Available online www.jsaer.com

***Journal of Scientific and Engineering Research*, 2017, 4(4):312-321**

Research Article

ISSN: 2394-2630
CODEN(USA): JSERBR

Development and Simulation of Human Tracking Mechanism in Wireless Camera Networks

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Abstract The sensing power of traditional camera networks for efficiently addressing the critical tasks in the process of cluster – based target tracking of human, such as measurement integration, inclusion/exclusion in the cluster and cluster head rotation. The Wireless Camera Networks efficiently uses distribution friendly representation and methods in which every node contributes to the computation in each mechanism without the requirement of any prior knowledge of the rest of the nodes. These mechanisms and methods are integrated in two different distributed schemas so that it can be implemented in the same mean time without taking into the consideration of cluster size. Thus, the experimental evaluation shows that the proposed schemes and mechanisms drastically reduce the energy consumption and computational burden with respect to the existing methodology.

Keywords Organizational Process Focus, Organizational Process Definition, Software Process, Software Industry, Nigeria Software Companies, Experiential Appraisal

Introduction

Limitations & tracking through GPS deprived of situations is an open exploration environment where a high range of sensors and procedures have been anticipated in the late periods. A decent number of following techniques for WCNs have been implemented. A large portion of them receive the clustering technique, in which the head moves about as the cluster scheduler. The Cluster based plans oblige strategies to incorporate the estimations of the objective accumulated by the bunch individuals [1]. Moreover, there is a need of instruments for selecting the incorporation and prohibition of hubs in the group and for dealing with the revolution of the group head part. These systems will have a straight effect on implementation and the asset utilization. Case in point, consideration/prohibition is connected to initiation/deactivation: hubs are kept dynamic while they fit in with the group and deactivated at the point when prohibited with a specific end goal to spare vitality. Various strategies for these instruments have been produced. Be that as it may, the majority of them is clear adjustments of instruments intended for conventional camera systems and regularly dismiss the qualities of WCNs. This particularly designed to get into consideration that the capabilities and demands of wireless sensor networks namely conservation of energy, minimal computational ability and potentially greater transmission defects. Mechanisms uses such as Extended Information filter for the unique measurement of data rates, an effectively based mechanism for the activation or deactivation of cameras which can balance the sensing expectation and resource consumption [2]. Another methodology involved is that selects the chief role to the eligible node for the effective integration of more information regarding the target by making use of the previously active nodes in the cluster. These three methods apply calculated approach which are devised for disseminated implementation such as a) the utilization of proficient and distributed open representations and statistics measurements; b) every cluster nodes adds to the calculation in every structure; and c) nodes don't require any

prior knowledge of the remaining nodes. Two differently conveyed schemes are proposed to amicably incorporate these components enormously abusing computation reuse.

Literature Review

The distributed wireless sensor micro sensor frameworks will allow the keen observation of a diverse kind of situations for both general and defense purposes. Dore et al. (2017) [3] discussed communication protocols that have a massive effect on the general vitality dissemination of the respective systems. Taking into account our experiments and results that the conventional protocol of direct broadcast, multihop routing, minimum energy transfer, and static clustering may not be suitable for sensor systems, suggesting "LEACH (Low-Energy Adaptive Bunching Hierarchy)", which is an clustering based method that implements distinct rotation of cluster heads to equally distribute the energy level in the system for each sensors in it. "LEACH" deploys partial organization to have robustness of dynamic networks and scalability, and sums up all the collected information form the sensors into the routing protocol in order to limit the measurement of collected information which has to be transferred to the base station. Simulations results shows that "LEACH" can achieve as an element of 9 reductions in terms of dissipation in contrast with the conventional routing protocols.

Various mechanisms have been held to track the moving objects in any geographical environment which may include rotating the head cluster node among the other cluster nodes within the system. This cluster head node is responsible for managing the impact of the cluster nodes respectively. Various large numbers of distinct methods and systems such as "LEACH" and its variations intend to normalize the consumption of energy by selecting the node which has a high remaining energy level and memory level as the head node [4]. However, these criteria will not be of any use to improve the sensing ability or to have reduced energy consumption. While in the other system environment the head role is allocated to the node that is very much near to the estimated target location [5]. The node which collects the exact information about the assigns target need not be close to the target; hence it is free to be located anywhere in the system. Various methods have tried for implementation which deals with addition and elimination of nodes in the respective cluster techniques. This keeps the node active whose distance is less than presumed values from the target.

Viola Jones Algorithm

The main characteristic of the face detection algorithm is it's i) robustness, ii) easy implementation in real time iii) detecting the human face or frames [6]. There are four steps or stages followed by this algorithm are Haar selection, Creation of an internal image, AdaBoost training and applying Cascading filter technique. There are five type of features used by this algorithm (Figure 1)

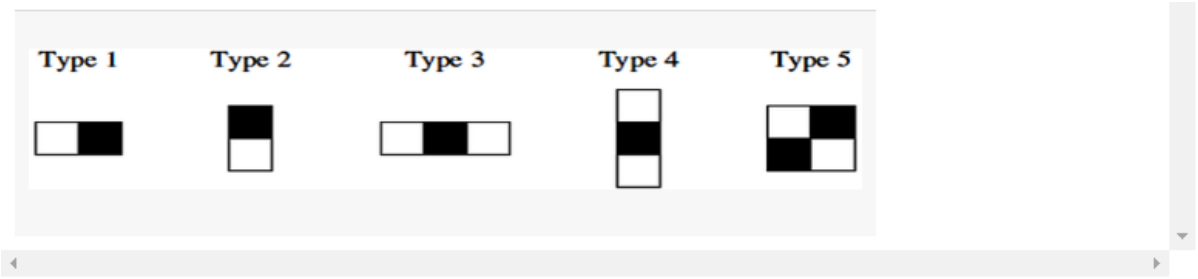

Figure 1: Sub window features

Haar Features: This step works based on similar human features that can be detected in very human face such as eyes which is darker than the upper cheek region (Figure 2). While the nose region will be brighter than the eye region.

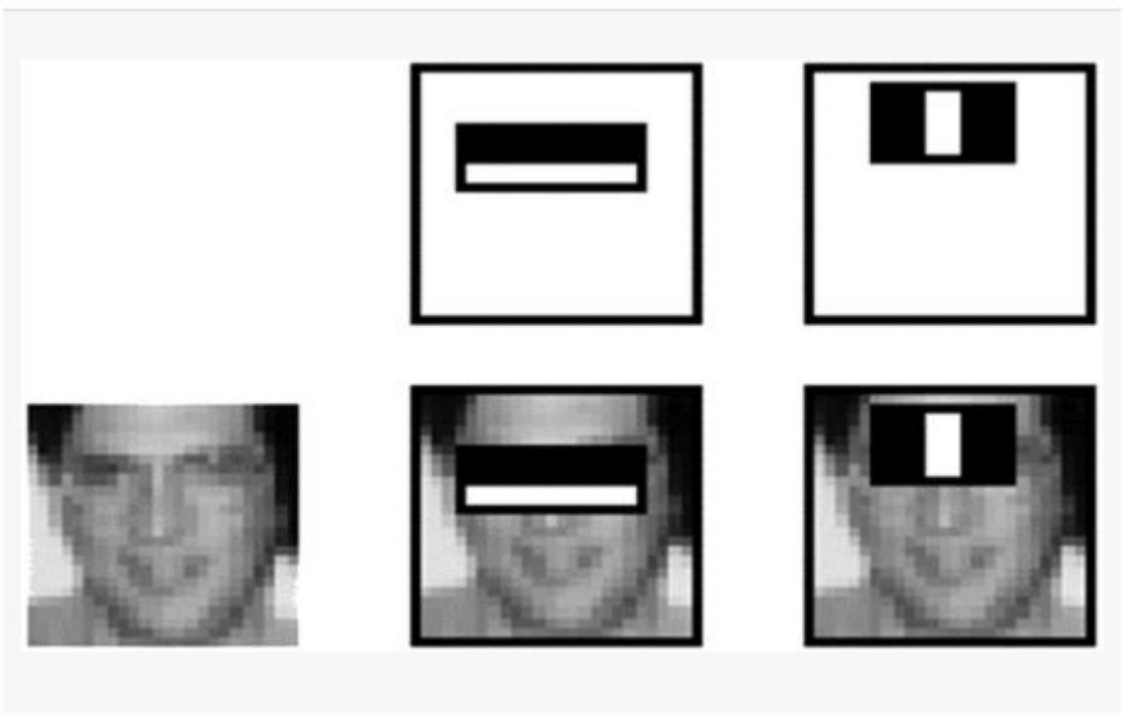

Figure 2: The Haar features

The rectangular features are applied to the gray scale image *i.e.* integral image along with a time constant. As a result (Figure 3), we can obtain a sophisticated alternative features. This uses the rectangle features which have array values such as three in 8 rectangle and four in nin erectangle.

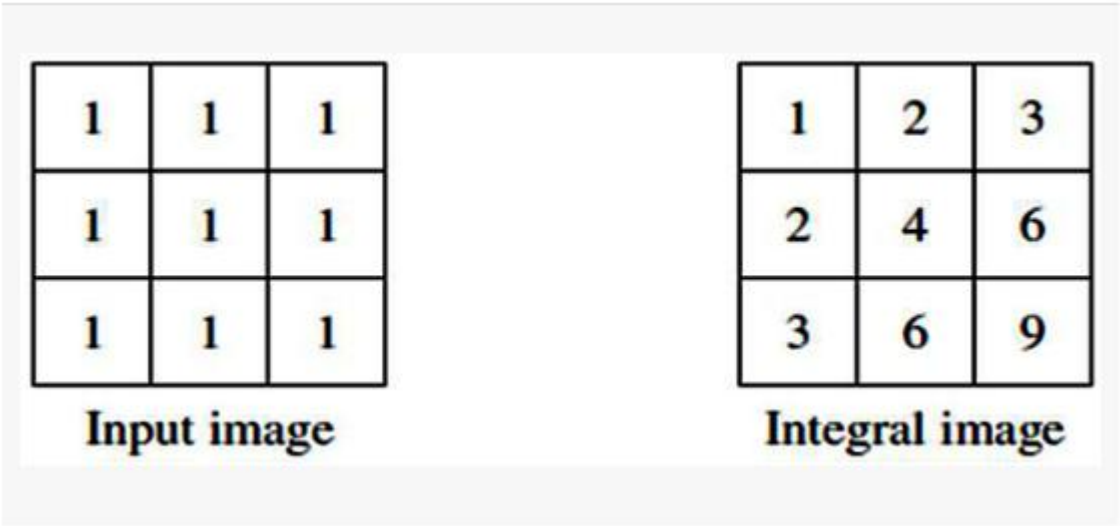

Figure 3: Array values of integral image

Methodology

It includes developing a distinct activation method that considers transmission errors for the enhanced version of cameras and can utilize all the data matrix uncertainty metric, which allows computation distribution and reutilize the data involving interesting advantages. The cluster selection mechanism is based on similar technology and tools in comparison with those implemented in the camera activation techniques. The performance of each methodology and the comparison of similar experiments, new robustness analysis and more practical performance analysis are measured. Unlike the previous techniques of a single hop cluster

schema, here the preference is given to the multicast socket methodology where each and every neighboring nodes are detected for collection and transmission of data. The implementation of SIFT. Algorithm for extraction of human and non-human frames helps to retrieve unique information of any particular object or an individual as per the demand. This has a high reduction of noise and can straight alignment of key point matching in each frame as shown in Figure 3.

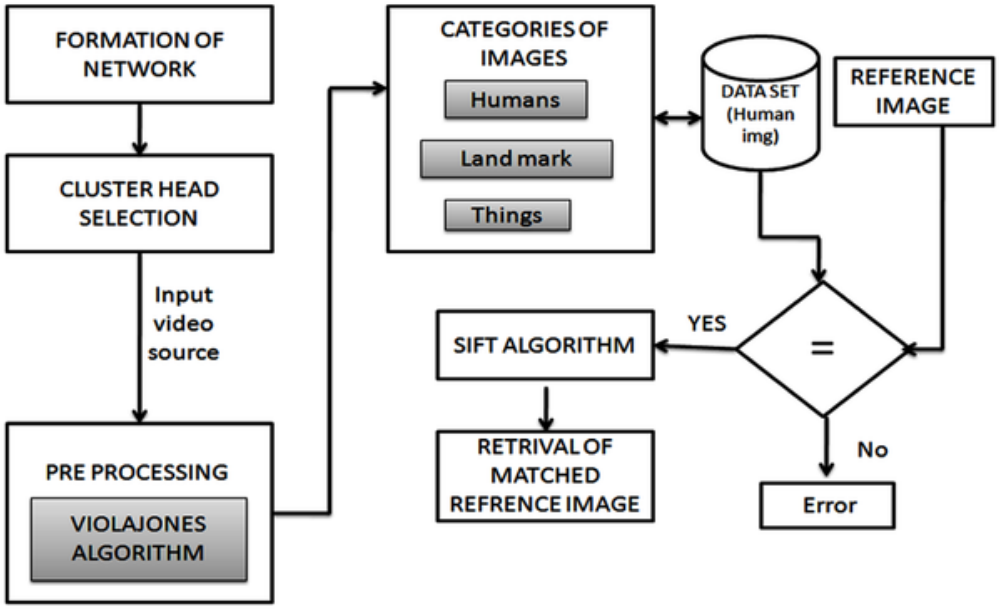

Figure 3: Architecture Diagram

There are mainly four modules in this system.

i. Networks formation,
ii. Clusters head selection,
iii. Pre-processing,
iv. Retrieval of matched images using SIFT algorithm.

i. Network Formation

The first module deals with the mechanism of network formation. This network is formed by various camera sensors which acts as an individual nodes in a network. Each node sends a "hello" message to other nodes within the network in order to detect the neighboring nodes. Once the node detects the "hello" message from other nodes or separate node from the system, it maintains a contact record to store the data about the neighboring nodes. Once the neighbour nodes are found, a queue is maintained at each neighbour node called real queue.

ii. Cluster Head Selection

The main diploma of performance tracking purely depends on the cluster head selection process. In order to select the cluster head, certain conditions are used as metrics for obtaining the higher performance. Hence the node that obtains estimation tentatively uses the measurement of the currently available active nodes. The selection of a bad cluster head node will increase the uncertainty level. The selected cluster node which will act as the cluster head must have an active communication with its cluster members in the network. Let us consider nodei as the cluster head is measured using EUi, the expected ambiguity regarding the target at time t+1 if the node is selected as the cluster head. Let us consider that at time t, St is the set of node that are active. St consists of the nodes that are both in tracking mode and the current mode. The cluster head is mainly selected by considering battery usage and the memory usage. Among all the nodes present in the cluster the node which is having the highest memory space and the highe rbattery power will be selected as the cluster head. By using the information matrix we can drastically reduce the burden as regarding to the previous entropy analysis.

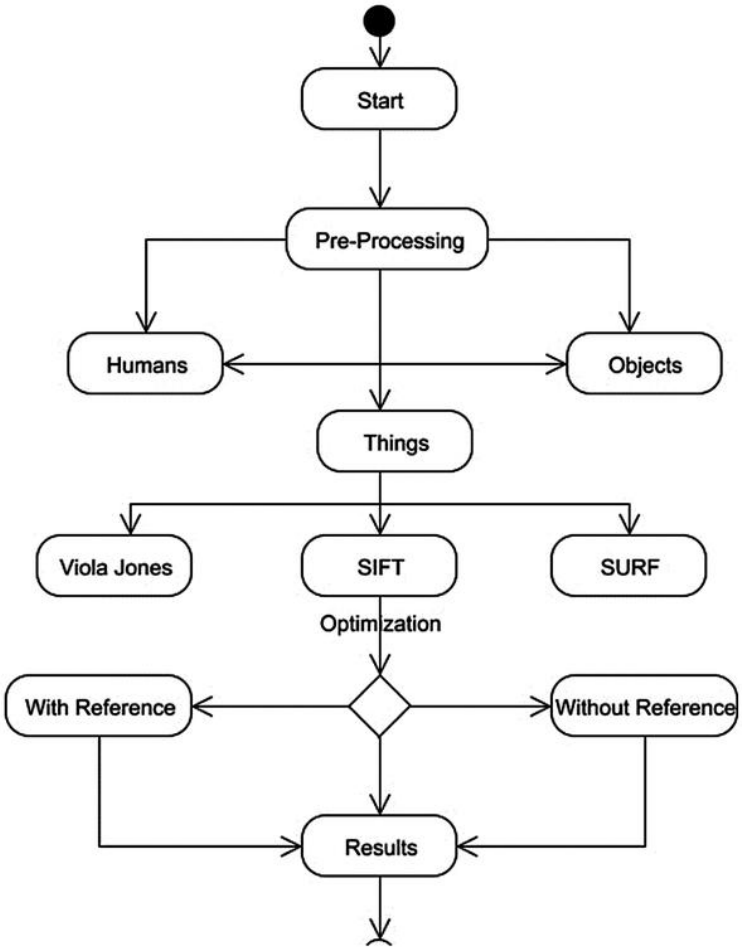

Figure 4: Activity diagram

iii. Preprocessing

After the selection of the clusters head now the collected data which are in the image format has to be preprocessed. In preprocessing the collected input videos are bisected and converted into frame format. Now these preprocessed frames are categorized into information less frames and the frames which are having valid information. These are determined on the bases of the metrics for the frames which are having a mean input frame value of less than 15 in terms of Matlab measurements and metrics. In order to make this process less complicated and easy to evaluate the preprocessed frames are clubbed together to form a single video for its categorization. This clubbed video consists of only valid information frames. The video categorization involves the separation of human frames and non-human frames using the Viola-Jones algorithm. The frame which comes under the Region of Interest comes under human frame category whereas the other framesa re evaluated and categorized as non-human frames.

iv. Retrieval of Matched Images Using SIFT Algorithm

Videos are categorized by using transition clues like human, object. In this module Human frame has to Compose with and without Reference image by using BPN with the help of Trainee Database. Trainee Database has to be Created after Processing has been completed. It consists of list of human frames with different angles in a specific Group. Each human frame is stored in a uniform manner. Initially Each Human Frames are checked and evaluated with the Trainee Database Frames. Suppose the initial starting human frames is in match with First groups in Trainee Database, then a separate Folder will create and write the Frame on that. Repeating the process until all the Human Frames has to be completed in Human categorized. If the Reference image is empty, on that condition Frames in the Each Folder will be composed and formed videos for individual all humans. If

the Reference image is not empty, Frames will be categorized depending on the Reference image for a specific human face.

Activity Diagram

This diagram represents the graphical flow of various activities in an ordered and stepwise manner. This is one of the important unified diagram that clearly shows (Figure 4) the operational steps in accordance to the algorithm and the methods used in the thesis. The concurrency of this diagram has to be accurate because this represents the actual methodological ways stepwise. It also represents the flow control of the proposed mechanism.

Results and Discussion

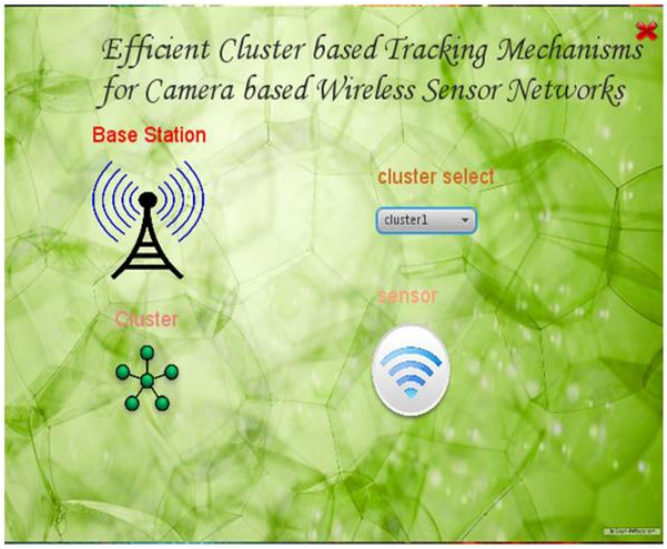

Figure 5: Base station page

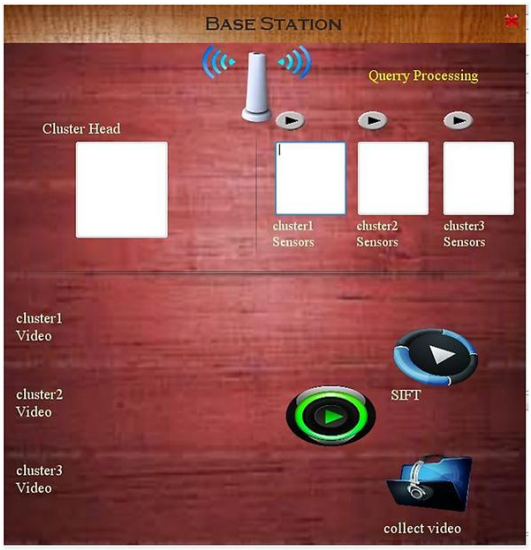

Figure 6: Input box for distance

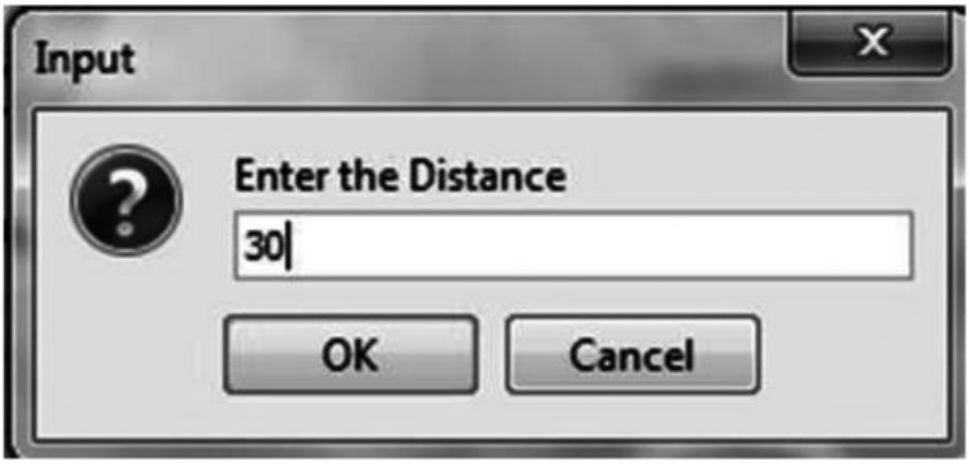

Figure 7: Input box for range

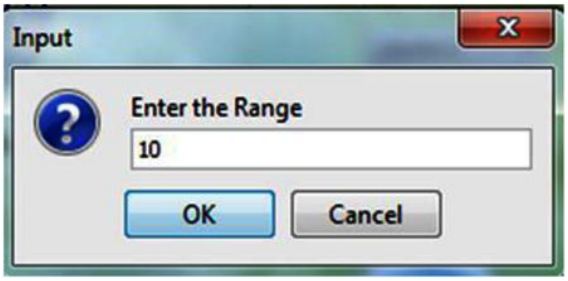

Figure 8: Input box for no. of sensors

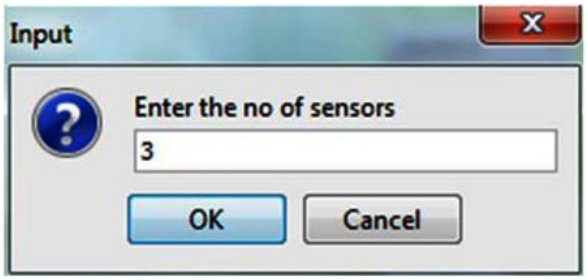

Figure 9: Cluster head

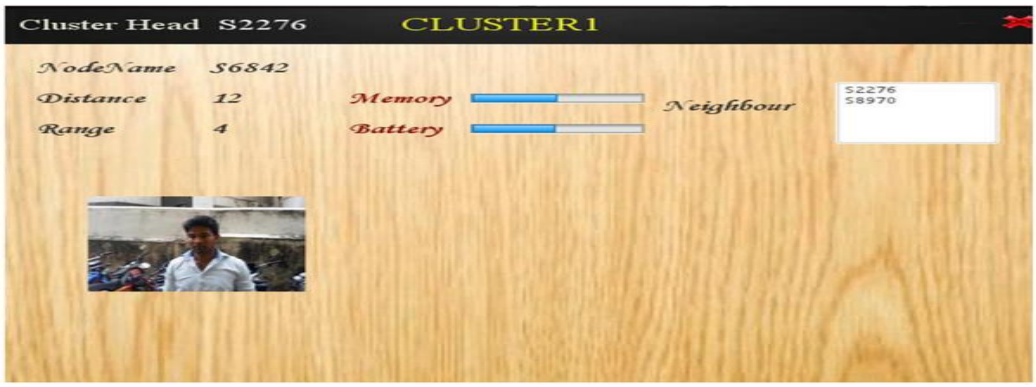

Figure 10: Neighbor node

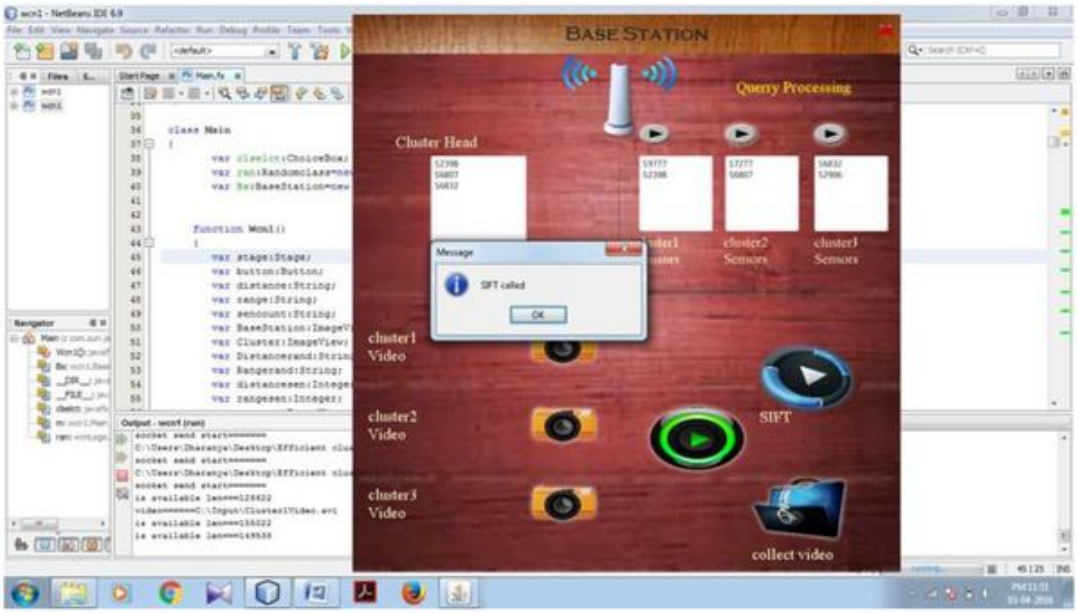

Figure 11" Detection of human face

Figure 12: Human frames extraction

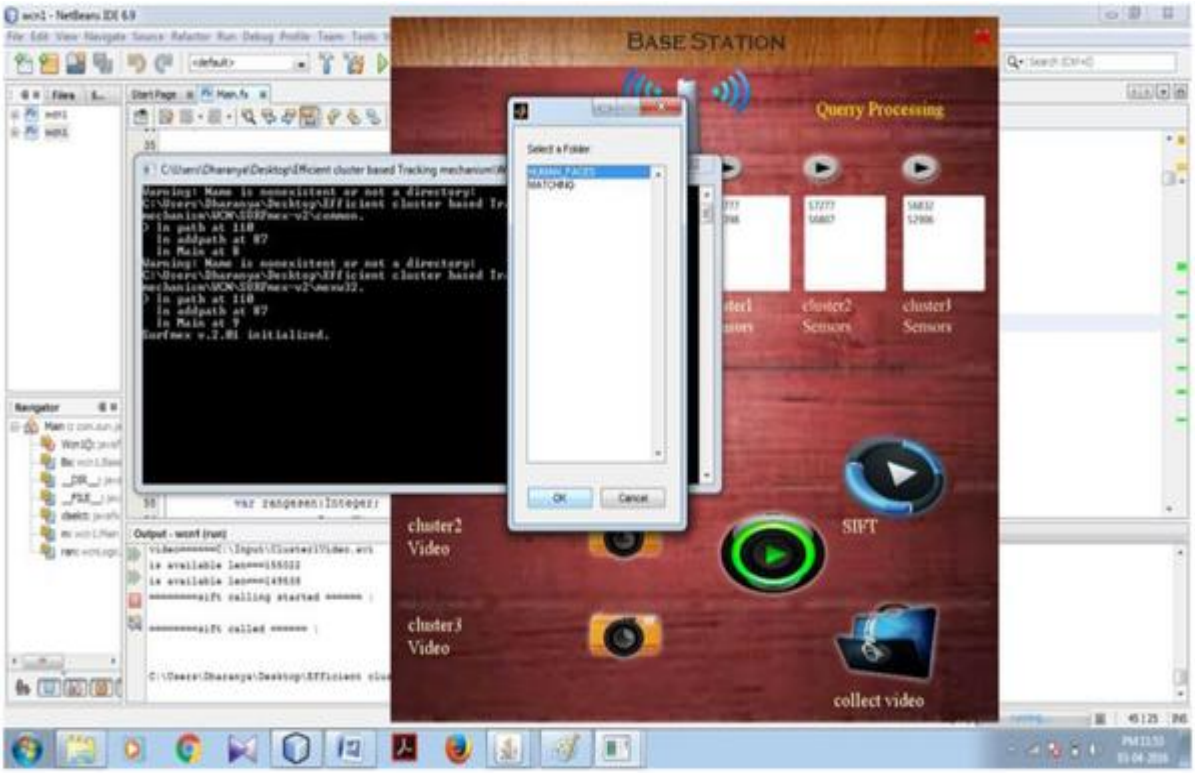

Figure 13: Separate video extraction

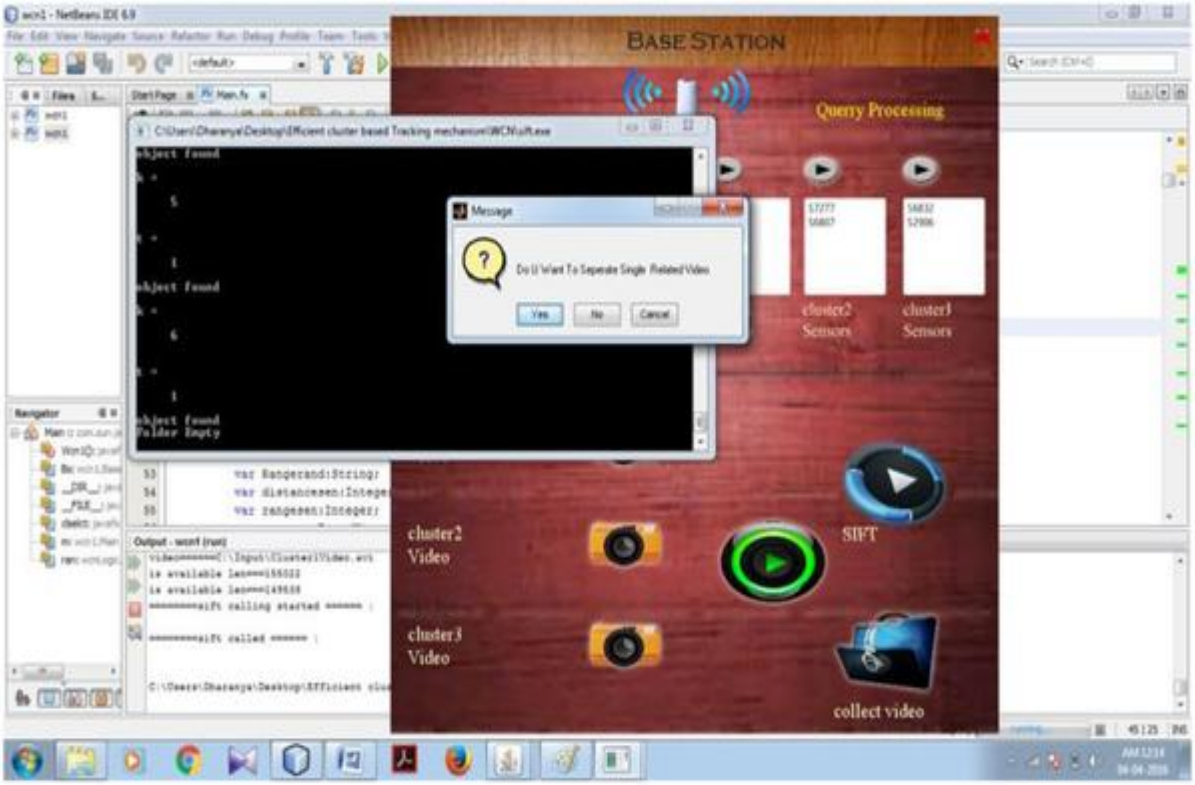

Figure 14: Selection of input image

Figure 15: Output

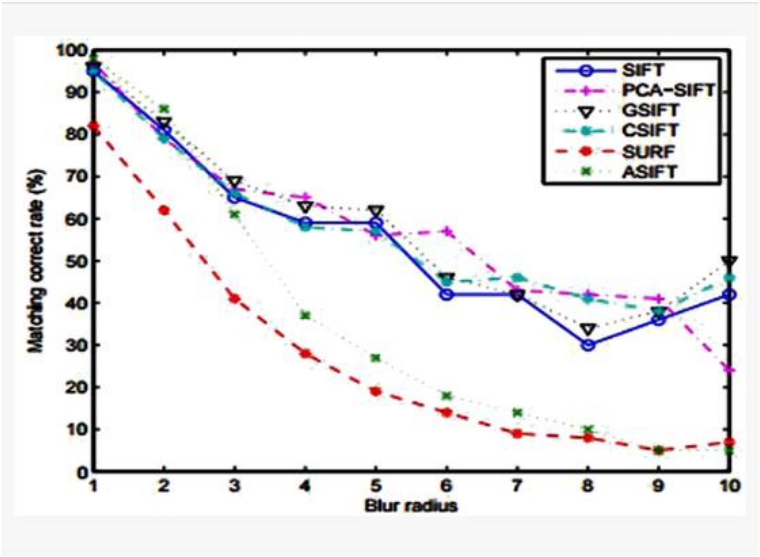

Figure 16: Experimental result for Blur radius

All the most each and every image data does not have the same frame value if the brightness property of images are changed. Each pixel of the image gets a new value every time when there is a slightest change in the brightness value.

Conclusion

The core objective of this research is to track a particular selected objects from a video frame captured by group of camera networks. These are based on the static node approaches which as specially developed for the implementation distribution. Each node of the cluster in the system environment contributes to the evaluation of each single and every methodology so that the work done by each cluster node is shared in a consistent way despite the consequences of the size of the clusters. There are 2 schemes as used for the selection of cluster process. This first schema is a straight forward integration mechanism. While the second schema is an approximated execution technique. This work paves way for a wide opening in the study area of tracking methods using a wireless camera networks. This wisely ignores the usage of RSSI which further involves extra

energy consumption. Thus the main advantage of energy consumption is achieved by neglecting the RSSI factor.

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