance", in IEEE Workshop on SPAWC, 2012.
- [4] P. Burt, J. Bergen, R. Hingorani, "Object tracking with a moving camera", In IEEE Workshop on Visual Motion, 2010, pp. 2-12.
- [5] Q. Zhang, T. S. Yeo, H. Tan and Y. Luo, "Imaging of a moving target with rotating parts based on the hough transform", IEEE Transaction on geoscience and remote sensing, 2013.
- [6] S. A. Shafer, "Using color to separate reflection components", COLOR research and application, vol. 10, no. 4, 2014, pp. 210-218.
- [7] I. Haritaoglu, D. Harwood and L. Davis, "Real-time surveillance of people and their activities", IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 22, no. 8, 2011, pp. 809-830.
- [8] Bharti, T. Thind, "Background Subtraction Techniques-review", E&C Sci, vol. 2, 2013, pp. 166-168.
- [9] R. S. Rakide, B. D. Patil, "Background Subtraction Algorithm Based on Human Motion Detection", E&C Sci, vol. 3, 2013, pp. 1-4.
- [10] J. Canny, "A computational approach to edge detection", Pattern Analysis and Machine Intelligence, IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 8, 2010, pp. 679–698.
- [11] D. Stricker and T. Kettenbach, "Active Contours and their Utilization at Image Segmentation", E&C Sci, vol. 5, 2011, pp. 9-15.
- [12] T. Kanungo, D. M. Mount, N. S. Netanyahu, "An Efficient K-Means Clustering Algorithm Analysis and Implementation", IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 24, 2012, pp. 881–892.
- [13] K. Alsabti, S. Ranka and V. Singh, "An Efficient K-Means Clustering Algorithm", IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 12, 2013, pp. 725–734.