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Animal Tracking Using Background Subtraction On Multi Threshold Segmentation

D.Vaishnav[1],M.Vijaymurugan[2] ,Mr.S.Prakash[3]

Student, Department of Computer Science and Engineering, Agni College of Technology, India[1,2].

Assistant Professor, Department of Computer Science and Engineering, Agni College of Technology, India [3].

ABSTRACT - *The proposed project performs motion detection and animal tracking based on background subtraction using multi threshold approach with mathematical morphology. Here the techniques frame differences , multi threshold based detection will be used. Along with this multi threshold, mathematical morphology also used which has an ability to attenuate color variations produced by background motions which will highlight moving objects. After the object foreground detection, the parameters like animal or human will be detected. The data which has been processed from the above process until segmentation on objects will be taken as a data for patterns matching and will be stored in the data base for further use .So when an input video is processed with the help of the above process methods it reaches to the classifier step. In this step data will be retrieved from the data base which has been already retrieved from the above process and has been stored in it and then could be used for classification of the data with the input video for obtaining the perfect output of the system. The object is tracked by comparing the mean value obtained from input video with already stored mean value in the data template. The classification part is carried out with the help of the SVM classifier which is nothing but Support*

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Vector Machine. When the classifier classifies and finds that its target is achieved it immediately sends the signal to the output ports which immediately creates an alert to the user using the machine. Hence when the output port gets the trigger signal from the classifier the first output port which is assigned with a buzzer which creates an alarm sound and followed by the second output port which displays a warning message at the screen of the main server so immediately when the user gets an alert he could immediately response to it even if he is not present at that spot.

1 INTRODUCTION

There are immediate needs for automated surveillance systems in commercial, law enforcement and military applications. Mounting video cameras is cheap, but finding available animal resources to observe the output is expensive. Although surveillance cameras are already prevalent in banks, stores, and parking lots, video data currently is used only "after the fact" as a forensic tool, thus losing its primary benefit as an active, real-time medium. What is needed is continuous 24-hour monitoring of surveillance video to alert security officers to a animal in progress, or to a suspicious individual animal entering inside a farm land, while there is still time to prevent the entry. In addition to the obvious security applications, video surveillance technology has been proposed to measure traffic flow, detect accidents on highways, monitor pedestrian congestion in public spaces, compile consumer demographics in shopping malls and amusement parks, log routine maintenance tasks at nuclear facilities, and count endangered species. The numerous military applications include patrolling national borders, measuring the flow of refugees in troubled areas, monitoring peace treaties, and providing secure perimeters around bases and embassies.

In 1997, the Defense Advanced Research Projects Agency (DARPA) Information Systems Office began a three-year program to develop Video Surveillance and Monitoring (VSAM) technology. The objective of the VSAM project was to develop automated video understanding technology for use in future urban and battlefield surveillance applications. Technology advances developed under this project enable a single animal operator to monitor activates over a broad area using a distributed network of active video sensors. The sensor platforms are mainly autonomous, notifying the operator only of salient information as it occurs, and engaging the operator minimally to alter platform operations. A team composed of Carnegie

Mellon University Robotics Institute and the Sarnoff Corporation were chosen to lead the technical efforts by developing an end-to-end test bed system demonstrating a wide range of advanced surveillance techniques: real-time moving object detection and tracking from stationary and moving camera platforms, recognition of generic object classes (e.g. animal, sedan, truck) and specific object types (e.g. campus police car, FedEx van), object pose estimation with respect to a geospatial site model, active camera control and multi-camera cooperative tracking, animal gait analysis, recognition of simple multi-agent activities, real-time data dissemination, data logging and dynamic scene visualization. Twelve other research contracts were awarded to university and industry labs to conduct research in focused technical areas that include animal activity recognition, vehicle tracking and counting, airborne surveillance, novel sensor design, and geometric methods for graphical view transfer.

1.1 LITERATURE SURVEY

We propose an adaptive model for backgrounds containing significant stochastic motion (e.g. water). The new model is based on a generalization of the Stauffer– Grimson background model, where each mixture component is modeled as a dynamic texture. We derive an online K-means algorithm for updating the parameters using a set test2 of sufficient statistics of the model. Finally, we report on experimental results, which show that the proposed background model both quantitatively and qualitatively outperforms state-of-the-art methods in scenes containing significant background motions.

The greatest challenge on monitoring characters from a monocular video scene is to track targets under occlusion conditions. In this work, we present a scheme to automatically track and count animal in a surveillance system. First, a dynamic background subtraction module is employed to model light variation and then to determine pedestrian objects from a static scene. To identify foreground objects as characters, positions and sizes of foreground regions are treated as decision features. Moreover, the performance to track individuals is improved by using the modified overlap tracker, which investigates the centroid distance between Neighbouring objects to help on target tracking in occlusion states of merging and splitting. On the experiments of tracking and counting animal in three video sequences, the results exhibit that the proposed scheme can improve the averaged detection ratio about 10% as compared to the conventional work.

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An animal-counting system based on a back propagation (BP) neural network is proposed in this paper. The proposed system uses cheap camera to collect data and introduces BP neural network for counting and recognition, and it is effective and flexible for the purpose of performing animal counting. In this paper, new methods for segmentation and feature extraction are developed to enhance the classification performance. Promising results were obtained and the analysis indicates that the proposed system based on BP neural network provides good results with low false rate and it is effective for animal-counting.

A conventional color histogram (CCH) considers neither the color similarity across different bins nor the color dissimilarity in the same bin. Therefore, it is sensitive to noisy interference such as illumination changes and quantization errors. Furthermore, CCHs large dimension or histogram bins require large computation on histogram comparison. To address these concerns, this paper presents a new color histogram representation, called fuzzy color histogram (FCH), by considering the color similarity of each pixel's color associated to all the histogram bins through fuzzy-set membership function. A novel and fast approach for computing the membership values based on fuzzy -means algorithm is introduced. The proposed FCH is further exploited in the application of image indexing and retrieval. Experimental results clearly show that FCH yields better retrieval results than CCH. Such computing methodology is fairly desirable for image retrieval over large image databases.

This paper describes a real-time system for animal detection, tracking and motion Analysis. The system is an automated video surveillance system for detecting and monitoring animal in both indoor and outdoor environments. Detection and tracking are achieved through several steps: First, we design a robust, adaptive background model that can deal with lightning changes, long term changes in the scene and objects occlusions. This model is used to get foreground pixels using the background subtraction method. Afterwards, noise cleaning and object detection are applied, followed by animal modeling to recognize and monitor animal activity in the scene such as animal walking or running.

2 EXISTING SYSTEM

video surveillance technology has been proposed to measure traffic flow, detect accidents on highways, monitor pedestrian congestion in public spaces.it is also used to track animals entering

into a farm by means of computer surveillance.in this system there are chances for computer being tapped by many methods. visual surveillance in such an unconstrained environment i.e. content based retrieval is really tedious. In the existing system background subtraction is done by means of simple threshold which refers to the elimination of standard frame from the current frame. since the system uses simple threshold there is a more sensation to external noise.

3 PROPOSED SYSTEM

In our proposed system, the surveillance is done by object tracking which is a technique in which the processing time per frame is reduced for reliability in the scene. Difference generation is done with multi threshold and frame separator. Multi threshold used in our system optimizes the delay in frames. Morphological filtering is another technique used where non-linear operations related to the shape on objects in frames are done.it is notable that noise in this system is reduced by frame differencing.

4 SYSTEM IMPLEMENTATION

- Frame separation
- Background subtraction
- Segmentation on objects
- Features extraction
- Classifier

4.1 FRAME SEPERATION

An Input Video (.avi files) is converted into still images for processing it and detect the moving objects. This sequence of images gathered from video files by finding the information about it through ‘aviinfo’ command. These frames are converted into images. Create the name to each images and this process will be continued for all the video frames.

4.2 BACKGROUND SUBTRACTION

Background subtraction is the first step in the process of segmenting and tracking animal. Distinguishing between foreground and background in a very dynamic and unconstrained outdoor environment over several hours is a challenging task.

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The structure of the background subtraction is shown in figure 4.1. The background model is kept in the data storage and four individual modules do training of the model, updating of the model, foreground/background classification and post processing.

The first k video frames are used to train the background model to achieve a model that represents the variation in the background during this period. The following frames (from k + 1 and onwards) are each processed by the background subtraction module to produce a mask that describes the foreground regions identified by comparing the incoming frame with the background model. Information from frames k + 1 and onwards are used to update the background model either by the continuous update mechanism, the layered Updating, or both. The mask obtained from the background subtraction is processed further in the post processing module, which minimizes the effect of noise in the mask. The background model will be described first since it contains the fundamental model used in the other modules of the background subtraction process. Next the training of the model, which is the initialization of the model, is described. The foreground/background classification will be the third module to be described and after that the updating will be described. This order corresponds to the order of the two modules in the actual background subtraction process. Finally the post processing will be described.

4.3 SEGMENTATION ON OBJECT

Segmentation is the process of dividing an image into multiple parts. This is typically used to identify objects or other relevant information in digital images. There are many different ways to perform image segmentation, including Thresholding methods such as Otsu's method

- Color-based Segmentation such as K-means clustering
- Transform methods such as watershed segmentation
- Texture methods such as texture filters

An effective approach to performing image segmentation includes using segmentation tools, and a comprehensive environment for data analysis, visualization, and algorithm development. Here in our process we are using thresholding method which is the Otsu's method for segmentation of the object from the background substraction process.

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4.4 FEATURE EXTRACTION

Feature extraction a type of dimensionality reduction that efficiently represents interesting parts of an image as a compact feature vector. This approach is useful when image sizes are large and a reduced feature representation is required to quickly complete tasks such as image matching and retrieval.

Feature detection, feature extraction, and matching are often combined to solve common computer vision problems such as object detection and recognition, content-based image retrieval, face detection and recognition, and texture classification.

4.5 CLASSIFIER

The most important process in the overall flow is the classifier because it helps to identify what sort of animal has entered inside the cameras vision and helps to give an alert to the user if the animal enters inside the users region or the area.

There are many verities of classifier available in the mat lab but they could not be trained accordingly to the users need. But SVM which is nothing but Support Vector Machine works on the basis of the neural schema which has an ability of training machine according to the users need.

And once when the user trains and stores the data retrieved from the SVM, the classifier classifies the input data with that of the stored data templates from the SVM and if both the data matches with one and another the classifier immediately sends a signal to output ports assigned to it.

4.6 SURVEILLANCE

Surveillance is the monitoring of behavior. Systems surveillance is the process of monitoring the behavior of animal, objects or processes within systems for conformity to expected or desired norms in trusted systems for security or social control.

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5 SYSTEM ARCHITECTURE

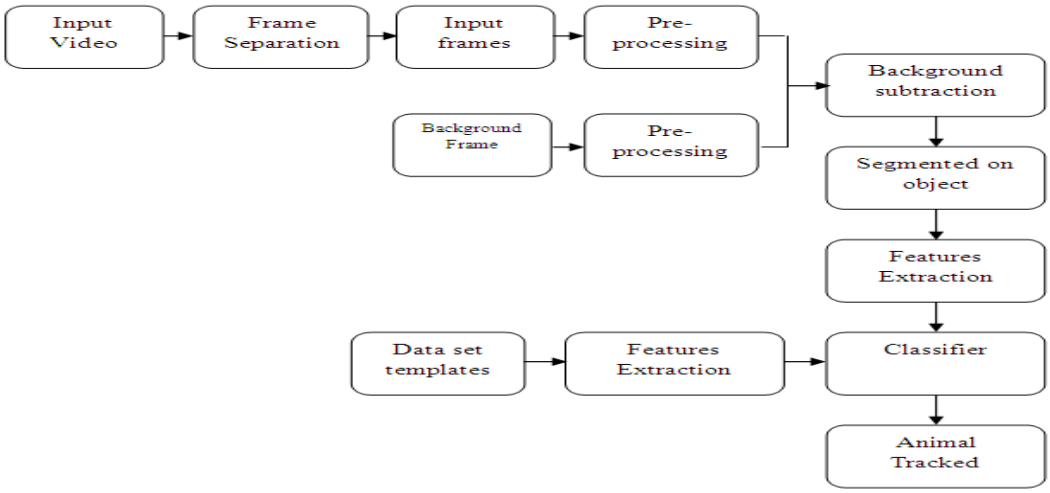

Figure 5.1 System Architecture

6 CONCLUSIONS

The project presented an efficient animal (object) detection based on background subtraction using frame difference with threshold and mathematical morphology. It will be enhanced with features of connected component analysis and morphological filtering for tracking and counting moving objects. After the foreground detection, the parameters like Count, velocity of the motion was estimated and performance of object detection will be measured with sensitivity and correlation using ground truth. Finally the proposed method will be proved that effective for the background subtraction in static and dynamic texture scenes compared to prior methods.

7 FUTURE ENHANCEMENTS

The project has a wide demand in various fields such as prisoner identification in a gaol. They are uniquely identified with their physical

appearance. The surveillance camera used here detects each and every person with the data templates provided and raises alarm when someone is beyond the boundary of the goal.

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