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Survey on Crowd-Source Video Sharing Systems

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Abstract: *Nowadays video capturing from mobile and sharing it is common. Consider it be any event, function, performance by an artist, any surprising event. For example, if any famous speaker addressing huge number of people, then this event there may be many people who capture the event in their mobile phones and uploaded it on the video sharing applications (VSA) such as YouTube, Twitter, Facebook. Same event is captured by the hundreds of the devices and uploaded on VSA. This leads to some issues like, huge amount of the bandwidth and battery is use by this activity of uploading videos of the same event and it might also cause the problem while retrieving that video. Numbers of approaches are proposed in the literature to address such problems such as on-demand approach in which first user query is matched to the metadata stored at the server and then data is fetched from user who uploaded the video.We described number of techniques available which gives solution for video sharing and retrieval problems.*

Keywords: *Crowd Source Videos, Spatio-Temporal Query, Video Sharing*

I. Introduction

Integrated high quality cameras to the mobiles in cheaper rates and easy availability of internet resulted into video sharing trend. In many events where public present in large numbers, events is recorded by many people and shared with their friends. In many contexts, single user can not shoot whole event. In literature [1] system named (MoVi) Mobile Phone based Video Highlight System is proposed which can sense the surrounding interesting event and can trigger the cameras. It gives similar results as manually created videos and capable of filtering socially relevant videos. The digital recording system in [2] named SEVA (Sensor Enhanced Video Annotation) records object's location and identity and produce tagged stream which can be used later for video searching or searching through frames of videos containing particular objects. A framework[3] used for searching videos from surveillance systems which uses rich set of operators for querying and optimizes the retrieval process and is proved as useful in tackling problems in mobile surveillance systems. [4]Proposed georeferenced video result ranking model by ranking the geo-spatial video search. This model ranks the result in more relevant manner of what the user is expecting. For this three ranking algorithms are used. For mobile video management, [5] used the idea that delays transmission of video segments which are not requested, saves energy, bandwidth and cost.Crowdsourcing [6] is one approach which enables to get more complete coverage of the event.[7] Introduced concept of photo tourism which used 3D modeling the images from web and presenting integrated view to the users.

Current systems use keywords to retrieve required video. Some events are attended by thousands of the people. As the public increases number of captured videos records increases and indirectly number of share also increases. It arises some questions like,

What will be effect on event side? All people are at the same location sharing the heavy data i.e. videos at the same time increases the load on the network results into degradation of quality network. User's mobile devices has limited battery, poor network may need more energy to upload the video.

What will be effect on the server side? As all videos are uploaded from same event, there is high possibility of redundant videos.

Another problem of existing video sharing system is that if users want to see video from same event then keywords will be same. Given keyword will give hundreds of videos of the same event. But if user wants to see video of particular time then such query is not supported. To avoid this problem, paper [1] proposed novel system named as Movisode. Movisode stands for MObileVIdeo Sharing On-DEmand. This video sharing system is Event centric which assumes that if user is registered for some event he will upload videos of that event only. Movisode has the following features; 1) Support of Spatiotemporal query, in such queries user can specify the time, angle from which video is shoot and Point of interest (POI) of camera.2) Videos are not uploaded directly to the server; metadata of the video is generated and metadata is uploaded to the server. If users query is matched with the metadata then that video is fetched from user who uploaded the metadata. This video sharing system works with On-demand feature.But the system possesses some disadvantages because after user demand the video related query is searched and then uploaded to server if available, depends on network strength time may vary hence it is time consuming.

II. Literature Review

[1]This paper used notion of sensor networks in which different nodes in the networks sense the surroundings and detect events and report them to the remote base station. Same idea is used in the case of smartphones. Mobiles are equipped with number of sensors and nowday's smartphone with sensors can do multiple tasks for the user such as tracking the traffic, monitoring individual's diet sensing surrounding temperature, location tracking while taking pictures etc. In future, with these devices we will be dealing with explosive of data containing redundancy and ambiguous information. Summarizing and extracting appropriate information to the end user is a challenge.Paper considered the specific case of socially gathered people carrying smartphones for video capturing. Proposed an idea which triggers the smartphones cameras of people attending the event and captures the on-going event and then gather all these video collaboratively and make an integrated video. The system is named (MoVi) Mobile Phone based Video Highlight System which can sense the surrounding interesting event and can trigger the cameras. For example a big laughter or also the crowd turning towards the any speech can be sensed using compass orientation of phones gathered nearby and cameras can be triggered. Results showed that video highlights generated by MoVi gives similar results as manually created videos and capable of filtering socially relevant videos.

[2] With the advanced technology camcorders and digital cameras are evolved which are able to record the video with capable quality and these videos can be edited later on PCs or on laptops with availability of various video editing software. This lifts the user to make his personal picture libraries and storage of thousands of images. Searching quickly through these data for desired interest requires automated tools. Along with this another trend is emerged in electronic devices which are equipped with sensors which can encode objects identity for example, RFID which sense the information of products through barcodes, GPS can track the user location. Paper based on idea influenced by these trends and proposed multimedia application in the context of digital cameras and camcorders. The digital recording system named SEVA (Sensor Enhanced Video Annotation) records object's location and identity and produce tagged stream which can be used later for video searching or searching through frames of videos containing particular objects.

[3] Surveillance systems record and monitor the particular area and provide the information about recorded events. Networks of cameras used for wide area surveillance are limited the covering spatial area. New infrastructure of network of cameras is evolved that can be used in public transport reaches to far wider area than static and fixed surveillance system.These surveillance systems pose many challenges mainly in the area of distributed system due to huge data scattered in distributed platforms and cannot be accessed continuously. To retrieve the recorded data mobile surveillance systems depends on temporary connection within network and sensors. On demand retrieval is needed because of insufficient bandwidth to retrieve all recorded data and the querying process must be enhanced. Paper proposed a framework which uses rich set of operators for querying and optimizes the retrieval process and allows queries to refine retrieved result over time. Results showed that system proved as useful in tackling problems in mobile surveillance systems.

[4] Digital video sensors are equipped in many domains such as surveillance systems described in [3] and in capturing videos casually. This results in numerous amounts of video data. Handling such data has become complex as it is exceeding the available databases and videos are complex to search and index efficiently. To search the large space of available video collections many techniques have evolved. Existing query techniques can be divided into two group i.e. content-based retrieval and meta-data information based retrieval. Metadata consist of textual and manual annotations or automated generated tags. Disadvantage of metadata process is textual annotation is often manual process and can possess errors. Paper worked on the idea of use of geographical location properties of videos to search large collection and also idea of viewable scene model that uses position, distance, zoom level and the angle of the camera information to be used for meta-data by the use of sensors. Paper proposed georeferenced video result ranking model by ranking the geo-spatial video search. This model ranks the result in more relevant manner of what the user is expecting. For this three ranking algorithms are used.

[5]Easily available, affordable, portable and network equipped video capturing devices makes video applications practical. With the use of wireless sensor network in many applications such as environmental monitoring, multimedia surveillance and location based multimedia services; data can be transmitted and searched.Nowadays smartphones are enhanced with various sensors, availability of WiFi and video capturing capacity. Use of mobiles to collect, send or search video content using content based, annotation based retrieval is increased. But with mobiles, there possess some constraints while searching for online videos like network bandwidth, battery consumption, delayed of process. This paper proposed Mobile geo-referenced video management framework for mobile video capture and sharing. This system used the idea that delays transmission of video segments which are not requested saves energy, bandwidth and cost.

[6] New concepts have evolved with the use of mobile surveillance like crowd source videos. Recent days HUDs (Head-Up Displays) are used in industrial and defense areas. The advance and popular technology invented by google as similar to the HUDs is Google Glass. Equipped with camera this device enables near and

effortless capturing of first person viewpoint video.This makes the capturing experience much easy and facilitates easy sharing of such videos.This paper focused on collecting, cataloging of such first person videos collaboratively. Paper used a technique to automatically tagging of this data and avails searching of any subset of the data and attempts to create public resource of such data. Paper presented the GiaSightcloud architecture for crowd-sourcing of videos from mobile devices.

[7] Searching of interest through number of videos has different techniques. Efficient classification of huge collection of available videos is essential. For example you tube uses tags, user comments and haphazard index to search the videos. This Paper proposed the system for real time clustering of video streams uploaded by the user. The system is named as FOCUS designed for Hadoop-on-cloud video analytics and also recognizes shared content viewed from different angles.

[8] On the web, an ocean of images is available. Most of the world's sites are captured from different view like areal root, from ground. Internet has diversified collection of such photos. To search and exploit these images the paper proposed 3D modeling and visualization framework which extract the images of popular world sites and integrate these images to create 3D view of an images to explore the site from the web and named as Photo Tourism.

[9] Number of people gathering at event captures the same event and shares these videos.This paper proposed Movisode system which is On Demand retrieval system. Depending on user query video will be fetched from user's device and then uploaded to the server. This video sharing system is Event centric which assumes that if user is registered for some event he will upload videos of that event only.System used two core algorithms, one is for metadata extraction from video and another is for selection of video to be fetched for spatio-temporal query of the user. Experimental results proved the effectiveness of the Movisode system.

Paper Name	**Author**	**Description**	**Results / Remarks / Disadvantages**
MoVi:Mobile phone based video highlights via collaborative sensing	X. Bao and R. Roy Choudhury,	This paper used notion of sensor networks in which different nodes in the networks sense the surroundings and detect events and report them to the remote base station.	Results showed that video highlights generated by MoVi gives similar results as manually created videos and capable of filtering socially relevant videos
SEVA: Sensor-enhanced video annotation,"	X. Liu, M. Corner, and P. Shenoy	Paper based on idea influenced by these trends and proposed multimedia application in the context of digital cameras and camcorder	The digital recording system named SEVA (Sensor Enhanced Video Annotation) records object's location and identity and produce
Distributed query processing for mobile surveillance	S. Greenhill and S. Venkatesh	Surveillance systems record and monitor the particular area and provide the information about recorded events	Paper proposed a framework which uses rich set of operators for querying and optimizes the retrieval process
Relevance ranking in georeferenced video search	S. A. Ay, R. Zimmermann, and S. Kim	Paper worked on the idea of use of geographical location properties of videos to search large collection and also idea of viewable scene model that uses position, distance, zoom level and the angle of the camera information	This model ranks the result in more relevant manner of what the user is expecting. For this three ranking algorithms are used.
Energy-efficient mobile video management using smartphones	Hao, S. H. Kim, S. A. Ay, and R. Zimmermann,	This paper proposed Mobile geo referencedvideomanagement framework for mobile video capture and sharing	This system used the idea that delays transmission of video segmentswhichare not requestedsavesenergy,bandwidth and cost.
Scalable crowd-sourcing of video from mobile devices,	P. Simoens, Y. Xiao, P. Pillai, Z. Chen, K. Ha, and M. Satyanarayanan,	Paper used a technique to automatically tagging of this data and avails searching of any subset of the data and attempts to create public resources of such data	Paper presented the GiaSight cloud architecture for crowd-sourcing of videos from mobile devices.

III. Conclusion

In this paper we have described various techniques available in literature for optimizing video sharing searching techniques. Number of approaches proposed for solution to the storing of large amount of captured videos and for querying of such huge database by optimizing processes and minimizing cost, time, bandwidth, energy, storage overhead. Approach in paper [9]has OnDemand retrieval framework but the system possesses some disadvantages, if user send query q to server then if relevant video is not present then relevant metadata is searched. Once relevant metadata is available then video is uploaded to the server from user's device. Time

requirement of upload may vary with network strength, availability of the user. Once the video is uploaded to the server then it is given to user. On demand retrieval increases results into degradation in the speed of the system.

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