

A STUDY OF OBJECT TRACKING TECHNIQUES

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Abstract

Identifying an image by a discriminative part of an image have been a great scope of research so far. The matching of such discriminative part can be done by various methods. The image matching or this identification consists of following steps. i.e., selecting the database, normalization of the database (which includes scaling, enhancement and adjustment), extracting the features from database images, doing same for the target image and at last performing the matching process based on the feature extracted.

Keywords: *Image Recognition, Object Tracking, Object Identification*

Introduction:

Image recognition techniques widely used in real time application, still more accurate, fast processing recognition techniques required. Today industry demanded the automatic recognition techniques. A user needs simple, low cost image recognition system that can be used with mobile phones. As every person has camera phones with good storage capacity and processing capability. Such system must capable of work in real time environment and very efficiently. The accuracy of the system should be high. Human recognition from image and video is also a challenging application of image recognition system. Some author demonstrated the learning based approaches to inspect the human activities. Accurate image recognition technique is also required for Image matching in criminal investigation task. Now a days image recognition techniques are used for the care of the old age person in hospitals and old age homes. These techniques helps in continuously inspection of the old people health. To watch out the unusual activity of the any suspicious person in crowdie area demanding fast recognition techniques. Automatic text detection and poster detection for e.g. vehicle license plate, also the application of the image recognition.

Image recognition has major role in human safety, security solutions. An automatic surveillance with minimum human interference is the emerging area of the image recognition. In this paper a study of recent invented image recognition method with application is reviewed.

Methodology Adopted:

Nikolaos Doulamis [1] has defined a motion estimation based to identify the person fall. In this paper author showed a fall detection subsystem framework for old peoples. In proposed system image processing and computer vision techniques is applied on simple camera output. Author claimed this algorithm track person in complex environment. This system also provide fall alert and motion activity by using all foreground and background information.

Toshiaki Miyazaki [2] has defined a work on human motion estimation. This method also identify people movement path in a room. The proposed algorithm counts the number of people in room. The proposed method used only binary data measured by infrared sensor. Jie Yang [3] showed a recognition system. The Proposed system, automatically detects the sign and translate it into desired language. Author showed the chines sign recognition in this paper. In proposed system firstly image is captured, then sign is detected. When sign is recognized, translate them in to desired language. Eunju Kim [4] has proposed system to detect the specific activities. This paper is the extended version of the existing AR approach. This method shows higher accuracy rate of recognition. This system firstly measured the activity and its effect. After that verify it the activity, by recognizing its effect. Author presented a comparison table of the experimentally evaluated data.

Nguyen Dang Binh [5] has presented a work on surveillance system by performing the intelligent detection of human activity in camera. Author proposed model of unsupervised learning based detector for the continuous supervision for a video data. In this approach a detection system with motion detector is proposed. In which learning based classifier is used to handle the large video data. Author shows an example in which surveillance task is done with minimum human intervention. Author claimed high rate of detection. Shih-Yao Lin [6] has presented a work on human marionette based interaction analysis to identify the human action recognition. In thig paper, author propose human-marionette interaction system. This method is used in artistic puppetry and a mimicking- marionette games. Author named this approach "i-marionette". Yi Li [7] has presented a work on human pose estimation and

prevalent computing analysis. Author shows the example of human motion pose. To extract the 3D information from pose human silhouette is detected. Then a motion model is created by using probability and statistical calculations. Which provide the pose of the human in video frame. Lastly a kernel regression is used which equalize the motion. Author shows that proposed algorithm analyse 3D pose from video effectively and also solve the ambiguities problem.

Stylianios Asteriadis [8] has defined a head pose estimation approach under camera position analysis in uncalibrated environment. Author shows a new face tracking method by using DVF tracker. Proposed algorithm successfully detect facial features in a videos. Author claimed that suggested algorithm doesn't need any type prior information for successfully face tracking. Elden Yu [9] has presented a work on human motion analysis under stable contact analysis. Author presented a work on analysis of image sequences, to investigate the person's activity. The proposed method is Hidden Markov Model based algorithm. In this method author used the star skeleton trajectory, then create stable contacts from extreme points. Author used the primitive motion units and intervals of the image sequences to measure the path of the human from video. S. F. Worgan [10] has defined a work on activity classification. In this paper author create a structural workflow model from different manifestation. When new person interact with this system, a feedback Bayesian model collect the spatial and temporal information. To extract the structural information author placed the Markov chain of actions into a simple place. Author compare suggested activity recognition method with other techniques and shows generalisability of this method.

N.J.C. Groeneweg, et.al. [11], presented a fast building recognition technique. Propose algorithm easily used on mobile phone platform. Taking the trend in context that today every mobile comes equipped with camera. It produce the feasibility for application of computer vision on mobile phones. Authors presented an algorithm for building recognition application by mobile. We know mobile has limited storage capacity and low processing power. Author tested proposed algorithm on building database and claimed good accuracy. Researcher implemented this algorithm on a mobile phone and shows that in real time condition performance of software is 80%. T. Goedeme, et.al. [12] have defined a method for fast visual navigation. Authors presented a new and fast way for image matching. Author implement propose system on a semi-automatic Wheelchair and shows fast recognition in natural and real environment. As in practical situation camera movement required to face lots of obstacles. In this paper author proposed affine invariant regions for real time conditions. Jing Cui, et.al. [13] have presented an improved Harris corner detection algorithm which is based on Barron operator. As the accuracy of the Harris corner detection algorithm is very poor and it may fail to detect real corners. In first step of the proposed algorithm image gradient is measured by an operator called Barron and for minimizing the calculation error another operator, Sobel is used. In next step, image keeps smooth by using B-spline function, which improve the corner information. In third step, reliability of detected corner is verified by using corners sieving method. After that an iterative algorithm is used to confirm the accuracy of the selected corners of each block of the test image.

Abdallah Eweiwi, et.al. [14] have presented a common approach for action recognition. Commonly local descriptors are used for action recognition. When recognising a still image from video, descriptor computes the key pints. But in these key points not so much information that is required for human action recognition. Several researchers proposed many approaches, some of them based on learning and some on saliency maps. In this paper, authors search

action-specific points or ROI in still images based on information extracted from video data. In this paper author suggest a method for extracting spatial interest region from video. Authors claimed that his proposed generative model for characterizing joint distributions of regions of interest, local image features (visual words), and human actions. Anke Meyer-Baese, et.al. [15] have presented an approach for statistical and syntactic pattern recognition. Research used these method for biomedical imaging. In this paper Parametric and nonparametric estimation methods and graphical methods are used for bio-imaging and pattern recognition respectively. Author show a review of ROC based classification used for the diagnostic application. Soumitra Samanta [16] has showed an approach for detection of movement in the video. The proposed approach is Detection and description space time based, which classify the activities in video. Author used three dimensional facet model to detect space time interest point (STIP) and named this approach facet space time interest point (FaSTIP). This method extracts all interested point very accurately. This is the new algorithm for detection of human activity and interested point id videos.

Kyungseo Park [17] has defined a new method for investigate the abnormal activities in videos using wireless sensor network. Proposed approach is a behaviour analysis based recognition system which is used in real environment. In proposed method a model is created, through which spatial and temporal information of object is observed. To minimize the miss classification similarity scoring function and threshold is defined. Georgios Goudelis [18] has presented a facial pose estimation method. In this method mutual information is used to extract the facial pose from video. This is a sequence analysis approach which detect automatically. Sawsan M. Mahmoud [19] has defined a behaviour recognition based dissimilarity analysis approach to analyse the abnormal behaviour. This approach provide difference in pattern of people's behaviour when the act abnormally. Author proposed a system through which behaviour of daily activity is observed. And fuzzy hamming distance and fuzzy hamming distance of observed data is calculated. The comparison of these dissimilarity measures gives the change in behaviour of the people.

Yingying Zhu [20] has proposed an algorithm for activity recognition. This is a spatial approach. This method provide both context and motion data. Proposed method work on the fact that activity depends on motion as well as neighbouring objects. These surrounding objects provide useful information regarding activity. In this author proposed a mathematical model in which predefined attributes are to capture the motion weight and context pattern of each activity. Author used convex methodology to learn the model parameters at each instance. Pengfei Zhou [21] has defined a work on movement detection in indoor and outdoor environments. Author presents IoDetector: it is a service which can installed on mobile phone. IoDetector is a combination of low cost light and magnetism sensors. Which detect the movements of objects in real time environment and performed good accuracy in detection. Hapugahage Thilak Chaminda [22] has defined a coupling paired activity analysis in daily life. This technique was mainly implemented to track the both hand movement of any person. And investigate that person on the bases of behavioural information of the hands. Author tested this algorithm on real time and show 80% recognition rate.

Michal Hradis [23] has defined a work on detection and classification algorithms. The work is here presented as the framework to improve the system recognition ratio. Here author showed a framework which is used for providing all needed information to detection classifier. Author proposed framework shows good performance, easy handling and full fill the all requirement of the every detection classifier. During experiment proposed algorithm shows good training

support, infrastructure with useful features. Hsuan-Sheng Chen [24] has defined a skeleton recognition based action recognition system under Hidden Markov Models (HMM) and action recognition. In this method author used star-skeleton contour to represent the person. A continuous sequence of star-skeleton images over time shows the person movement. Then feature vector sequence (FVS) is extracted from these images. This FVS is fed to HMM to recognise the action of the person. Author proposed a codebook to measure the similarity of the features. Vasil Khalidov [25] has defined a work on audio visual based object recognition under unsupervised clustering approach. This work shows the object detection and recognition in video. Video has both visual and audio information. Author suggest a probabilistic framework that use cluster of the audio and video. Author maps the information on 3D representation which is used for recognition of the human [65-71].

Alexia Briassouli [26] has defined a work on human activity localization and change detection. Author proposed a new sequential detection method, in which temporal change of the person is detected. This technique provide the frame information, where any event start and finished. This does not require prior information and thresholds. Michael Voit [27] has presented a work on pose analysis so that the object attention over the cameras will be obtained. In this work, Author presented a Neural Network with Bayes filter approach to localize the head movement of the targets. Rajat Singh [28] has presented a work on unusual activity analysis under video surveillance system. Author presented a tracking system that track a person in the presence of obstacles. To segments the person from background in video, Gaussian model is used. To investigate the activity of the person Bayesian inference model is used. An operator continuously inspect the suspicious activity of the tracked people. Hock M. Ng [29] has defined a human activity monitoring and detection system under sensor analysis. To detect the person, each person is inspect by a thermopile sensor. This sensor sense the change in temperature of persons. And on the bases of these temperature reading localize the person.

Mikel D. Rodriguez [30] has defined a work on human segmentation and detection in crowded scenes. In this method firstly learning of the code of person posture clusters is performed. This system detect the person in crowded scene of the video on the basis of the human posture. David Vazquez [31] has presented a work on human detection and learning system in virtual environment. Author address learning technique to simulate the real world and human activities in videogames [46-58]. For this author used a training classifier that automatically simulate the large image data in virtual world. Zhu Li [32] has presented a human action recognition system under luminance trajectory analysis. This method doesn't required object level information. Author shows a comparative state of art of this method. Author proof that this method has less computation. So this method easily used for real time applications. Shehroz S. Khan [33] has presented a work on unusual temporal event analysis under HMM approach. Author proposed a three Hidden Markov Models based technique to detect the unusual activities. Walter S. Lasecki [34] has defined a work on activity monitoring in real time crowd environment. Author introduced Legion:AR, a system. This system used labels those are collected from crowd workers. These activity labels is used to train the recognition system. This method shows the high accuracy in real time environment.

Zhongwei Cheng [35] has presented a human group activity recognition and analysis under motion fusion. In his paper, Author used multi Kernel learning method to recognize the activity of the person from small countable group. In this technique motion and appearance knowledge is used for learning the model [36-45]. The study has been based on empirical observation available from different reports, various journals, and e-journal. Collection of available

literature, detection of situation in the place of importance was gathered through personal observations and, collection of related information's. Observations were made based on news reports, interaction with some of the local people associated with tourism and tourist, discussions with some of the Officials, NGOs, travel agencies etc. who are actively working on tourism [59-64]. The nature of the present research work is explorative and the whole work has been done by descriptive as well as analytical method.

Conclusion:

Considering all the techniques that have been discussed in this paper, it can be concluded that the image processing techniques for object identification, tracking and recognition would be appropriate improved day by day. Implementation of these techniques in for real life solution is increasing. Still these techniques are application specific.

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