ISSN (ONLINE): 2454-9762
ISSN (PRINT): 2454-9762
Available online at www.ijarmate.com

IJARMATE
Your ub-MATE Research Paper !!!

International Journal of Advanced Research in Management, Architecture, Technology and Engineering (IJARMATE) Vol. 3, Special Issue 14, April 2017

EFFICIENT VIDEO OBJECT TRACKING USING ST-MARKOV RANDOM FIELDS MODEL FOR INDUSTRIAL APPLICATIONS

Dr.S.Saravanan,
Associate professor & HOD , EEE
Jeppiaar Maamallan Engineering College
saravanantec@yahoo.co.in

Abstract-Despite the recent progress in both pixel-domain and compressed-domain video object tracking, the need for a tracking framework with both reasonable accuracy and reasonable complexity still exists.Method of tracking moving objects in H.264/AVC-compressed video sequences using a spatio-temporal Markov random field (ST-MRF) model is used instead of pixel-domain and compressed-domain for reasonable accuracy & reasonable complexity.An ST-MRF model naturally integrates the spatial and temporal aspects of the object's motion. First, the MVs are preprocessed through intracoded block motion approximation and global motion compensation. At each frame, the decision of whether a particular block belongs to the object being tracked is made with the help of the ST-MRF model, which is updated from frame to frame in order to follow the changes in the object's motion.This ST-MRF model based video object tracking implemented in industry applications for checking the fault items of various conveyors at the same time using single camera.Overall priority control could be assigned to the PIC micro controller on the control units, providing performance monitoring of each function, the actual reconfiguration is done locally at each layer.

I. INTRODUCTION

The image processing algorithms of video object tracking is complex one. The video object tracking is done here to identify the fault objects in the conveyor. The image processing is implemented in the MATLAB to identify the size of the object that is travelling in the conveyor. This object tracking is implemented in the industry applications for checking the fault items. The solenoid valve is used for throwing out the fault item. Another advantage of this project is viewing multiple conveyors by using single camera.

Following these ideas, a reconfigurable architecture for image processing of vision surveying is presented. The image processing algorithms will be divided into stages. Overall priority control could be assigned to the PIC micro controller on the control units, providing performance monitoring of each function, the actual reconfiguration is done locally at each layer. The assignment problem is a key to this technique. Because assignment is complete, therefore, the efficient, dynamic solution to the pipeline assignment system is to use both hardware and software implementations.

Model matching which is very frequently used in image processing, with the following stages: 1) Canny edge detection and conversion to parallel camera geometry; 2) stereo matching; 3) connection of edges and classification as lines and arcs; 4) Model matching. Given the balance of processing between the tasks, one possible way of potentially giving a good throughput is to dynamically share the stages on different PE in the system. A copy of the configuration information created by control to run all algorithms required for the application can be stored in the pc. Overall priority control could be assigned to the pc and software developed on the control units, providing performance monitoring of each function. If the new scene contains different edges, then the matching and edge-connection can occupy more processing elements while the edges are determined.

Although the PIC has the task of resource allocation, the actual re-configuration is done pc fault detection and an alert in sound or graphics.

The method evaluates the labelling dependence of consecutive frames through MVs as well as thesimilarity of context and neighbouring MVs within the frame,and then assigns MVs into the most probable class (object vs.non-object), as measured by the posterior probability.

ISSN (ONLINE): 2454-9762
ISSN (PRINT): 2454-9762
Available online at www.ijarmate.com

International Journal of Advanced Research in Management, Architecture, Technology and Engineering (IJARMATE) Vol. 3, Special Issue 14, April 2017

II. LITERATURE SURVEY

The Soo-Chul Han; Christine I. Podilchuk "Video Compression With Dense Motion Fields" IEEE transactions on image processing, vol. 10, no. 11, November 2001 proposed a motion-compensated video coding system employing dense motion fields. The dense motion fieldis calculated at the transmitter, and the motion information isefficiently encoded and transmitted along with the residual frame.The motion estimation is performed by existing techniques in theliterature, while we focus on the coding of the motion field and thedisplaced frame difference (DFD) frame. The dense motion fieldformulation leads to several novel and distinct advantages. The more accurate and precise motion descriptionallows us to predict where the DFD energy will be significant, thusleading to a more efficient DFD encoder compared to applyingtraditional still-image coding techniques. Wei Zeng; Jun Du; Wen Gao; Qingming Huang "Robust moving object segmentation on H.264/AVC compressed video using the block-based MRF model" W. Zeng et al. / Real-Time Imaging 11 (2005) 290–299

Moving object segmentation in compressed domain plays an important role in many real-time applications, e.g. video indexing,video transcoding, video surveillance, etc. Because H.264/AVC is the up-to-date video-coding standard, few literatures have beenreported in the area of video analysis on H.264/AVC compressed video. H.264/AVCemploys several new coding tools and provides a different video format.

Experiments show that ourapproach provides the remarkable performance and can extract moving objects efficiently and robustly.Chad Aeschliman,.;Johnny Park,.; Avinash C. Kak.; "A Probabilistic Framework for Joint Segmentation and Tracking", Computer Vision and Pattern Recognition 2010 proposed a paper, stating a novel probabilistic frameworkfor jointly solving segmentation and tracking.

Startingfrom a joint Gaussian distribution over all the pixels,candidate target locations are evaluated by first computingpixel-level segmentation and then explicitly includingthis segmentation in the probability model.

The segmentationis also used to incrementally update the probabilitymodel based on a modified probabilistic principal componentanalysis (PPCA). Our experimental results showthat the proposed method of explicitly consideringpixellevelsegmentation as a part of solving the tracking problemsignificantly improves the robustness and performanceof tracking .

The Marina Georgia Arvanitidou; Michael Tok,; Andreas Krutz"shot-term motion based object segmentation" Communication Systems group Technische University Berlin,Germany explained about Motion-based segmentation approaches employ either long-term motion information, which is computationally demanding,or suffer from lack of accuracy when employing short-terminformation.

We present an automatic motion-based objectsegmentation algorithm for video sequences with movingcamera, employing short-term motion information solely.For every frame, two error frames are generated using motioncompensation. We propose a simple and effectiveerror frame generation and consider spatial error localization.

III. EXISTING SYSTEM

Most existing MRF-based schemes use a spatial (i.e., 2-D) MRF field model to impose spatial constraints. This method provide a framework for tracking moving objects in compressed domain based on MVs and associated block coding modes alone. The object of interest is selected by the user in the first frame, and then tracked through subsequent frames.An iterative scheme that combines Global Motion Estimation (GME) and macro block (MB) rejection is exploited in to identify moving object blocks, which are then tracked via MB-level tracking.

Foreground objects are identified by applying the background subtraction technique followed by temporal filtering to remove the noise.Afterwards motion segmentation is performed by Timed Motion History Images approach, and finally, the trajectory is estimated by object correspondence processing.Motion segmentation is performed by Timed Motion History Imagesapproach, and finally, the trajectory is estimated by objectcorrespondence processing. Mean shift clustering is used into segment moving objects from MVs and partition sizein H.264 bit stream.

After obtaining salient MVs by applyingspatial-temporal median filter and Global Motion Compensation(GMC), this method applies spatial-range mean shiftto find motion-homogenous regions and then smooth's theregions by temporal-range mean shift.The spatial homogenous moving regions are formed by statistical regiongrowing. In [11], the

ISSN (ONLINE): 2454-9762
ISSN (PRINT): 2454-9762
Available online at www.ijarmate.com

IJARMATE

International Journal of Advanced Research in Management, Architecture, Technology and Engineering
(IJARMATE) Vol. 3, Special Issue 14, April 2017

segmented regions are further classifiedtemporally using the block residuals of GMC.

Another line of research addresses segmentation and tracking problems using Markov Random Field (MRF) models, which provide a meaningful framework for imposing spatial constraints. Treetasanatavorn proposed an algorithm for motion segmentation and tracking from MV fields through the Gibbs-Markov random field theory and Bayesian estimation framework.The segmentation of the firstframe is carried out by using the stochastic motion coherence model.

For the subsequent frames, the algorithm predictsa partition hypothesis by projecting previous partitions tothe current frame based on the affine displacement model,and then relaxes the partition labels. The algorithm inalso initializes local partition hypothesis and employsthe resulting incongruities of two hypotheses to finalize thesegmentation. The optimal configuration of this partition isfound in the relaxation process so that it minimizes themaximum a posteriori(MAP) cost, described by hypothesisincongruity and the motion coherence model.

First, the MVs are classifiedinto multiple types, such as background, edge, foreground,and noise. In the second stage, moving blocks are extractedby maximizing MAP probability. In these methods, moving regions arecoarsely segmented from MV fields prior to boundary refinement,which uses colour and edge information.

The authorsemploy GMC and MV quantization to extract a preliminarysegmentation map, which is used later in initializing theirspatial MRF model. The Drawbacks are 1.Object distinct from background are not able to segment and track.2.Most of the high level companies use this for the verification of final output conveyor.3.Camera is used for the only one conveyor.

IV. PROPOSED SYSTEM

This proposed system presents a method for tracking moving objects in H.264/AVC-compressed The resulting ST-MRF model helpsoptimize bject Fig. 4.2 Block Diagram tracking by referring to otion coherence andspatial compactness, as well as temporal continuity of theobject's motion. ideo sequences using a spatio-temporal Markov random field (STMRF) model.Built upon such amodel, the proposed method works in the compressed domain anduses only the motion vectors (MVs) and block

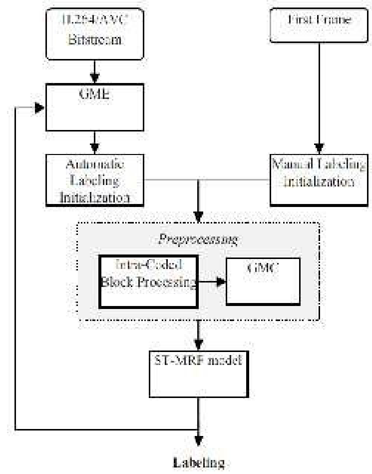
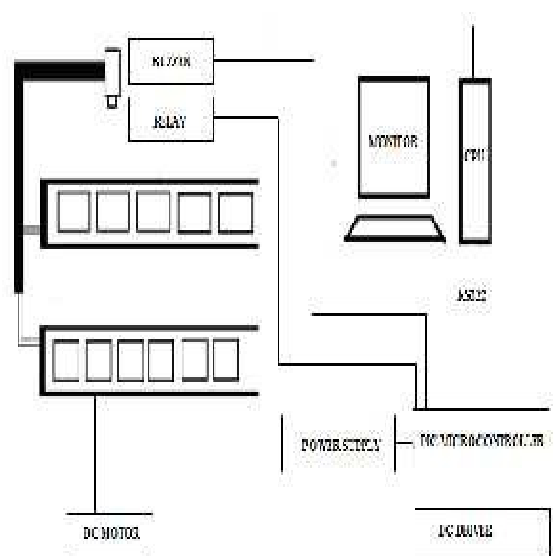


Fig. 4.1 Proposed ST-MRF Model

This ST-MRF model based video object tracking implemented in industry applications for checking the fault items of various conveyors at the same time using single Overall priority control could be assigned to the PIC micro controller on the control units, providing performance monitoring of each function, the actual reconfiguration is done locally at each layer.The DC motor and DC driver are used for moving the conveyor.1.The camera is used for taking the pictures of the conveyor and it is send to the PC.2.The MATLAB program in the PC checks for the size of the object.



ISSN (ONLINE): 2454-9762
ISSN (PRINT): 2454-9762
Available online at www.ijarmate.com

International Journal of Advanced Research in Management, Architecture, Technology and Engineering
(IJARMATE) Vol. 3, Special Issue 14, April 2017

The particular size is predefined and if the size varies then the controller stops the conveyor and varying objects pixel area is displayed.The Advantages are 1.Accuracy compared to Iterated Conditional Modes (ICM)2.One camera is used for all conveyors.3.A compressed domain method in practical applications is their generally lower computational cost.

V. SIMULATION AND RESULTS

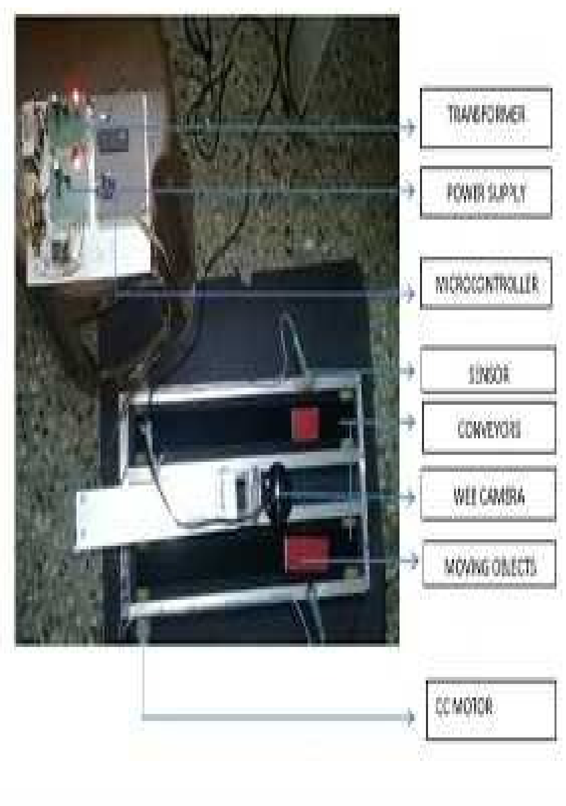


Fig.5.1 Hardware Kit

VI. OBJECT IMAGES

Objects moving in the conveyor are captured by the web camera as instructed by the Microcontroller.

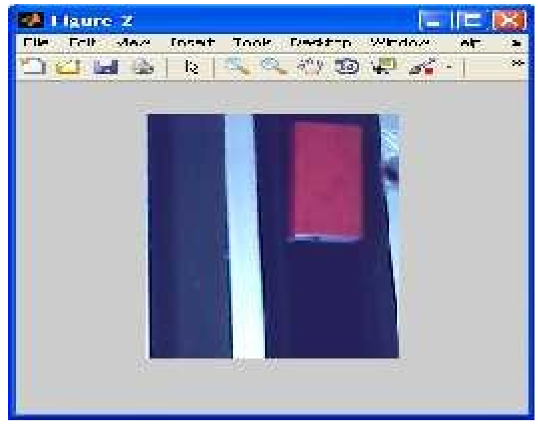


Fig. 6.1 WEB CAM IMAGES

VII. GRAYSCALE IMAGES

Moving objects captured are processed and converted into Grayscale Images as per the processing model.

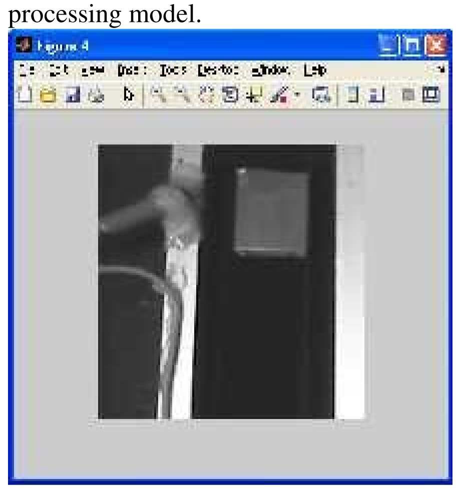


Fig. 7.1 GRAY SCALE IMAGE

VIII. MATLAB OUTPUT

Grayscale images are then converted into binary images which is then processed to find out the pixel area difference of two objects.

ISSN (ONLINE): 2454-9762
ISSN (PRINT): 2454-9762
Available online at www.ijarmate.com

International Journal of Advanced Research in Management, Architecture, Technology and Engineering (IJARMATE) Vol. 3, Special Issue 14, April 2017

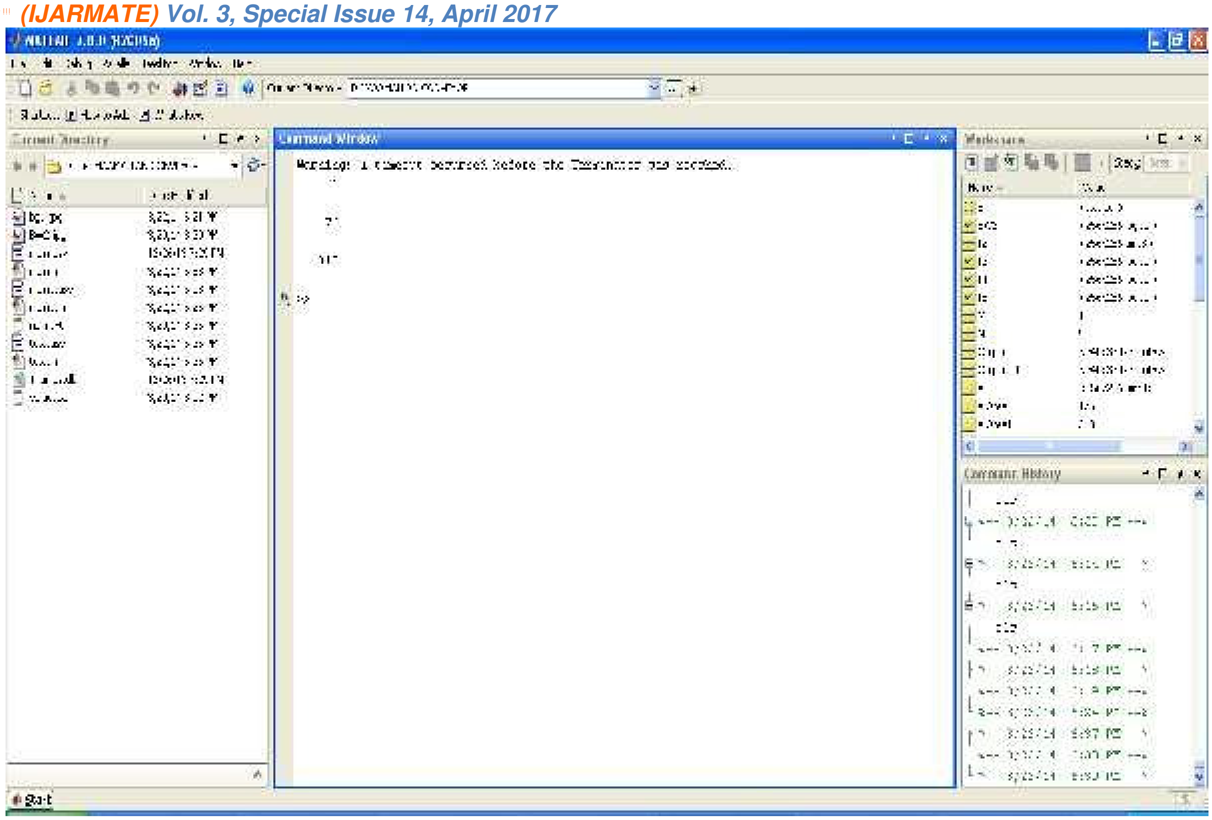


Fig. 8.1 MATLAB OUTPUT WITH PIXEL AREA

IX. CONCLUSION

In this paper, we have presented a novel approach to track a moving object in a H.264/AVC-compressed video. The only data from the compressed stream used in the proposed method are the motion vectors (MV's) and block coding modes. As a result, the proposed method has a fairly low processing time, provides high accuracy. The results of experimental evaluations on ground truth video demonstrate superior functionality and accuracy of our approach against other state-of-art segmentation/tracking approaches.Although our algorithm works well even with fixed parameter values, possibly better performance may be obtained byadaptive tuning, although this would in general increase thecomplexity. Along these lines, dynamic parameter tuning asproposed by Kato Et Alwould be worth investigating asfuture work.

X. REFERENCES

[1]Sayed Hossein Khatoonabadi and Ivan V. Baji´c, "Video Object Tracking in the Compressed Domain UsingSpatio-Temporal Markov Random Fields"IEEE transactions on image processing, vol. 22, no. 1, January 2013.

[2] M.G.Arvanitidou, M.Tok, A.Krutz, and T. Sikora, "Short-term motionbased object segmentation," in Proc. IEEE Int. Conf. Multimedia Expo, Barcelona, Spain, Jul. 2011.

[3]Y.-M. Chen and I. V.Bajic, "A joint approach to global motionestimation and motion segmentation from a coarsely sampled motionvector field," IEEE Trans. Circuits Syst. Video Technol., vol. 21, no. 9, Sep. 2011.

[4]W.Fei and S. Zhu, "Mean shift clustering-based moving object segmentation in the H.264 compressed domain," IET Image Process., vol. 4, no. 1, pp. 11–18, Feb. 2010.

[5] C. Aeschliman, J. Park, and A. C. Kak, "A probabilistic framework forjoint segmentation and tracking," in Proc. IEEE Comput Vis. Pattern Recognit., San Francisco, CA, Jun. 2010, pp. 1371–1378.

[6]A.Cherian,J.Andersh,V.Morellas,N.Papanikolopoulos,B.Mettler ,"Autonomous altitude estimation of a UAV using a single onboard camera," in Proc. IEEE Int. Conf. Intell. Robots Syst., Oct.2009, pp. 3900–3905.

[7] Z. Liu, L. Shen, and Z. Zhang. "An efficient compressed domain movingobject segmentation algorithm based on motion vector field," J. Shanghai Univ. (English Ed.), vol. 12, no. 3, pp. 221–227, 2008.

[8]R. Huang, V. Pavlovic, and D. N. Metaxas, "A new spatio-temporalMRF framework for video-based object segmentation," in Proc. MLVMA Conjunct. Eur. Conf.Vis., 2008, pp. 1–12.

[9] Z. Yin and R. Collins, "Belief propagation in a 3D spatio-temporal MRF for moving object detection," in Proc. IEEE Comput.Vis. Pattern Recognit., Jun. 2007.

[10]] Z. Liu, Y. Lu, and Z. Zhang, "Real-time spatiotemporal segmentation of video objects in the H.264 compressed domain," J. Visual Commun Image Represent., vol. 18, no. 3, pp. 275–290, 2007.

[11] Y. Wang, "A dynamic conditional random field model for object segmentation in image sequences," in Proc. IEEE Comput. Vis. PatternRecognit., vol. 1. Jun. 2005, pp. 264–270.

[12] Y. Wang, K.-F.Loe, T. Tan, and J.-K. Wu, "Spatiotemporal video segmentation based on graphical models," IEEE Trans. Image Process.,vol. 14, no. 7, pp. 937–947, Jul. 2005.

[13]S. Treetasanatavorn, U. Rauschenbach, J. Heuer, and A. Kaup, "Bayesian method for motion segmentation and tracking in compressed videos," in Proc. 27th DAGM Conf. Pattern Recognit., LNCS 3663. 2005, pp. 277– 284.

[14]S. Treetasanatavorn, U. Rauschenbach, J. Heuer, and A. Kaup, "Model based segmentation of motion fields in compressed video sequences using partition projection and relaxation," in Proc. Visual Commun. Image Process., Beijing, China, Jul. 2005, pp. 111–120.

[15] V. Mezaris, I. Kompatsiaris, N. V. Boulgouris, and M. G. Strintzis, "Real-time compressed-domain spatiotemporal segmentation and ontologies for video indexing and retrieval," IEEE Trans. Circuits Syst. Video Technol., vol. 14, no. 5, pp. 606–621, May 2004.

[16] S. Treetasanatavorn, U. Rauschenbach, J. Heuer, and A. Kaup, "Stochastic motion coherency analysis for motion vector field segmentationon compressed video sequences," in Proc. IEEE Workshop Image Anal. Multimedia Interact. Services, Apr. 2005, pp. 1–4.

[17] W. Zeng, J. Du, W. Gao, and Q. Huang, "Robust moving objectsegmentation on H.264/AVC compressed video using the block-basedMRF model," Real-Time Imaging, vol. 11, no. 4, pp. 290–299, Aug.2005.

