A New Inference Method for Camera's Ego-Motion and People's Paths Surrounded by a Single Logical Framework using Hog Descriptor

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Abstract— In the recent world, person tracking is very important for many applications such as surveillance, identification of personals etc. To improve the odds of finding people, this system combines multiple different detection and tracking methods. Combine the advantages of both detection and tracking in a single framework. This tracking framework applies to the task of tracking numerous people from a affecting camera. In person detection, the cascade object detector uses the Viola-Jones algorithm to detect people's faces, noses, eyes, mouth, or upper body and so on. After these detection steps are over, then it will track multiple people using a adaptive tracking algorithm based on different detectors. Here HOG algorithm is used to increase the detection rate and also improves the efficiency of tracking by increasing the detection rate.

Key words: HOG, adaptive tracking, cascade object detector

I. INTRODUCTION

A. *Detection:*

Object detection is the process of finding instances of real-world objects such as faces, bicycle, and buildings in descriptions or videos. Object detection algorithms naturally use extract features and learning algorithms to distinguish instances of an object category. It is frequently used in application such as image retrieval, sanctuary, scrutiny, and computerized vehicle parking system. You can detect objects using a assortment of model include:

- Feature-based object detection
- Viola-Jones object detection
- SVM classification among histograms of oriented gradients (HOG) description
- Image segmentation and blob analysis
- Other method for detecting items with workstation vision includes using gradient-based, derivative-based, and template matching approaches.

B. *Tracking:*

The first step is identifying and tracking features. A feature is a detailed aim in the picture that a track algorithm can catch onto and track during multiple frames (SynthEyes calls them blips). Often features are certain since they are bright/dark spot, limits or corner depending on the fussy tracking algorithm. all the temper programs use template matching base on NCC score and RMS error. What is central is that each quality represents a specific peak on the facade of a real article As a characteristic is tracked it becomes a succession of two-dimensional match that correspond to the arrangement of the attribute across a sequence of frames. This progression is referred to as a "track". Once tracks had been fashioned they can be used instantly for 2D motion tracking, or then be used to weigh up 3D information.

Video Tracking is the development of locating a moving object (or multiple objects) beyond time using a camera. It has a selection of uses, some of which are: human-computer interface, security and surveillance, video statement and compression, amplified reality, traffic manage medical imaging and video suppression. Video tracking can be a time unbearable process due to the total of data that is enclosed in video. Adding auxiliary to the complexity is the promising need to use object recognition techniques for tracking, a tough problem in its own right.

To perform video tracking an algorithm analyzes sequential video frames and output the movement of targets stuck between the frames. There are a selection of algorithms, each have strength and weaknesses. Considering the proposed use is central when choose which algorithm to use. There are two major workings of a visual tracking system: target representation and localization, as well as filtering and numbers association. Target diagram and localization is mostly a bottom-up process. These methods give a mixture of tools for identifying the affecting object. locate and tracking the objective object successfully is ward on the algorithm.

II. RELATED WORKS

The process introduced in this paper is considered to pathway several people from a upsetting camera. To answer this problem a number of challenges must be defeat, including cope with the varying facade of people as they distort over time, occlusions among people and among people and the environment, possibly missing detections, and the complications of estimating a moving camera's position. In this section, we discuss the related work designed to trounce one or more of these challenges.

Human detection. One result for improving tracker waft and enabling automatic track initialization is the use of person detectors. Over the last decade, algorithms for detecting human have improved a great deal. Modern human detection methods are quite consistent when applied to large pedestrians in simple scenes that include minimal crowd occlusion and clutter. Methods by Ferrari et al. and Felzenszwalb et al. are also able to detect humans in nonpedestrian poses with reasonable exactness. However, in real-world environments that are crowded, include large amount of occlusion and clutter, as well as wide pose variation, none of these methods is suitable. For this reason, we combine a number of person detection cues into our organization.

Tracking-by-detection. Thanks to the perfection in human detection methods, the tracking problem can be reformulated as a tracking-by-detection problem. This approach can generate reliable tracking results if the camera is kept inactive. Multitarget tracking problems can either be formulated to estimate target location online, such as in the works of Wu and Nevatia and Breitenstein et al.or to find the globally optimal alliance among detections at different time stamps, such as is done by Pirsiavash et al. Zhang et al. and Shitrit et al.using a linear programming framework. Methods that perform global optimization may manufacture more consistent targets with fewer identity switches, but they want an complete video sequence as input and so cannot be used for real-time planning. In this paper, we instead focus on designing an online algorithm that is applicable to self-directed driving and robot navigation, with a focus on higher finding accuracy. More consistent trajectories could be obtained by applying a tracklet company method on top of our results. Also, most of the methods that do not unequivocally consider camera motion are prone to failure when a camera move since the camera motion and target motions become intertwined.

Tracking with a moving camera. To address the challenges of tracking from a moving platform, several approach have recently been proposed. Wojek et al.proposed a probabilistic framework to detect multiple people in a busy scene by combining multiple detectors and explicitly analysis about occlusions among people. However, they did not associate detections between frames, so no tracking was performed. In addition, they relied on odometry readings from the car on which the camera was mounted to obtain the camera position. Our work perform data association to track people and is proficient of estimating the camera motion. Our work is most similar in spirit to the work by Ess et al. which combine multiple detectors to estimate camera odometry and track multiple people at once. Unlike , we track targets and estimate camera motion in a unified framework and do not necessitate stereo information.

III. METHODOLOGY

A. *Methods for Detection:*

In this system, seven detectors are combined to generate the observation likelihood as follows:

- Face detector
- Pedestrian and upper body detectors
- a target-specific detector based on appearance model
- a skin detector
- a motion detector.

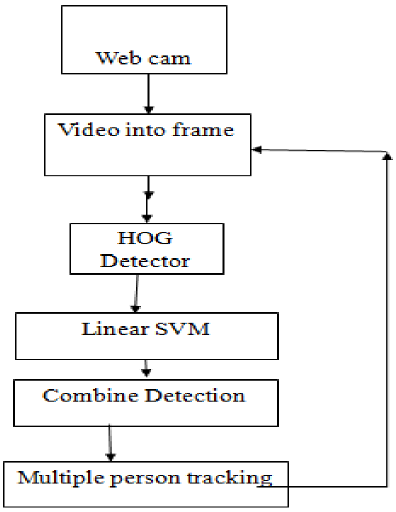

Fig. 1: System Architecture

1) *Face Detector:*

A widely used method for object detection is viola-jones face detector. Training is slow, but detection is very fast.It has four stages

1) Haar Features Selection
2) Creating Integral Image
3) Adaboost Training algorithm
4) Cascaded Classifiers

2) *Pedestrian and Upper Body Detectors:*

The detector based on the distribution of gradients in the image, encoded by the histogram of oriented gradient detector (HOG). HOG is a type of feature descriptor. Two HOG detection models are incorporated, an upper body detector and a full-body detector as trained, respectively. Using both models allows us to cope with lower body occlusions, different pose configurations, as well as different resolutions of people in images. To obtain a detection response, the HOG detector performs a dot product between the model parameter w and the HOG feature h, and thresholds the value (above zero). In previous used a Gaussian model centered on positive detections to obtain the observation model. However, this is a brittle approach in the case of missed detections or false positives. Instead, in this work, both the positive detections and confidence values are used to model the observation likelihood from the HOG detector, as inspired by Breitenstein et al.

3) *A Target-Specific Detector Based on Appearance Model:*

A detector often fails to detect the target even when it is present (false negatives). Appearance-based tracking can be used to help link consecutive detections. By restrictive the use of appearance-based tracking to a small number of consecutive frames, issues due to tracker drift can be minimized. A color-based tracking algorithm is employed to provide target-specific tracking information at each time frame.

4) *A Skin Detector:*

The next indication used is skin color. If a person exists in a location Zit, then pixels corresponding to the face region are likely to be observed even if the face is observed from the side view. To detect pixels with skin color appearance, threshold is applied on each pixel in HSV color space and then applies a median filter on the skin image ISkin, an image of binary pixels that indicate skin region. A more sophisticated approach could be adopted to learn a statistical model for skin.

5) *A Motion Detector:*

The presence of motion in a scene is a strong indicator of the presence of a person, especially indoors. Given depth information, motion can be efficiently identified by using a change detector in 3D.This implementation uses the octree-based change detection algorithm between the point clouds in consecutive frames. A binary motion image is obtained by projecting the moving points into the image plane and thresholding.

B. *Methods for Tracking:*

Tracking multiple people using adaptive tracking algorithm based on different detectors. Histogram of oriented gradients with SVM approach is used to improve the detection rate and also improves the efficiency of tracking by increasing the detection rate.

IV. RESULT

Fig. 2: Tracking multiple people using different detectors

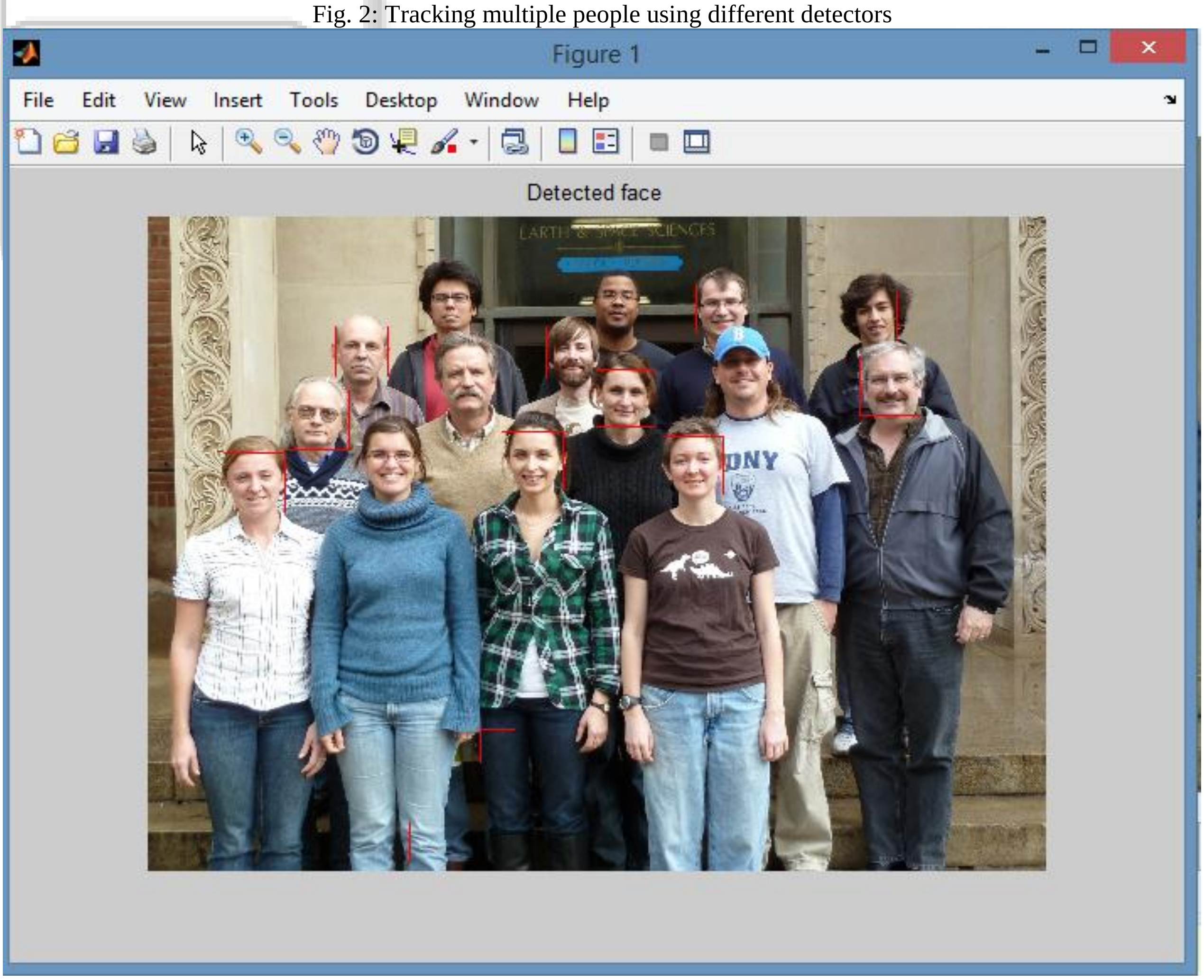

Fig. 3: Face Detection

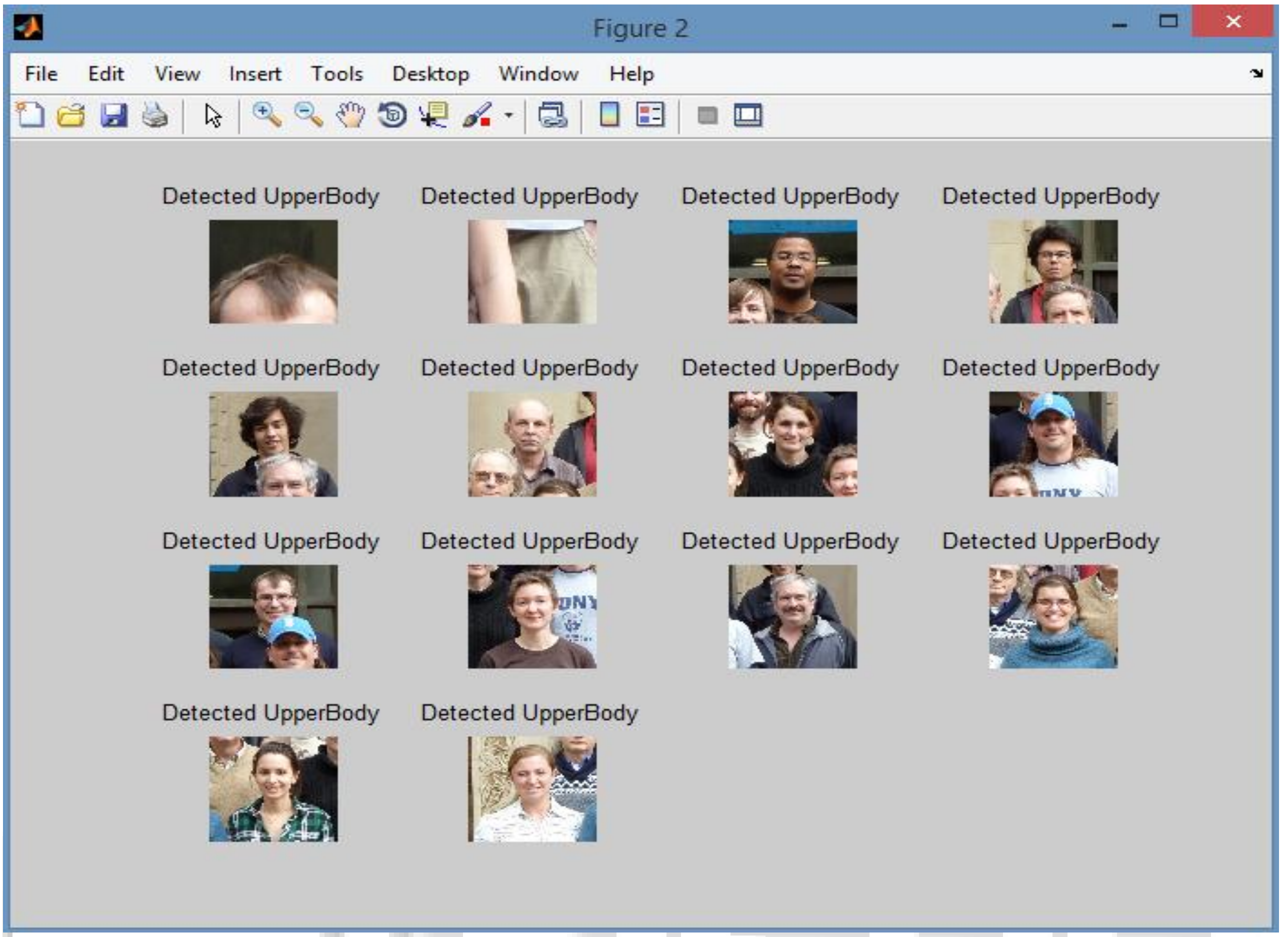

Fig. 4: Pedestrian and Upper Body Detectors.

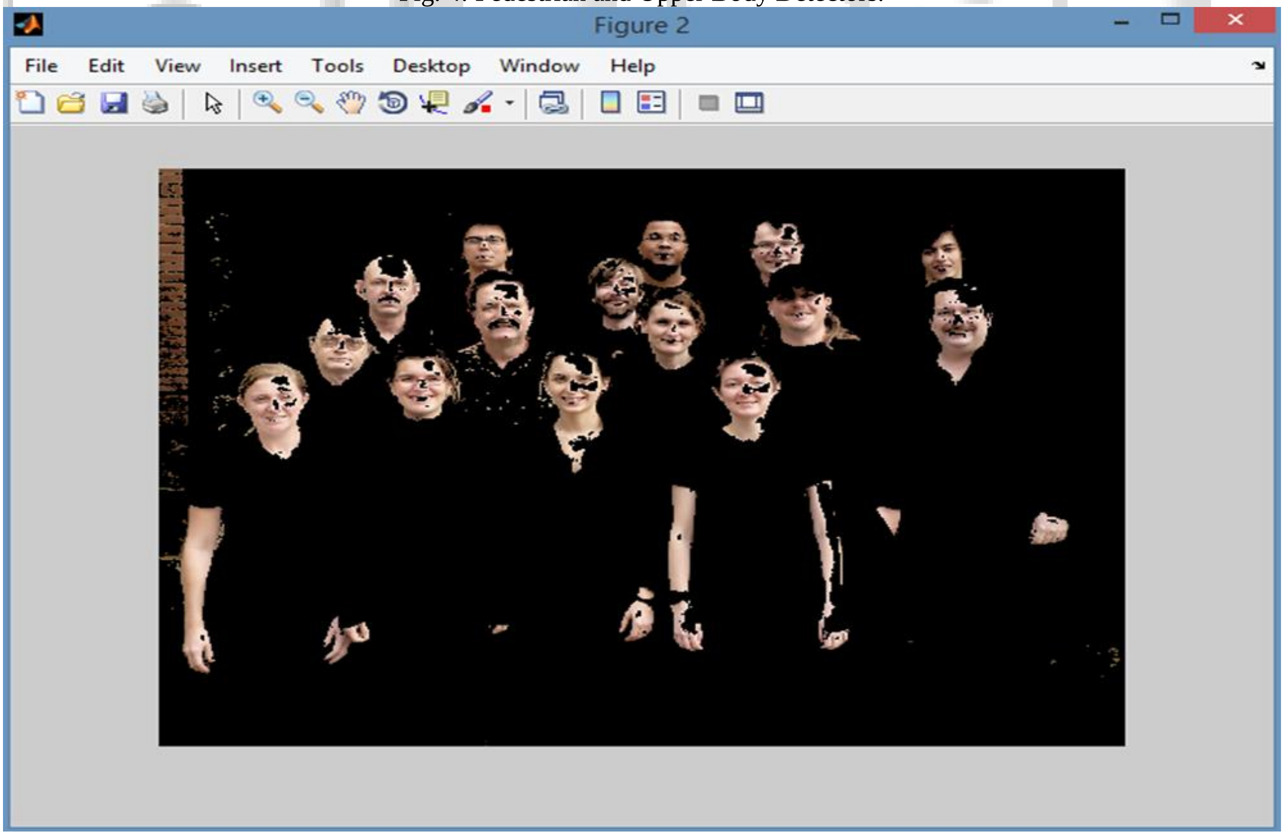

Fig. 5: Skin Detection

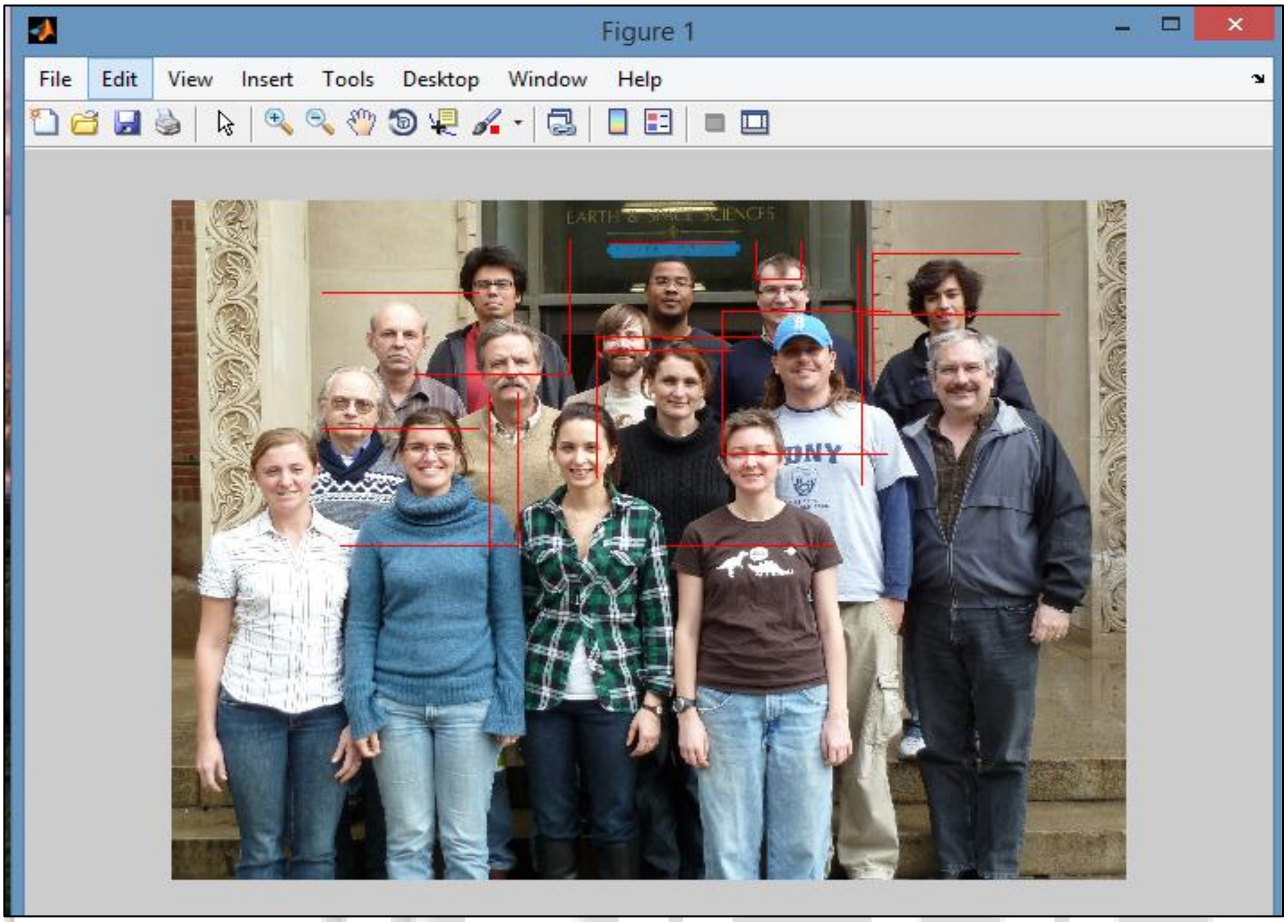

Fig. 6: Tracking Multiple People

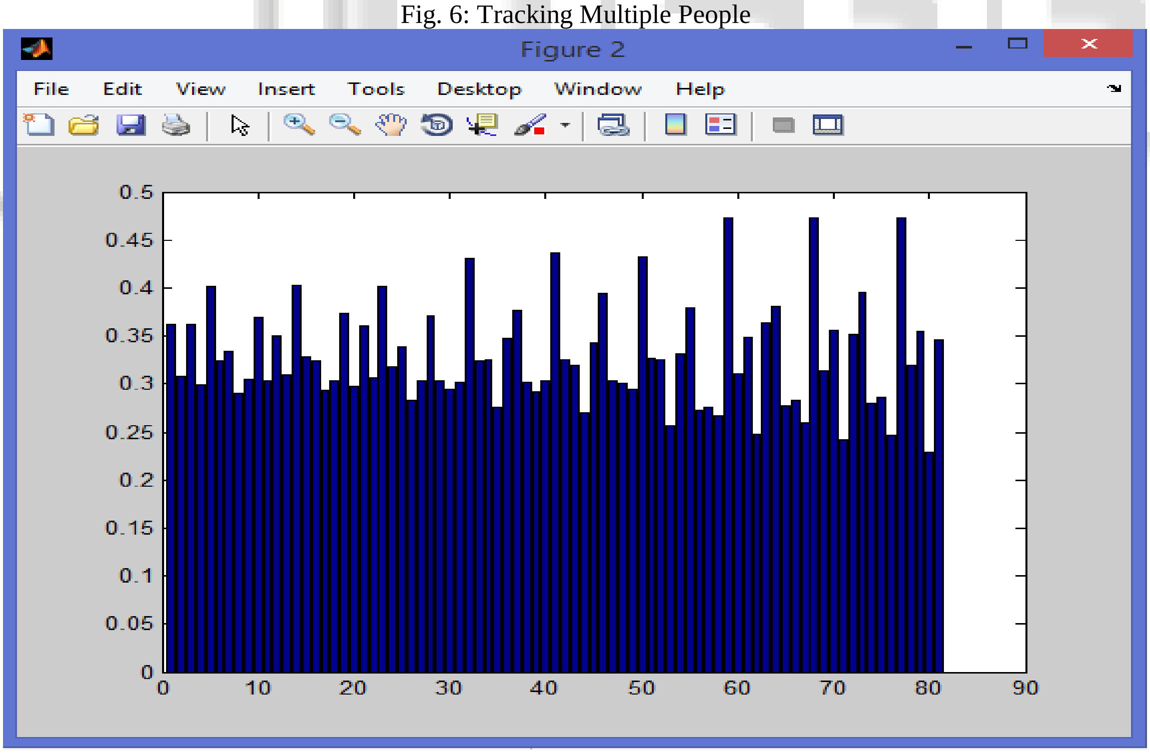

Fig. 7: Histogram

V. CONCLUSION

The proposed system will be capable of tracking people from a moving,ground-level camera,and tracking people indoors from a mobile robot platform.This system uses the Histogram of oriented gradients is used to improve the detection rate and also improves the efficiency of tracking by increasing the detection rate.

VI. REFERENCES

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