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REVIEW ON DIFFERENT FEATURE EXTRACTION ALGORITHMS

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***Abstract*— In visual sensor networks, energy conservation is main issue because more energy is consumed in processing and transmitting the large amount of data. The traditional approach, denoted here in after as "Compress-Then-Analyze" (CTA), it consists following steps: first the visual data is acquired by a sensor node in the form of still images or video sequences; then, it encoded and efficiently transmitted to base station where visual feature extraction and analysis takes place. In this process large amount of energy is consumed in compression processes and transmission processes also transmitting data at low bandwidth is also a main issue so to overcome this issues new approach is used i.e. "Analyze-Then-Compress" (ATC) In particular; nodes process visual content in order to extract relevant information in the form of visual features. Then, such information is compressed and sent to a base station where visual analysis takes place. Here In this paper we will just overview the different compression techniques or different algorithms in real valued (SIFT and SURF) and binary feature extraction (BRIEF, BRISK, Bin Boost) and also describe coding technique in WVSN.**

Keywords— ***Visual features, binary descriptor, SIFT, SURF, BRIEF, BRISK, Bin-Boost, video coding***

I. INTRODUCTION

Visual features provide a compact and also efficient representation of the underlying visual content, these features are robust and invariant to many global and local transformations. They are used in more applications like video retrieval, object recognition, structure-from motion etc. [1] Visual feature extraction algorithms consist of two main components first is detector, which can be used to identifies salient key points within an image; and the descriptor, which provides a succinct representation of the image surrounding each key point. There are various descriptor are designed up till now which perform same function such as pre-smoothing, transformation and spatial pooling.

In WVSN different compression techniques are used to compressed data and transfer it to the base station. The tradition approach is "Compress-Then-Analyze"(CTA).This technique perform following steps: a still image or a video sequence is obtained by a sensor node, then it is compressed by using compression techniques like JPEG or H.264/AVC so that it can be efficiently transmitted over a network. At last, visual analysis is performed at a base node [2].This type is used in different application like video surveillance, smart cameras, etc. but it represent a lossy visual features and having bandwidth limitation so we switch toward new technique Analyze-Then-Compress.

An alternative technique to the Compressed-then-Analyze is Analyze –then-Compressed is more popular in the research area. In this process local features are extracted directly from sensing node. Then, they are compressed to be effectively dispatched over the network. There are different algorithms are used for extraction of local features such as SIFT, SURF, BIREF, BRISK, Bin-Boost.

The rest of the paper is organized as follows related work or literature survey explain in II. Proposed system for video coder explains in III. Then concluding remarks are given in section IV.

II. RELATED WORK

Compression of visual features is one of the important tasks in WVSN. The main problem related to transmission of data is bandwidth, in WVSN the date which is transferred to the base station having low bandwidth. Several works are done to solved this problem for the case of extraction of features and suitable methods to encode this features[3]or to introduced suitable algorithms for feature extraction so that it suitable for further compression [3].

Processing of the visual features requires more data, so the energy required for transmission of the large data is also more so this is also one of the problems regarding transmission of data directly to the base station [4]. So different algorithms are used to extract visual features and then designed encoder which encodes the data at low computational complexity.

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First, Real-valued features such as SIFT [5] or SURF [6], these two methods are used to extracting distinctive invariant features from images. These features are then further used for matching between different views of an object. The features are invariant to image scale and rotation distortion. The recognition proceeds by matching individual features to a database of features from known objects using a fast nearest-neighbour algorithm, followed by a Hough transform to identify clusters belonging to a single object, and finally performing verification through least squares solution for consistent pose parameters. This approach to recognition can robustly identify objects among clutter and occlusion while achieving near real-time performance.

BRIEF [7] propose to use binary strings as an efficient feature point descriptor, which we call BRIEF. We show that it is highly discriminative even when using relatively few bits and can be computed using simple intensity difference tests. Furthermore, the descriptor similarity can be evaluated using the Hamming distance, which is very efficient to compute. Thus this algorithm is suitable whenever energy resources area issue, such as in the case of low-power devices, where they constitute the only available option. The processing pipeline for the extraction of local features comprises: i) a key point detector, which is used for identification of striking key point within an image ii) also a key point descriptor, which assigns a description vector to each identified key point. Within the class of local binary descriptors, BRIEF [8] finds the descriptor vector by pair wise comparison of the intensity of pixels which are randomly sampled from the neighbouring key points.

BRISK [9], FREAK [10] and ORB [11] are inspired by BRIEF, and similarly to their predecessor, are also based on pair wise pixel intensity comparisons. They differ from each other in the way pixel pairs are spatially sampled in the image patch surrounding a given key point.

BAMBOO [12] adopts a richer dictionary of pixel intensity comparisons, and selects the most discriminative ones by means of a boosting algorithm. This leads to a matching accuracy similar to SIFT, while being 50 xs faster to compute. BinBoost [13] which proposes a boosted binary descriptor based on a set of local gradients. BinBoost is shown to deliver state-of-the-art matching accuracy, at the cost of a computational complexity.

In this paper we just overview the different algorithms of extracting features or compare different types of descriptors for video coding. Now in next part we explain proposed system of video coder by using BRISK algorithm, then proposed flow chart of video coder and BRISK algorithm, and finally conclusion.

III. PRAPOSED SYSTEM OF VIDEO CODER

As described in previous section different compression techniques are used in WVSN and different algorithms are used for visual feature extraction. Here we describe video coder in which features extracted from video by using binary feature extraction algorithm i.e. BRISK algorithm. After extraction of features by BRISK algorithm then it coded by using entropy coding as shown in figure 1.then this data is transferred wireless channel to the base station. Here descriptors are coded to meet the energy and bandwidth requirement

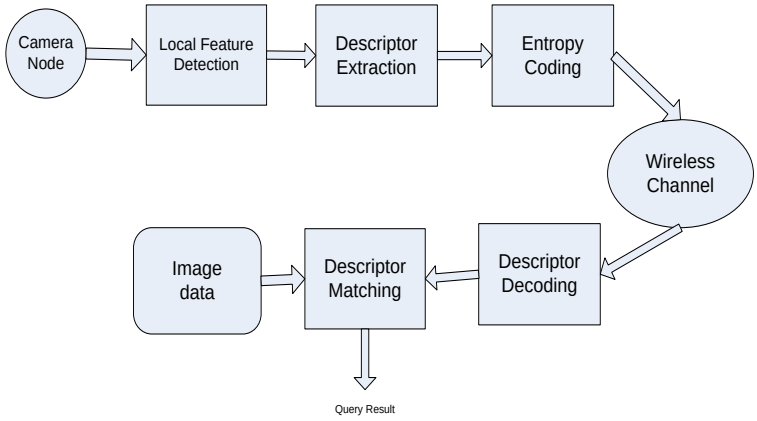

Figure1.Proposed Block Diagram for video coding and feature matching.

Figure1. Describe the proposed block diagram of video coding and feature matching. In this first Image is capture from camera node and then key points are detected. Then descriptors are extracted from image then these points are encoded by using BRISK algorithm here Descriptors key points are coded in binary form. Then this data is encoded by using entropy coding and transferred to the base station by using wireless channels.

At decoder side i.e. at base station this data is first decoded by using descriptor decoder then it given to the descriptor matching. Here in descriptor matching comparison is done between decoded descriptor's data and Image database which is already stored at base station so query result is obtained here decoder side is used for video retrieval task in WVSN.

In this system we used Binary Feature extraction algorithm i.e. BRISK algorithm is used for feature extraction. This Brisk algorithm is more suitable than other algorithm like SIFT and SURF. The flow chart of Brisk algorithm is given in Figure 2. Here Figure 2a shows flowchart of key point detection and Figure 2b shows Flowchart of descriptor designing.

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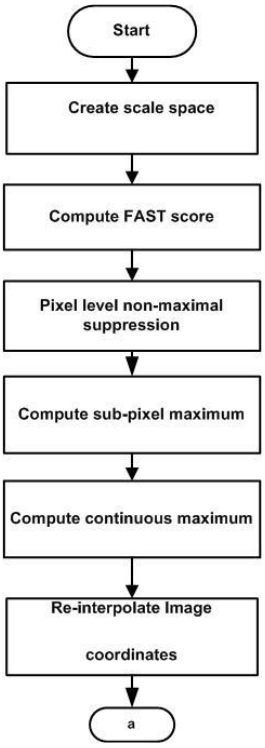

Figure .2a Flow chart of Key point detection

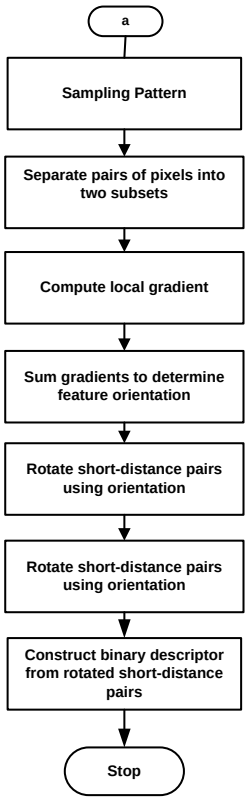

Figure2b.Flow chart of Descriptor Designing

IV. CONCLUSION

We conclude that Analysis-then-Compression is much better than Compressed-then-Analyzed method. And also conclude that by comparing different algorithms of compression that binary feature extraction algorithms are more suitable than SIFT and SURF algorithm.

V. REFERENCE

[1] L. Baroffio, M. Cesana, A. Redondi, M. Tagliasacchi, and S. Tubaro, "Coding visual features extracted from video sequences," *IEEE Trans.Image Process.*, vol. 23, no. 5, pp. 2262–2276, May 2014.

[2] B. Tavli, K. Bicakci, R. Zilan, and J. Barcelo-Ordinas, "A survey of visual sensor network platforms," *Multimedia Tools Appl.*, vol. 60, no. 3,pp. 689–726, 2012.

[3] G. Takacs, D. Chen, J. Singh, and B. Girod, V. Chandrasekhar, S. S. Tsai, "Transform coding of image feature descriptors," in *Visual Communications and Image Processing*, vol. 7257, M. Rabbani and R. L. Stevenson, Eds. Bellingham, WA, USA: SPIE, 2009, pp. 725–710.

[4] V. Chandrasekhar *et al.*, "Compressed histogram of gradients: A lowbitrate descriptor," *Int. J. Comput. Vis.*, vol. 96, no. 3, pp. 384–399,
Feb. 2012.

[5] Luca Baroffio, Antonio Canclini, MatteoCesana, Alessandro Redondi, Marco Tagliasacchi, and Stefano Tubaro," Coding Local and Global Binary Visual Features Extracted From Video Sequences", IEEE transactions on image processing, VOL. 24, NO. 11, pp1-15,november 2015

[6] D. G. Lowe, "Distinctive image features from scale-invariant keypoints," *Int. J. Comput. Vis.*, vol. 60, no. 2, pp. 91–110, Nov. 2004.

[7] H. Bay, T. Tuytelaars, and L. Van Gool, "SURF: Speeded up robustfeatures," in *Proc. ECCV*, 2006, pp. 404–417.

[8] M. Calonder, V. Lepetit, C. Strecha, and P. Fua, "BRIEF: Binary robust independent elementary features," in *Proc. ECCV*, 2010, pp. 778–792.

[9] S. Leutenegger, M. Chli, and R. Y. Siegwart, "BRISK: Binary robust invariant scalable keypoints," in *Proc. ICCV*, Nov. 2011, pp. 2548–2555.

[10] A. Alahi, R. Ortiz, and P. Vandergheynst, "Freak: Fast retina keypoint," in *Proc. CVPR*, Jun. 2012, pp. 510–517.

[11] E. Rublee, V. Rabaud, K. Konolige, and G. Bradski, "ORB: An efficient alternative to SIFT or SURF," in *Proc. IEEE Int. Conf. Comput.Vis. (ICCV)*, Nov. 2011, pp. 2564–2571.

[12] L. Baroffio, M. Cesana, A. Redondi, and M. Tagliasacchi, "Bamboo: A fast descriptor based on AsymMetric pairwise BOOsting," in *Proc. IEEE Int. Conf. Image Process. (ICIP)*, Oct. 2014, pp. 5686–5690.