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A Survey on Counting People with Low Level Features

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Abstract:- The main objective of this paper is to evaluate recent development in counting people with low level features. This paper describe the various techniques of counting people with low level features, compares them with the help of evaluation performance measures which are widely used for counting. The aim of this paper is to find the best method among some prominent exiting methods.

General Terms:-Bayesian regression

Keywords:-*Bayesian regression, crowd analysis, Gaussian Processes, Poisson regression,*

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1. INTRODUCTION

Now days there are great interest in vision technology for observing all types of environment. This could have many goals such as security, resource management, urban.This paper address the problem of detecting and tracking the people in a inhomogeneous crowd, which is collected of pedestrians that travels in different direction without expending clear object separation or tracing is proposed. As a replacement, the crowd is separated into the modules of similar motion by using the combination of dynamic texture motion model. A set of complete low level features is removed from each separated region and maps the features into evaluates the number of people per segment is learned with Bayesian Regression. There is two Bayesian regression models are observed.

The first is a mixture of Gaussian process regression with a compound kernel whichexplains the both the global and localtrendsof count mapping but is restricted by real valued outputs that do not match with a discrete counts. There is no need for pedestrian detection, object tracking, or object-based image Primitives to achieve the pedestrian counting goal, even when the crowd is sizable and inhomogeneous, e.g., has subcomponents with different dynamics and looks free in outdoor environments, as shown in fig 1 In fact, based on crowd centric approach the problem seems simpler. In this simply crowd segment into the region of interest, extract a set of complete features from the each segment and calculates the crowd size with a suitable regression function.

. By avoiding in-between processing stages,

such as people detection or tracking, which are prone to occlusion problems.

Fig.1. Scenes containing a sizable crowd with inhomogeneous dynamics due to pedestrian motion in different directions.

2. REVIEW OF COUNTING TECHNIQUES

Ma, Zheng et al, 2013 and Li, Jingwen, et al, 2011 have categorized the crowd counting in video as two broad categories.

Estimating the number of people using

 Region of interest (ROI counting)

In this is a process of countingcalculate approximately the total number of people in some sections at assured time instance[12].

 Line of interest (LOI counting)

In this method of counting people who crosses a detecting line in certain time duration.

A. LOI COUNTING:

The LOI counting can be advanced using feature tracking techniques:

- ***Feature Tracking Counting:***

Cong, Yang, et al, 2009 stressed that in this technique the features are either tracked into trajectories and these trajectories are gathered into object tracks or based on extracting and counting crowd blobs from a sequential slice of the video.

B.ALGORITHMS BASED ON FEATURE TRACKING COUNTING

- ***Based on Feature Trajectories:***

Rabaud, Vincent, et al, 2006 have established a technique based on a highly parallelized version of the KLT tracker in order to process the video into a set of feature trajectories. This will providea substrate for motion analysis, their unequal lengths and irregular nature present complicationsfor succeeding processing. This will be addressed by a simple means of spatially and temporally conditioning the trajectories. Then they have combined it with a learned object descriptor to achieve a separation of the integral motions.More complex model object will face the problem of identification in this framework.

An approach that uses the clustering methods for automatic counting of pedestrians in video sequencesis presented in Antonini, Gianluca,etal, 2006. Clustering techniques are applied to the resulting trajectories from tracking system in order to decrease the partialitybetween the number of tracks and the real number of targets. The main assumption will be those trajectories belonging to the same human body are more similar than trajectories going to dissimilar individuals [12]. Theconventionsprepared by this systemresult in a limitation when the concentration is on thetracking problem.

- ***Using moving direction:***

Bidirectional people counter model based on area andcolor evaluates is enclosed byChen, Thou-Ho, et al, 2006. The passing people are approximatelycounted with the area of people suggested on an image captured by a zenithal video camera and then the moving direction of the pedestrian can be predictable by tracking each people-pattern with an investigation of its HSI histogram. The factors such as counting accuracy is influenced, in crowded situation that the segmented people patternis collected of more than five persons,sudden moving and some intentional actions.

C. ROI Counting:

Cong, Yang, et al, 2009 and Riachi, Shirine, et al, 2014 have stressed that the ROI counting can beestablished using two techniques:

- ***Detection Based Techniques:***

These methods detect people individually and count them. It develops any of the following process Background Differencing, Motion and Appearance joint segmentation, shape matching and Standard object recognition method.

- ***Feature Based and Pixel Regression Techniques:***

These method abstract the features such as foreground pixels and interest points. And vectors are formed with those features and it uses machine learning algorithms to decrease the number of pedestrians or people. Some of the common features according to recent survey are edges, wavelet coefficients, and combination of large set of features. Some of the common Regressions are Linear Regression, Neural Networks, and Gaussian Process Regression and Bayesian regression, Relevance vector regression.

D.FEATURE BASED AND PIXEL REGRESSION TECHNIQUES

i) FEATURE BASED LEARNINGTECHNIQUES

(a) Based on Multiple Local Features:

Ryan, David, et al, 2009 have presented an Method uses local features to count the number of people in each foreground blob segment. It can easily be used to calculate crowd density all overdifferent regions of the scene and be used in a multi-camera environment. This method reduces the required training data. Due to imperfect foreground segmentation, some blobs are disposed totoerrors such as splitting, fading and noise which reduce overall precision in counting.

(b) Counting People in Groups:

Fehr, Duc, et al, 2009 have suggested a model in which the first step is foreground segmentation and then the different blobs get estimated onto the head and ground planes. Later predictions are used to calculate the number of people in a group. The count estimates is combined with tracking information to get a smooth count estimate. This is not necessary in public places like airports or railway stations it is highly likely that there will be people who remain stationary for extended periods of time.

(c)Based on Group Tracking and Local Features:

Ryan, David, et al, 2010 have proposed an algorithm that uses tracking and local features to count the number of people in each group as characterized by a fore-ground blob segment.

Tracking is applied to improve the robustness of the estimate. The system is limited by the simpleleast-squares linear model which is used for group size estimation.

(d) A robust method for counting people:

Ye, Qing, 2010 have proposed a method that has counted the number of people through four modules: image pre-processing module, morphology processing module that uses improved erosion operation and the better-quality expansionoperation to extract target feature, image marking module uses connected component detection algorithm and people counting module. This technique should not overcome the problems such as brightness, rapidly changing weather conditions, people head which are enclosed completely.

(e) Based on Edge detection:

Yu, Shengsheng, et al, 2008 have developed a method that includes three steps: (i). A new Foreground/Background Edge Model for detecting moving people based on edge detection.(ii). Two effective methods are used for moving people tracking. (iii). Counting process. The algorithm cannot handle the situation when the person wears clothes

with similar color to the floor, and when the sensed foreground edge is divided into smaller curves.

ii) PIXEL and REGRESSION TECHNIQUES

(a) Based on Regression Technique/ on Low- Level Features:

Privacy-preserving system for calculating the size of inhomogeneous crowds, composed of pedestrians that travel in various directions is introduced by Chan, Antoni B, et al, 2008 The crowd is segmented into components of homogeneous motion, using the mixture of dynamic textures motion model and a set of simple complete features is extracted from each segmented region, and the correspondence between features and the number of people in each segment is well-read with Gaussian Process regression. When there are very few people (less than two) in the scene this method is fail.The method that estimates the size of the crowd, which travels in different directions is also developed byChan, Antoni B, et al, 2012. Here, the crowd is segmented into components of homogeneous motion, by using the mixture of dynamic-texture motion model. A set of completelow-level features is extracted from each segmented region, and a function that recordsfeatures into approximate of the number of people per segment is learned with Bayesian regression. Later Gaussian process regression and Poisson regressionare used. It requires training for each specific perspective for crowd counting is the limitation of Bayesian regression.

(b)Relevance vector regression

Simon J.D. Prince. ,2012[11] have established the model to model thecorrespondence between features and the pedestrian number, RVR also gives the probability density distribution of the state; and RVR uses few consequence vectors but shows superb simplification ability.

(C)Gaussian process regression

Composed of compound kernel technique, which accounts both local and global trends is proposed by S.-Y. Cho, T. W. S. Chow, and C.-T. Leung, 1999,[11]. It is non-linear regression using Bayesian method .which is Differing from RVR, it doesn't consider the sparsity over training samples. The simple training process and wide kinds of available kernels make it of high value in machine learning. The limitation of this method is real valued output that do not match with discrete counts.

(D) Bayesian process regression

This technique overcome the limitation of GPR is overcome by this method and it is explained byA. C. Cameron and P. K. Trivedi, 1998[20] .A typical solution is to model the output variable as poisson regression or negative regression based on arrival rate parameter that is the function of input variables. This limits the generalization from small training samples and avoids a principled probabilistic approach to learning hyper parameters in a kernel function. Thus they have associated the future approximate Bayesian Poisson regression to Gaussian processes.

The presence of non-human objects like bicyclesdisturbs the overall working of the algorithm.[12].

(E) Based on feature regression:

Fradi, Hajer, et al, 2012 have introduced a counting system based on measurements of interest points, where perspective normalization and crowd measure-informed density estimation are introduced into a single feature, where the correspondence between this feature and the number of persons is learned by Gaussian Process regression. Here the accuracy of the people count is less.

3. CONCLUSION

This paper presents a survey of some of the broadly used lot of methodologies, algorithms, methodologies available within the discipline of crowd (humans) counting structures remains required for the strong gadget which should manage the following situations with a single framework: dense occlusion, massive crowd, both static and dynamic crowd counting, all kind of environments, less computational cost and time. therefore efficient humans count extractions are beneficial in many ways; one such instance is useful resource allocation for public occasions and so forth. so as to conquer the problems just like the indistinct look of body parts, occlusion, want a strong approach for extracting the human beings remember.

The destiny work will consists of the subsequent system for creating a distinct people counting machine. step one is to use nice methodologies like adaptive Gaussian aggregate version for extracting history statistics from shifting snap shots. the second one step is to explain the neighborhood/worldwide capabilities inclusive of Crowd density, relative peak/width; foreground pixels, horizontal/vertical imply kinetic strength and crowd distribution are extracted for human beings count number.

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