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HUMAN DETECTION AND COUNTING

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Abstract— This document talks about the fastest human detection through advanced machine learning
Algorithm called Histogram Oriented and Gradients (HOG). It is a powerful algorithm which detects the humans and count them. In this fastest growing world to count the humans in heavily public places have become a very complicated task to overcome this problem we can use this human detection and counting technique which is very useful for short term surveys as inflow and outflow of public in many places.

Keywords— capturing videos, Counting humans, Generating report.

1. INTRODUCTION

This document proposes a real-time human detection, tracking and counting system specifically for public places. It helps to detect individual human objects within the camera coverage area to estimate the crowd size. Technically a surveillance camera will be installed at the place where we want to track and identifying the humans and send real-time video footage to the system. The system should then perform human detections and tracking on the video received and keep track of the number of humans. Tracking is the process to assign a unique identification to the detected human object and perform constant tracking when it moves throughout the frames until the object is disappeared. In addition, this system implements image processing technique and HOG learning algorithms for object detection, SVM classifier for classification, and tracking. The main contribution of the work is to allow human detection and counting in almost real time for concurrent crowd management in real-life environment. This paper presents human detection on images and gives number of human counts on that image as output

2. LITERATURE REVIEW

[1] Mohamed Atri ,Haythem bahri, (2022). Real-time application of image and video processing algorithms have seen explosive growth in number and complexity over the past decade driven by consumer. **[2]** Xiaoyu Wang, Tony X.Han, Shuicheng Yan, (2020)By combining Histograms of Oriented Gradients (HOG) and Local Binary Pattern (LBP) as the feature set, we propose a novel human detection approach capable of handling partial occlusion**.** **[3]** prima Kristalina, Bima sena (2019). Detection and tracking of a moving target in a crowded area using camera surveillance is still an open topic that to be resolved. We propose a color-based human tracking algorithm by considering the correlation distance from the color histogram used as the target selection. Then, we apply the HOG extraction feature to the human detection system. We apply the Recall-Precision curve to evaluate the performance.

The human activity recognition is an open issue for the video surveillance community. Previously it has been handled based on the mere computer vision and pattern recognition perspective. Recently

research work on automated surveillance human activity develops a new perspective that brings some principle from the social, affective, psychological literature and it is called as Social Signal Processing (SSP).

The video analysis and interpretation human actions and movements are important. Previously less number of methods has been proposed for the recognition of individual actions and group interactions. But in the video surveillance multiple human interactions remains a challenge. The proposed model mainly focuses on small group of people interactions that have the countable number of persons, who acts for the correlative purpose. Here the proposed model employing the Gaussian processes to represent motion trajectories
Human group activity detection and tracking plays an important role in technology in recent years including applications like public security and surveillance of the video public and private places video surveillance event detection is an important task. The main aim of this proposed model is to detect event in a video, which is based on optical flow techniques. Optical flow method is nothing bur struck low level information like points of interest. Using k-means algorithm these tracked points are grouped into several clusters. In order to calculate principle component of each cluster, geometric location, direction, displacements of each cluster are projected. According to the observations of these calculations, high activity cluster has high possibility to include video event.

3. EXISTING METHODOLOGY

There are many existing systems that can be used for human detection and counting. Here are a few examples:

- Closed-circuit television (CCTV) systems: These systems use cameras to capture images or video of a scene and can be equipped with machine learning algorithms for human detection. Many CCTV systems also have the ability to track and count individuals as they move through the scene.
- Computer vision software: There are several software packages available that use machine learning to detect and track humans in images or video. These packages can be integrated into existing camera systems or used with standalone cameras.
- Overall, the choice of an existing system will depend on the specific needs and constraints of the project, as well as the budget and technical expertise available.

Previously, we would capture the video and check for people that occur in the video manually. This can be very time consuming when the footage that is to be checked is long. As humans are not efficient over long periods of time there can be human errors as well.

4. PROPOSED METHODOLOGY

Proposed system for a human detection and counting project:
Camera setup: The first step is to set up one or more cameras at the desired location for monitoring human traffic. These cameras should have a clear view of the area and be able to capture images or video with good resolution.
Image/video acquisition: The camera(s) will continuously capture images or video of the area being monitored.
Human detection: The system will use a machine learning model to identify and detect humans in the images or video frames. There are several approaches that can be used for this, such as using a pre-trained model or fine-tuning a model on a dataset of images with labeled human instances.
Human tracking: To accurately count the number of humans in the area, the system will need to track individual humans as they move through the scene. This can be achieved by assigning each detected human a unique identifier and then keeping track of their location over time.

Counting: The system will keep a running tally of the number of humans in the scene and display this count in real-time.

5. LIMITATIONS

Sensitivity to pose and scale: HOG works best when the object being detected (in this case, a human) is roughly upright and at a certain scale. It can struggle with detecting humans in different poses or at different scales, leading to missed detections or false positives.

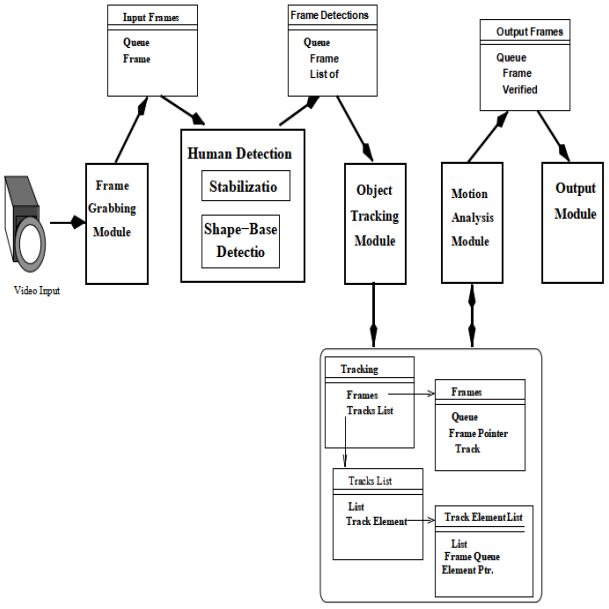
Limited ability to handle occlusion: If parts of the human body are occluded (hidden from view), HOG may not be able to detect the human accurately.

Limited ability to handle cluttered backgrounds: If there are many other objects or people in the background, HOG may have difficulty distinguishing the human from the background.

Computationally intensive: HOG requires a significant amount of computation to extract the feature descriptors, especially when working with high-resolution images.

Limited ability to handle variations in appearance: HOG may not be able to handle variations in clothing, lighting, and other factors that can affect the appearance of a human.

6. SYSTEM ARCHITECTURE



7. MODULES

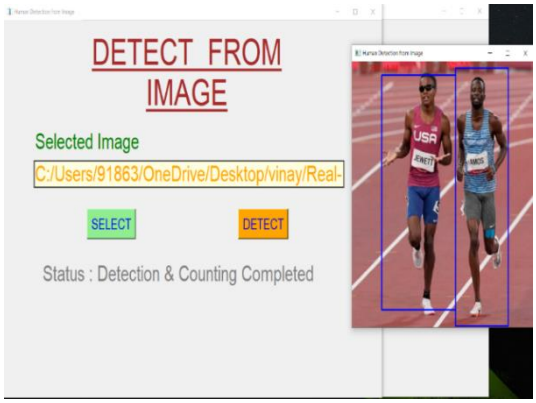
To detect and count humans, several modules are required.

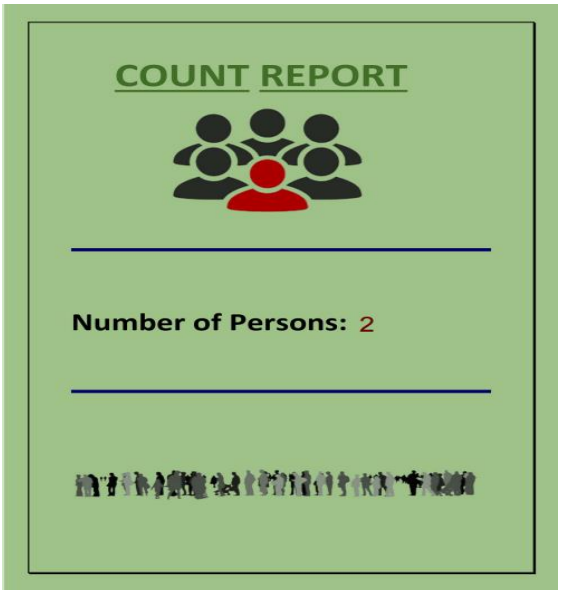
- The first is an image/video recognizer, in which it is able to recognise humans in images, videos, and live cameras.
- The video recognition module is the most important one because it should be able to capture all the people in the range.
- The live camera capture module is used for the live detection of humans, counting them, and generating the report.
- One of the important modules is generating a report for all the captured humans and generating the report for the human count.

8. RESULTS AND CONCLUSION

In conclusion, the Histogram of Oriented Gradients (HOG) is a powerful feature descriptor that has been widely used for human detection and counting in computer vision.

HOG remains a popular and widely used feature descriptor for human detection and counting, and it has paved the way for more advanced techniques such as deep learning-based object detection.





9. FUTURE SCOPE

There is a wide range of potential applications for human detection and counting, and the field is likely to continue to grow and evolve as technology improves. Some possible areas of future development and application include:

Human-computer interaction: Human detection and counting can be used to enable more natural and intuitive interaction with computers, such as through gesture recognition or eye tracking.

Transportation: Human detection and counting algorithms can be used in transportation systems to track the movements of people and optimize routes and schedules.

Health care: Human detection and counting can be used in health care settings to track the movements and behaviour of patients, and to monitor their vital signs and physical activity levels.

3d model: in future we can upgrade to new technology of this model in which it can get exact shape and size of human which is more effective than most of the 2d models

Overall, the future scope of human detection and counting is likely to be wide and varied, with applications in many different sectors and industries

10. REFERENCES

[1] H.S. Parekh, D.G. Thakore, U.K. Jaliya, A survey on object detection and tracking methods, Int. J. Innov. Res. Comput. Commun. Eng. 2 (2014) 2970–2978.

[2] N. Singla, Motion detection based on frame difference method, Int. J. Inf. Comput. Technol. 4 (2014) 1559–1565. http://www.ripublication.com/irph/ijict_spl/ijictv4n15spl_10.pdf.

[3] D.G. Lowe, Distinctive image features from scale-invariant key-points, Int. J. Comput. Vis. 60 (2004) 91–110. https://doi.org/10.1023/B:VISI.0000029664.99615.94.

[4] H. Bay, A. Ess, T. Tuytelaars, L. Van Gool, Speeded-up robust features (SURF), Comput. Vis. Image Underst. 110 (2008) 346–359. https://doi.org/10.1016/j. cviu.2007.09.014.

[5] P. Sabzmeydani, M. Greg, Detecting pedestrians by learning shapelet features, Comput. Vis. Pattern Recognition. CVPR'07. IEEE Conf, 2007. pp. 1–8.

http://citeseerx.ist.psu.edu/viewdoc/download?doi =10.1.1.205.8978&rep=rep1& type=pdf

[6] B. Wu, R. Nevatia, Detection of multiple, partially occluded humans in a single image by Bayesian combination of edgelet part detectors, Proc. IEEE Int. Conf. Comput. Vis. 1 (2005) 90–97.

[7] Y. Jiang, J. Ma, Combination features and models for human detection, Proc. IEEE Comput. Soc. Conf. Comput. Vis. Pattern Recognit. (07-12-June 2015) 240– 248. https://doi.org/10.1109/CVPR.2015.7298620.

[8] Y. Mu, S. Yan, Y. Liu, T. Huang, B. Zhou, Discriminative local binary patterns for human detection in personal album, 26th IEEE Conf. Comput. Vis. Pattern Recognition CVPR, 2008. https://doi.org/10.1109/CVPR.2008.4587800

[9] N. Dalal, B. Triggs, Histograms of oriented gradients for human detection, IEEE Comput. Soc. Conf. 1 (2005) (2005) 886–893.

[10] K.B. Bhangale, Human body detection in static images using HOG & piecewise linear SVM, Int. J. Innov. Res. Dev. 3 (2014) 179–184.

[11] S.Y. Nikouei, Y. Chen, S. Song, R. Xu, B.-Y. Choi, T.R. Faughnan, Real-Time Human Detection as an Edge Service Enabled by a Lightweight CNN, Arxiv Prepr. Arxiv1805.00330, 1. 2018, 1–5. http://arxiv.org/abs/1805.00330.

[12] X. Wang, T.X. Han, S. Yan, An HOG-LBP human detector with partial occlusion handling, Comput. Vision, 2009 IEEE 12th Int. Conf., 2009. pp. 32–39 https:// doi.org/10.1051/matecconf/20165602003.

[13] D.T. Nguyen, W. Li, P.O. Ogunbona, Human detection from images and videos: a survey, Pattern Recognit. 51 (2016) 148–175. https://doi.org/10.1016/j.patcog. 2015.08.027.

[14] S. Shalev-Shwartz, S. Ben-David, Understanding Machine Learning: From Theory to Algorithms, Cambridge University Press. 2013. https://doi.org/10.1017/ CBO9781107298019.

[15] F. Chollet, Deep Learning With Python Manning Publications Company, Manning Publications Company. 2017