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Object Tracking Based on Color Features from Key Frames

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1. Introduction: In the world, everybody needs to protect their life to save and to prevent from dangerous case. Some case cannot protect for life, such as accident case on the road, the criminal case and so on. It says that need to give some information to them that is never emancipate from the criminal case and never find bolt-hold. This system can support like case, because system processes under the security surveillance camera network and use all video files from that camera network. These videos are extracted as frames based on time and relevant frames are stored as frame sequence. The system extracts key information frames from that frames sequence with relevant time. The system handles all important key information frames and extract important object using colour features base and collects the path of that object by tracking of different background region. To track selected object, the system collects all key information frames from videos in a network with time base. The selected importance key object is searched other information key frames. To search selected object from other key frames, the system use object segmentation on colour features.

The user needs to select tracking objects from key frames a video. That selected important object is extracted feature values based on RGB features and HSV hue value. This research tests on private dataset, surveillance camera network, from Myanmar Institute of Information Technology University (MIIT), Mandalay, Myanmar. All surveillance cameras are configured at the different stable places and camera view is stable in vision. That camera network has 85 cameras totally and used HIKVISION network bullet camera and HIKVISION E series Network Speed Dome camera. This research is ongoing stage and five members are working as a group.

2. Research Questions: This research support to the big data analysis and the objective is to extract object tracking region for moving object. The main idea of this research is object segmentation on different background area based on features by using key information frames.

Image segmentation supports dividing of the image into the disjoint homogenous regions or classes. That is all the pixels organized in the same class based on their common characteristics. The segmentation applied to bands of the RGB images and tested on the HSI. The result is good segmentation by processing the intensity band of the HSI model and the dilation using two models are similar [1]. Research technique based on the optimal, linear time, computation of weighted on the distances of the data is automatically segmented. The weights are based on spatial and temporal gradients. The localization refinement step follows fast segment and

accurately compute the corresponding matte functions. By adding of constraints into the distance definition permits to efficiently handle occlusions such as people or objects crossing each other in a video sequence [2]. This survey provides color image segmentation techniques. Color segmentation is based on monochrome segmentation approaches. To segment object image used histogram, threshold value, feature clustering, edge detection, region based methods, fuzzy techniques and neural networks. HIS model can solve the color image segment problem and Fuzzy set theory can support uncertainties problem for image segmentation [3].

Combines of different color spaces such as RGB, HSV, YIQ and XYZ are used for image segmentation. The combine of different color space give more accurate segmentation results. K-means clustering and Effective Robust kernelized Fuzzy C-means (ERKFCM) are used to segment object [4]. Author proposed new method for object segmentation in motion object and color base in a different background. Their algorithm presents a major extension to the state of the art and the original active shape model (ASM) using landmark points in stable background [5]. This paper presented to detect and track for thermal images. Their framework exploits raw H.264 compressed video streams and they work on Motion Vectors (MV) by using a video compression technique [6]. They used video surveillance systems in public places with different action and views. They consider scene, event and analyze human movements. The system recognizes objects and observes the effect of the human movement on that object. The system used high level motion feature extraction method and embedded Markov chain models to detect object behaviors. Probability based multiple background modeling technique is used to detect moving objects [7].

3. Methodologies: Manual video analysis is a time consuming process, the storage of videos over duration of time becomes very expensive due to increasing storage hardware need. Thus tools are required for video summarization is key frames extraction. Many researchers have proposed many approaches for key frames extraction, their efforts to improved their accuracy of key frames extraction and not consider execution efficiency. This system use new method to find excellent key frames from long video sequence. That new method mentions many video frames sequences to find different frames and extract transition frames from continuous frames sequence. To find tracking region from different background, that method use key information frames from different video on different cameras.

4. Proposed Method: To select objects tracking areas selection in camera network, has many different steps. First step is the key frame extraction from different surveillance video. The second is to selection tracking object of key frame and resize that object. The third is the feature Extraction from tracking object and the foreground object extraction from key frames in different surveillance video and resizes that foreground object as same dimension of tracking object's frame. The next step is to compare frame different value tracking object and foreground objects based on feature values and to search the higher similarity on tracking objects, the system store time values from relevant key frames by using character image detection and recognition process. Finally, the analysis of object information and extract tracking areas based on a time schedule.

The system process these seven steps and step two to step six based on image processing such as object extraction, object segmentation, foreground detection and character image detection and reorganization processes. Tracking the selected object in a security camera network is very important for future life. It can support to find some accident case in the city traffic system and security control system. The system gives change to select important objects from key frame. That key frame is collected based on important point in surveillance video.

4.1 Key Frame Extraction on Surveillance Videos: This system starts with key frames from many different surveillance cameras. To extract key frames from a surveillance camera video used Block Diagonal Movement Technique (BDMT). That technique gives excellent result by reduce of calculation time and complexity rate. The system extracts three key frames and this research use only one excellent key frame with mix difference value from strong shot [8].

These key frames are important to extract tracking objects and to track that object from different videos. The user selects an important object from key information frame and system extract similar objects in a surveillance camera network by using key information frames. Key frame extraction process is preprocessing step of this system.

4.2 Selection of Tracking Key Objects: The user selects the important object from the point of that object and draft as rectangle size. The video frame dimension is 2688 x 1520 pixel values. The system extracts the selected area as one rectangle image and that image is resized as area 100 x 100 pixel object frame. System segments object by use of the Global threshold technique.

4.3 Segmentation and Extraction Feature Values: The tracking object's RGB color moment value is compared with other object from key frames of different video. To compute the object's color value from the other key frame, system segment foreground and background by using color segmentation algorithm. The system uses the Otsu's threshold method to segment the object from selected tracking object frame. The moment features based on RGB values and Hue value are calculated for that object.

Other key frames are segmented foreground object and background objects by using threshold technique. That foreground object is resized to the 100x100 image frame. That segmented object extracts feature value and these values are compared with the value of important object feature value. For key frames from different cameras, background information on relate cameras are already stored in the database. It supports extracting foreground region from an image and compare for the object with the important object.

TABLE 1. Key frame and user selected object

Camera	Key frames with tracking object	Selected tracking object	Segment on RGB
GA-2030			

Comparison of feature values between tracking object and other key information frames, the system extracts related camera information and relevant time information. This information can be seen as simple as table 1.Tracking object's path camera information is sorted based on time and that time is sorted am to pm. That table information can support to draw object tracking region based on place.

To compare object similarity value, system use RGB color moment value.

Color Moment Mean value is $\mu_i = \frac{1}{N}\sum_{i=1}^{n} P_{ij}$ (1)

Color Moment Standard Deviation is $\sigma_i = \frac{1}{N}\sum_{i=1}^{n}((P_{ij} - \mu_i)^2)^{1/2}$ (2)

Color Moment Skewness is $S_i = \frac{1}{N}\sum_{i=1}^{n}((P_{ij} - \mu_i)^3)^{1/3}$ (3)

P ij = value image address i x j;
N = size of block

4.4 Extraction Time Information from Frames: To track object movement, the time information from key frames are very important section. It can support the object movement path with time base and the system decides the tracking region path based on that time schedule.

TABLE 2. Camera and relevant time information

Point No.	Extracted video Time						Camera Information	Point and place
	Year	Month	Day	Hours	Min	Sec		
1	2019	3	15	12	26	06	GA-2030	Gate point In
2	2019	3	15	01	30	34	GA-2076	Gate point Out
3	2019	3	15	12	45	12	GF-3065	Front of B
4	2019	3	15	12	56	23	GF-1020	Mid of public area
5	2019	3	15	01	20	05	GF-2451	End of Public area
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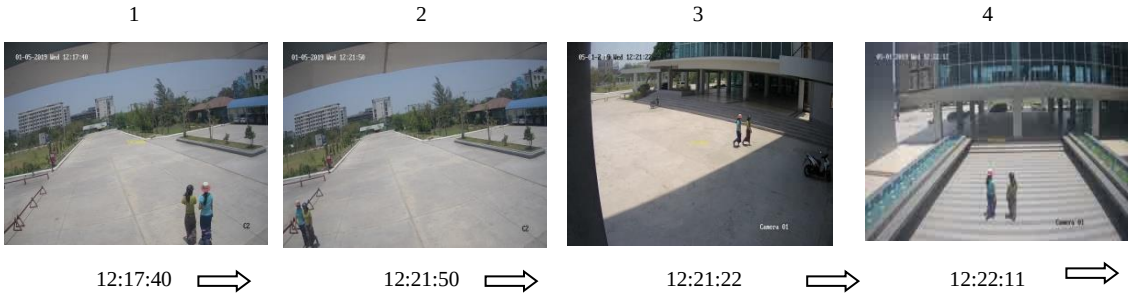
To extract time information from the key information frame, the system uses character segmentation and character recognition technique. Segment date and time information and classify that character using genetic algorithm and dynamic image processing techniques. The classified information is stored in database their relevant frame information. The system finds the time difference value on similar object frames information and calculates the object move priority on different cameras.

4.5 Fining Tracking Region based on Time: The system extracts camera information from the camera network based on object similarity rate between important object and another object from other key frames. All key frames from different video camera are stored with the relevant information such as camera's location and time value of a record. To store time values in the storage, system needs to use image processing technique. Time information character is included in relevant frame. To define the time information, character image needs to process character segmentation and recognition algorithm and this information is well become real time information for that key frame. The system selects character region and transform that region from a gray image to a binary image. By using vertical projection profile (VPP) algorithm, characters are separated as a single character and analysis and transformed to time value [9].

5. Expected Results: The system extracts the result of object passed path information based on a time schedule. System show the important object information and the object route on camera network map. Basic information shows with table based on object movement schedule.

The important objects tracking information are given based on their key frames time sequence. The system gives the object tracking areas as object tracking regions and used can seen the object's moving area and moving time. It supports for security system, other traffic control system and crime cases for public area.

TABLE 4. Object tracking region path



6. Conclusions: This system can support many environment setters for security and big data control system. When we complete this research, the results are support moving object extraction on different background areas and color object segmentation process.

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