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Survey on Image Matching Model of Human Feature Localization

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Abstract: Face detection and human pose estimation are two challenging problems in computer vision and received great attention in last few years. It is challenging as the effect of illumination, facial expression and different angel of body position should not affect the resulting image. The accurate result of the system is depends on the component features are going to use and how will system use it. The application of face detection and pose estimation is important because has many applications in various fields. Many methods have shown the promising results to detect the humans and determine their poses. In this paper, overviews of some methods for face detection and human pose estimation.

Keywords: Biometrics, faces recognition, face expression, finding people, pose estimation, person identification

I. INTRODUCTION

Biometric-based techniques have emerged as the most promising option for recognizing individuals in recent years since, instead of authenticating people and granting them access to physical and virtual domains based on passwords, PINs, smart cards, plastic cards, tokens, keys and so forth, these methods examine an individual's physiological and/or behavioral characteristics in order to determine and/or ascertain his identity. The face n detection techniques is used for gender classification, expression recognition and facial feature recognition and tracking. [1]

For example, consider if facial feature detection used when a person doesn't follow the traffic signal or rules while driving the vehicle. Another example will encounter as, if any person working under stress then he/she can't give the accurate result as some mistake happens. By monitoring the workers condition while working will improve the output of work.

Finding pose of human body is important for the criminal evidence, tracing of human body, describing the action of body. For example, consider the factory where thousands of workers used to work. If some tragedy happens, that time the workers images capture from the camera are useful to detect the probable mistake happen by any worker which will useful in investigation.

II. DIFFERENT METHODS

Here illustrate the method for two quite different generic recognition tasks, detecting faces and finding people. For faces, the parts are features such as the eyes, nose and mouth, and the spring-like connections allow for variation in the relative locations of these features. For people, the parts are the limbs, torso and head, and the spring-like connections allow for articulation at the joints.

A. Pictorial Structure

The pictorial representation introduced by Fischler and Elschlager, where an object is modeled by a collection of parts arranges in a deformable configuration. [2]

Here the pictorial structure shown by the collection of parts arranged in distort manner. Each part is presented separately and the relation between the parts is shown by the spring like connection. The part encode the local properties and the distort part encodes connection between related parts. The matching of image gives the best solution by calculation the match cost. This cost is depend on the match cost of each part and the cost of distort pair. The calculation this cost using energy function i.e. minimizing the energy function.

But certain problem arises for the models as the result is the single match image where the similar images may be available. Another is the, many parameters are to be consider and energy minimization problem cannot be solved efficiently. These limitations are removed in part based model by the Felzenszwalb and Huttenlocher.

B.Part Based Model

For finding people the author take into account the pair of eyes, nose and mouth. While for estimating the poses contribution are of limbs, torso and head part. This model stores the complete part of human body not just its corner points. The relative parts are join by the edges to give significant search result.

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Author introduce the three fold contribution provide an efficient energy minimization function having acyclic graph. Learning an model by the training examples. The method developed for finding the good hypothesis for the location of parts. [6]

Here the matching cost is calculated as the how much he image matches and how much relative location will be match. This relative location is important as it is not changes to global transformation. It present as the articulate object, with different parts of human boy connected with joints which is flexible. The body structure represents in tree like structure which makes optimal solution in polynomial time. This method finds an optimal solution without any initialization.

C. *Iterative Process*

As in articulated object many positions are possible with different angles. Finding position of a body is hard in case of articulated object.

Here the used methodology is iterative parsing, where one sequential learns better and better features tuned to a particular image [7].

In other methods contribution is the return the set of poses from which the appropriate one should be selected manually. But in iterative paring the calculation is the probability of observed pose. So that no needs to select the manual one. For matching the poses different approaches are used like top down approach. In top down approach the set of various parts are match against each other. While in bottom up approach after detecting the body, the part of body will search its place. But in tree structure approach the body parts are match one by one and it allows efficient inference i.e. sum and product inference algorithm.[5] It is used to passing the signal from a node to its parent node and vice versa.

For getting the human body from the image the background must be removed. For removing the background here used the edge based deformable model, in which tree structure conditional random field is used as probabilistic model. Using edge based deformable model the torso will detect in whitish and background will detect in greenish. Now our human body is detected, it is ready to detect its body parts.

For detecting the body parts here used the region based deformation model. For body parts build an region based model for each part. The features of part are extracted and it will give clues for the probable position of part in an image.

D.Gaussian Markov Random Field

Assuming a GMRF prior over part configurations, construct the graph structure of the prior by regressing the position of each part on all other parts, and selecting the neighbouring edges using a Lasso-based method. This approach produces a prior structure which is not only sparse, but also faithful to the spatial dependencies that are observed in training data. [8]

The spatial prior is the relationship between the parts related to each other in all possible direction. Lasso method is used for learning the structure from the available data where it can preserves the most useful data for future analysis. This methodology will save the computational cost as in the beginning specify the number of key points which are going to be used. Here the object learned automatically from landmark objects which capture the key generating regularities.

E.Subspace image mapping

Learned subspace model gives the relation between image and its position of part. Till now techniques are about to saves the whole size of feature. Here method says to save the corners of the features which save the space.

Aim is to select the subset features which gives the better match model. The set of ideally selected landmarks would correspond to the corners of the eyes and mouth. The subspace model of shape and appearance has been previously learned from a set of labeled images. The method that we propose in this paper jointly optimizes over parameters of the subspace model and the selection of image features. [9]

For the feature selection corners of eyes and mouth need to be extracted. These corners are detected by harries corner detector. [3] After getting the six corners use histogram of as descriptor[4] We build a generic shape and appearance model. The idea of image will more clear and confusion free when shape and appearance of parts or features of shape will more localized by combining it. We evaluate two optimization strategy based on gradient descent and quadratic programming. But the quadratic programming gives better result as the gradient descent had drawback of local minima.

F.Adaptive Pose Priors

In adaptive pose prior non parametric method is used. As is non parametric methods to generalize the image should used the pixel wise matching. Here we combine the part based model with non parametric method which provide us the flexibility of non parametric method.

We propose a simple semi-parametric approach that combines the tractability of pictorial structure inference with the non-parametric methods by expressing a subset of model parameters as kernel regression estimates from a learned sparse set of exemplars. This yields query-specific, image-dependent pose priors. We develop an effective shape-based kernel for upper-body pose similarity and

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propose a leave-one-out loss function for learning a sparse subset of exemplars for kernel regression.[10]

III. CONCLUSION

In this survey the aim has been to investigate different methods of face detection and human pose estimation. Every model has some disadvantages which try to removed in another advance model. But still it suffers from problem of local and global features, feature selection, techniques used. The future research in the will strike towards improving the accuracy, speed and the feature component selection method for face detection and pose estimation.

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