

# Video to Image Conversion Techniques Video Frame Extraction

Chandra Shekhar Mithlesh, Dolley Shukla, Manisha Sharma

**Abstract:** The video is electronic Media for broadcasting, watching, recording, advertising, sharing and displaying visible effect. A key component of the video is Image; the standard term for the image is the frame. A powerful application of video is indexing, summarization, browsing, online video database analysis these all need for converting the video into a number of the frame. This paper has given a technique for the video to frame extraction with the help of MATLAB platform. This project help today's demand like social media (WhatsApp and facebook), video lecture distribution, and surveillance system

**Index Terms:** frame; group of picture; frame rate; video formate; video type; pixal; aspect ratio, digital and analog video, video resolution.

## I. INTRODUCTION

The video is most important multimedia. It is combination of frame that is called Group of Picture (GOP)[1]. With the rapid growth of video indexing, editing and trans coding system, video analysis and segmentation become more important than ever before[2]. Frame extraction plays an important role in segmenting a long video sequence into the smaller unit for further processing. The efficient frame extraction means capturing important information of video so we sent a valuable data throughout the network so that network stress load is low that's why video data sharing is easy and fast, more and more focus on image and video processing technology.

## II. HISTORY

Video standard is defined by the frame per second so categories in the different standard with associated countries Europe, Australia, Asia use 25 FPS PAL standardized is used, France, Russia, part of Africa use 25 FPS SECAM standardized and USA, Canada, Japan use 29.97 FPS standardized NTSE. The old mechanical camera uses the frame rate 6 to 8 FPS where professional camera uses 120 or more. The minimum frame rate for the illusion of moving video is 16 FPS.[20]

## III. CHARACTERISTIC OF VIDEO SEQUENCE

A. Images may be two-dimensional, such as photograph , screen display, and as well as a three-dimensional, such as hologram. They may be captured by optical such as cameras, mirror, lenses, telescope etc[2].

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- B. **Picture Element** (Color Space and bit per Pixel) : The pixel (a word invented from "picture element") is the basic unit of programmable color on a computer display or in a computer image[2].
- C. **Video:** A typical video sequence its organized into a sequence of group of pictures(GOP).A video can be broken down in scene, shot and frames[2].
- D. **Scene :-**A scene is a logical grouping of shots into a semantic unit[2].
- E. **Shot :-**A shot is a sequence of frames captured by a single camera in a single continuous action. A shot boundary is the transition between two shots[2].
- F. **Frame:-** A digital video consists of frames that are a single frame consists of pixels[2].
- G. **Sample Rate:** It is rate of video in frames per second (FPS) [3].
- H. **Aspect Ratio:** Aspect ratio describes the dimensions of video screens and video picture elements. All popular video formats are rectangular, and so can be described by a ratio between width and height. 
$$\text{Sample Time} = \frac{1}{\text{FPS}} \text{ sec}$$
- I. **Video quality:** Video quality can be measured with formal metrics like PSNR value.
- J. **Video formats:** Different layers of video transmission and storage each provide their own set of formats to choose from. For transmission, there is a physical connector and signal protocol ("video connection standard"). In addition to the physical format used by the data storage device or transmission medium, the stream of ones and zeros that is sent must be in a particular digital *video compression format*, of which a number are available.

**Table 1:Video format**

S. No.	Video format
1	Mp3
2	3GP
3	MKV
4	FLV
5	SWF
6	AVI

## IV. ALGORITHM

In this paper, we focus to develop an algorithm that can extract frames from video sequences. Every frame F depend on the video structure  $V_i$ . Video sequence is composed into a number of frames; Frame is taken one by one from the video structure.

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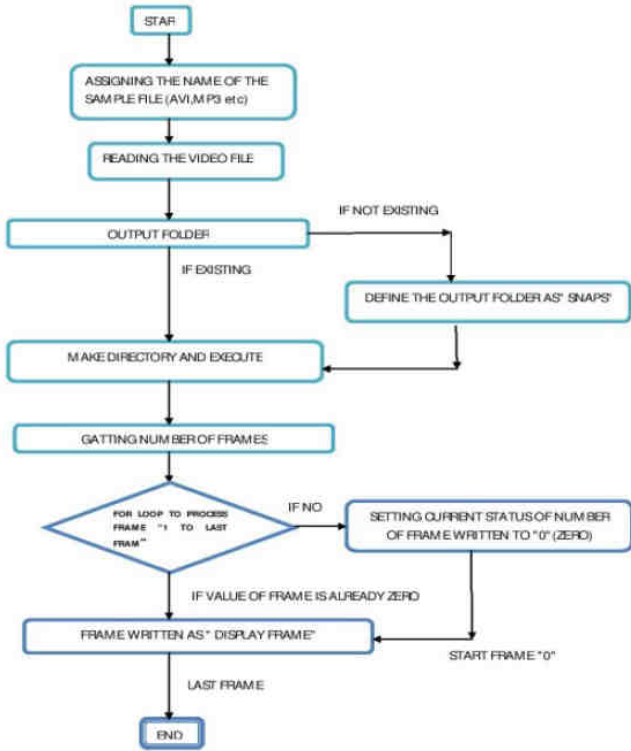


Figure1: Flow Chart of the Video Frame Extraction

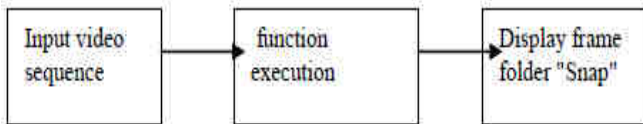


Figure 2: Block diagram of frame extraction

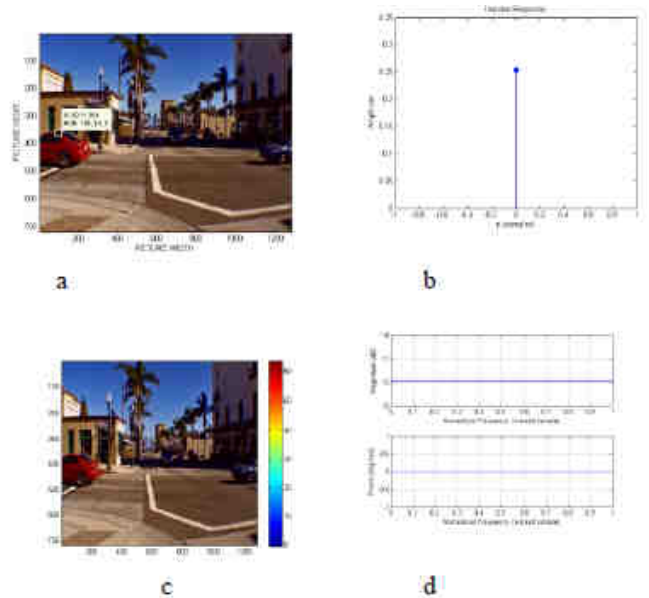


Figure 3: (a) frame width and height graph(in sample video 1st frame ,12080x720) (b)Impulse response of frame 1 of video V1 (c) RGB component scaling (d)Magnitude and Phase Response of frame 1 of video V1.

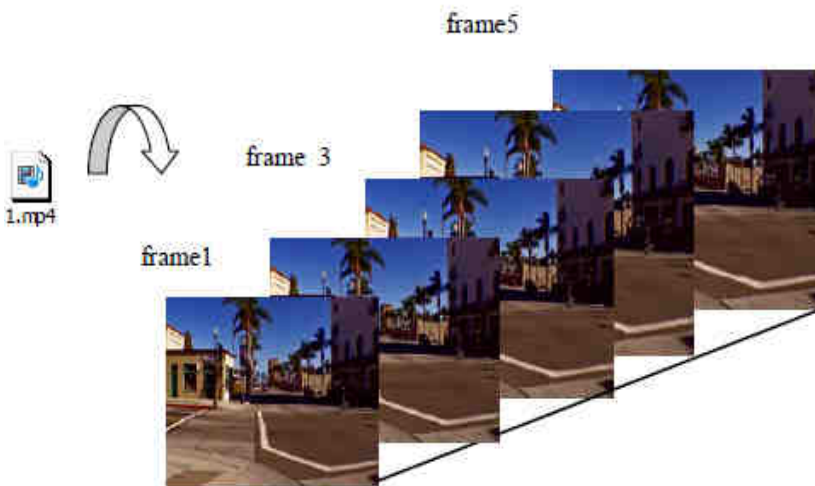
### Process

- i. Load the video sequence
- ii. Run the program
- iii. Wait for execution of the video to frame conversion.
- iv. Open the snap folder where the video is converted to the frames.
- v. If the file format changes then change the file name path.
- vi. Continuous this process for every video sequence

frame number 158( last frame)



Group of picture (GOP)



## v. RESULTS AND ANALYSIS

### Experimental result of frame extraction



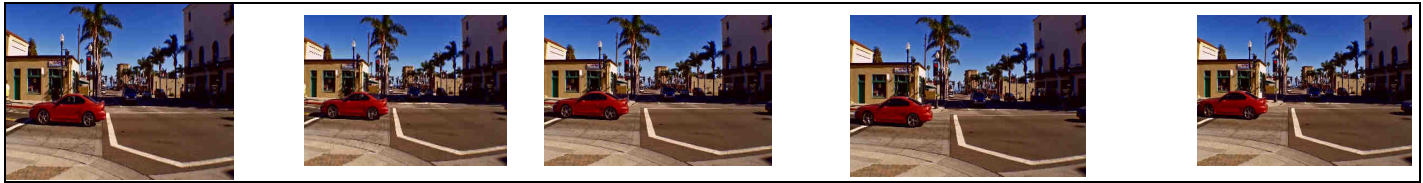
FRAME NUMBER 1

2

3

4

5



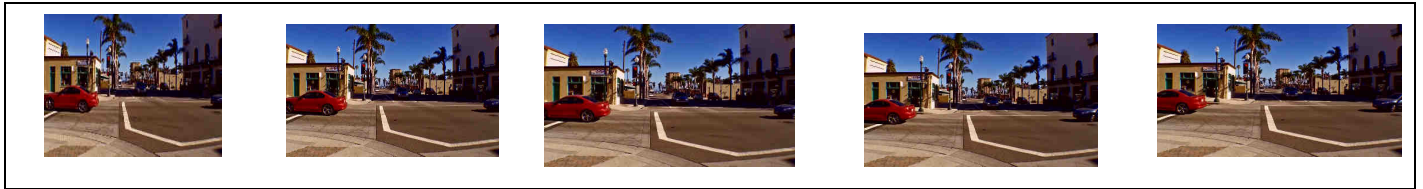
FRAME NUMBER 149

150

151

152

153



FRAME NUMBER 154

155

156

157

158

**Sample Video Properties Analysis**

S. No.	FILE NAME	SIZE	DURATION( Sec)	FILE TYPE	BITS PER PIXELS	FRAME RATE	HIGHT	WIDT H	NO OF FRAME	VIDEO FORMAT E
1	V1	3.20MB	6.3240	MP4	24	25	720	1280	158	RGB24
2	V2	804Kb	6.0370	MP4	24	29.97	720	1280	179	RGB24
3	V3	1.34MB	15.3370	MP4	24	25	640	640	375	RGB24
4	V4	536Kb	4.9690	MP4	24	30	720	1280	147	RGB24
5	V5	908Kb	4.5520	MP4	24	29.9	720	1280	135	RGB24
6	V6	3.36MB	23.8710	MP4	24	29	720	1280	706	RGB24
7	V7	832Kb	5.0050	MP4	24	29.97	480	640	150	RGB24

**Table 2: Different video sequence properties**

S. No.	FILE NAME	SIZE	DURATI ON( Sec)	FILE TYPE	BITS PER PIXELS	FRAM E RATE	HIGHT	WIDTH	NO OF FRAME
1	VIDEO 1	3.20 MB	6.3240	MP4	24	25	720	1280	158
2	VIDEO 2	3.81 MB	6.3240	AVI	24	25	720	1280	152
3	VIDEO 3	269K b	6.5340	3GP	24	15	144	176	98
4	VIDEO 4	3.49 MB	6.3240	MKV	24	25	720	1280	158

**Table 3: Same video sequence with different file format properties**

S. No.	FILE NAME	VIDEO PROPERITES		AUDIO PROPERTIES		
		DATA RATE (Kbps)	TOTAL BIT RATE (Kbps)	BIT RATE (Kbps)	CHANN EL	AUDIO SAMPLE RATE (KHz)
1	VIDEO1	4334	4468	134	2	44
2	VIDEO2	4950	5078	128	2	44
3	VIDEO3	299	311	11	-	44
4	VIDEO4	0	148	148	2	44

**Table4: same video sequence different file format with audio and video properties**

S. No.	FILE NAME	VIDEO PROPERITES		AUDIO PROPERTIES		
		DATA RATE (Kbps)	TOTAL BIT RATE (Kbps)	BIT RATE (Kbps)	CHANN EL	AUDIO SAMPLE RATE (KHz)
1	V1	4334	4468	134	2	44
2	V2	96	1087	126	2	44
3	V3	729	749	20	1	24
4	V4	743	868	124	2	44
5	V5	1363	1478	115	2	44
6	V6	115	117	19	1	24
7	V7	1360	1360	-	-	-

**Table 5: Different video sequence with audio and video file format**

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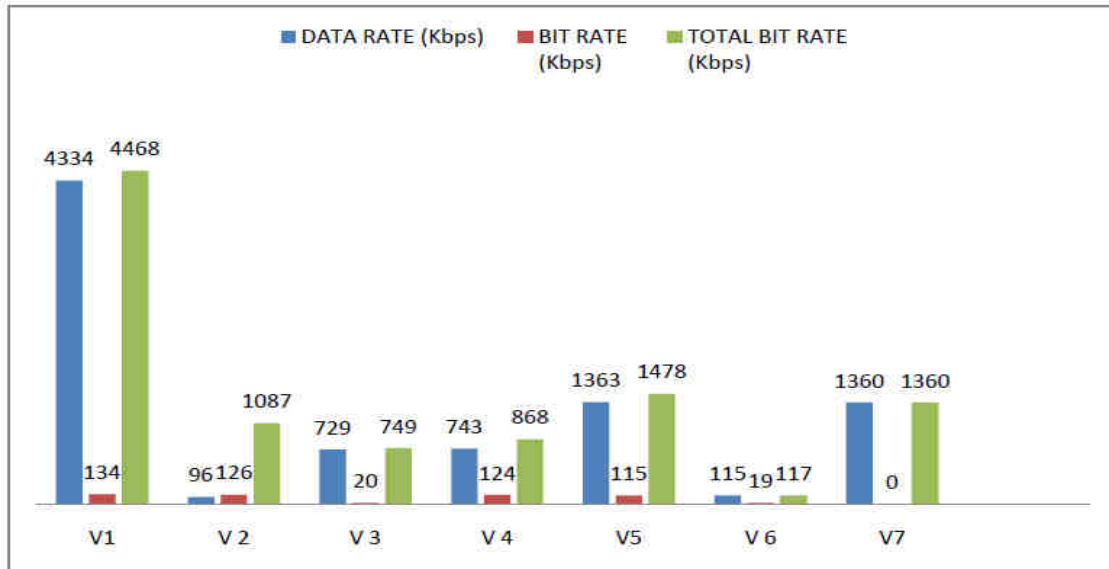


figure4: graph is plotted between different video sequences and data rate, bit rate and Total bit rate

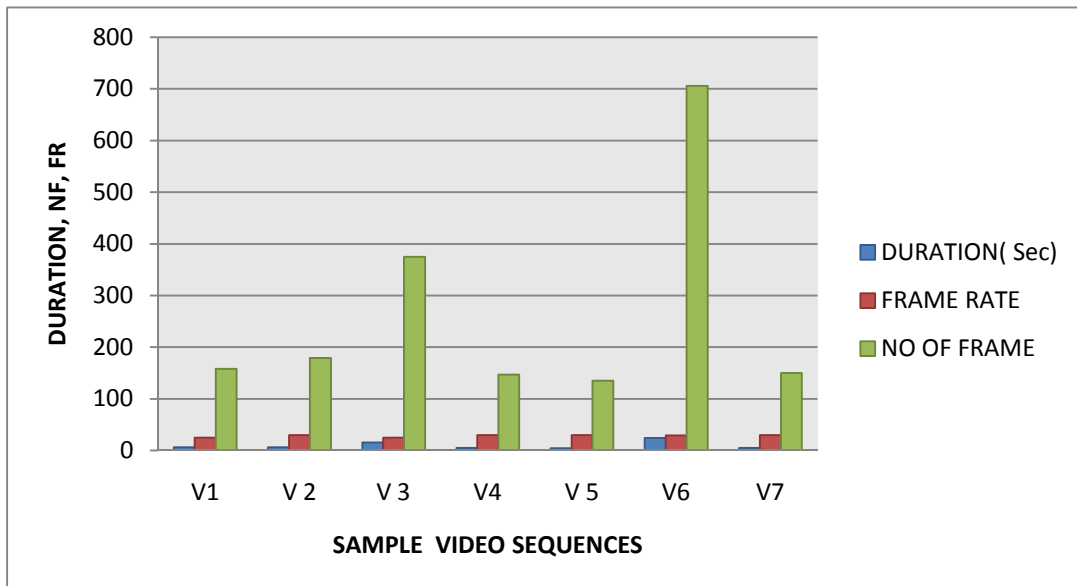


Figure 5: sample video sequences Vs duration , frame rate and number of frame plotting

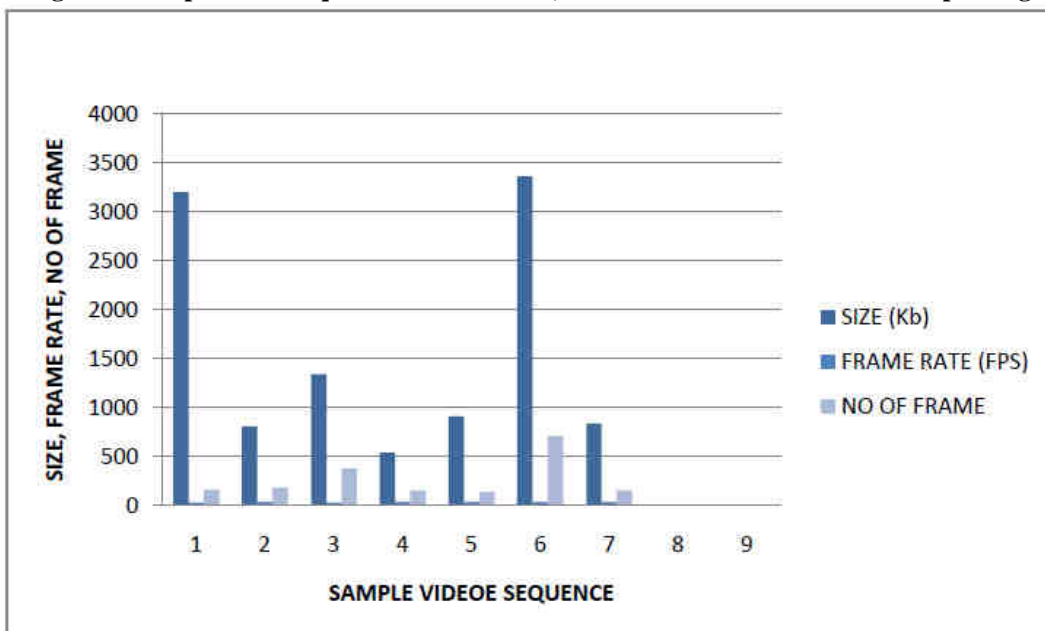


Figure 6: sample video sequence with size, frame rate and no of frame graph

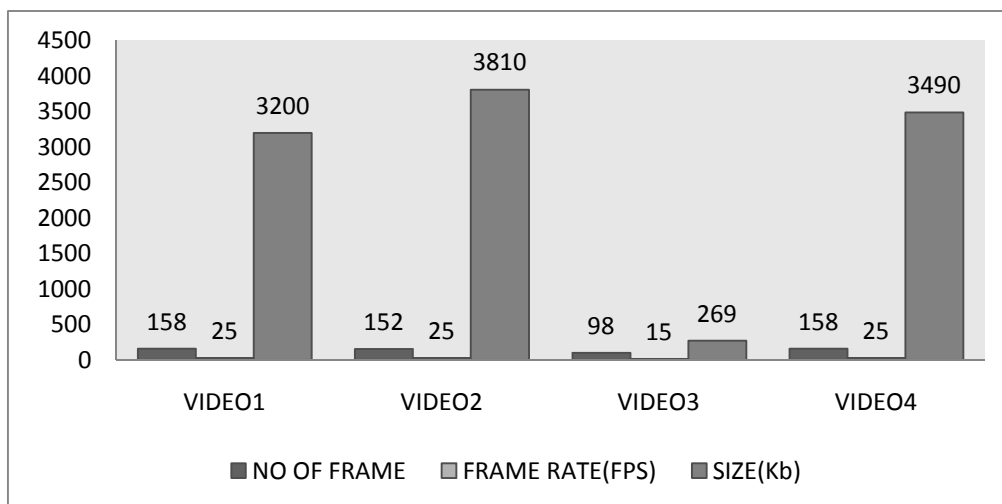


Figure 7: same video sequence different file format with number of frame, frame rate and size plottin

## VI. CONCLUSION

All experiment of different video and same video sequence with different file format analyze that Size of the video sequence depend on the number of the frame in the video. More size more number of the frame be calculated so that execution time be slower and take some time to display a result of frame extraction. Commonly use the video sequence height to width ratio is 720x 1280. Same video sequence but different file format (MP3, AVI, 3GP, MKV) have different video size (Kb). 3GP format is taken less execution time because of frame rate, a number of frame and height to width ratio is less compared to another file format. this paper helpful in Key frame extraction, and the key to key frame extraction. Video frame extraction is helped in the surveillance system security system, change detection system, video summarization, indexing, online video processing etc.

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