

Lab Assignment 2:

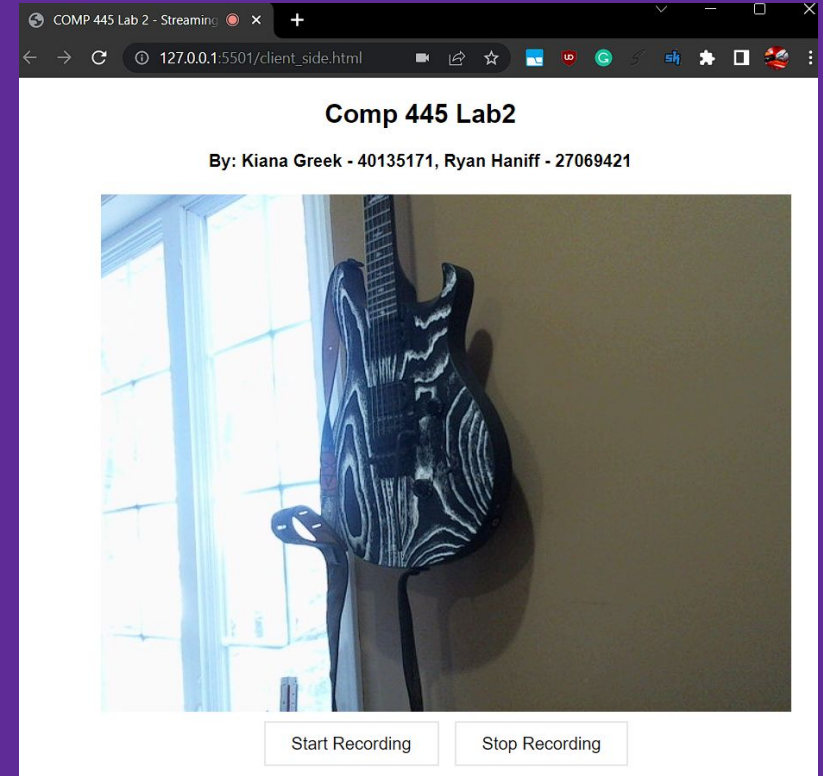
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Video Capture

- On client web browser
 - HTML (client_side.html)
 - CSS (style.css)
 - JavaScript (scripts.js)



Video encoding

- Encoded using:
`navigator.mediaDevices.getUserMedia()`
- Avc1 is the same technology as h.264 (names used interchangeably)

```
video/mp4; codecs="avc1.4d002a"
```

An [MPEG-4](#) file containing [AVC](#) (H.264) video, Main Profile, Level 4.2.

(https://developer.mozilla.org/en-US/docs/Web/Media/Formats/codecs_parameter)

```
navigator.mediaDevices
// setting the video dimensions for the webcam
.getUserMedia({
  // allow audio recording
  audio: true,
  video: {
    // width and height of video stream
    minWidth: 1280,
    minHeight: 720,
    // framerate
    frameRate: { ideal: 30 },
    // avc1 is the same as h.264 (are used interchangeably)
    mimeType: 'video/mp4; codecs="avc1.4d002a"',
    // 5 mpbs
    bitrate: 5000000
  },
})
```

Video Segmentation

- Created a time slice value of 3000
- `mediaRecorder.start()` takes the time slice as a parameter to record a video Blob.

```
// begins recording media into one or more Blob objects
mediaRecorder.start(timeslice);

mediaRecorder.ondataavailable = (video_segment) => {
  // upload one blob at a time
  let blob = new Blob([video_segment.data], { type: "video/mp4" });
  let formData = new FormData();
  formData.append("video", blob, "video.mp4");
}
```

Media Packaging

- Client side:
 - Blob Format: file-like object of immutable, raw data
- Server side:
 - file called counter.txt that stores a number
 - save_video.php reads that file and appends that number to the \$file_name
 - Video segment gets saved into video_segments directory on Concordia server

```
// upload one blob at a time
let blob = new Blob([video_segment.data], { type: "video/mp4" });
let formData = new FormData();
formData.append("video", blob, "video.mp4");
```

```
// Loading the counter value from separate file
$counter_file = "counter.txt";
$counter = intval(file_get_contents($counter_file));

if (isset($_FILES['video'])) {

    // location where video segments are saved
    $upload_dir = "video_segments/";

    // video segment name
    $file_name = "video_" . $counter . ".mp4";

    // Moves the uploaded file to the new location
    move_uploaded_file($_FILES['video']['tmp_name'], $upload_dir.$file_name);

    // Increment the counter value and save it to the counter file
    $counter++;
    file_put_contents($counter_file, $counter);
}
?>
```

Real-time Video Upload

- Using FormData to package the blob since XMLHttpRequest accepts formData
- XMLHttpRequest() to POST to concordia server
- serverURL = "http://labs445-2.encs.concordia.ca/~team5/save_video.php"

```
// POST to APACHE2 server
const xhr = new XMLHttpRequest();
// calling the .php file server side
xhr.open("POST", serverURL, true);
xhr.onload = function () {
    if (xhr.status === 200) {
        // console log successfully upload with counter
        console.log("Video saved successfully! " + count.toString());
    } else {
        console.log("Error saving video!");
    }
};
// uploadiing the blob
xhr.send(formData);
```

Video storage at the server

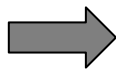
- Directory called video_segments
- /home/team5/public_html/video_segments

```
team5@labs445-2:~/public_html/video_segments$ ls
video_0.mp4  video_13.mp4  video_17.mp4  video_20.mp4
video_10.mp4  video_14.mp4  video_18.mp4  video_21.mp4
video_11.mp4  video_15.mp4  video_19.mp4  video_22.mp4
video_12.mp4  video_16.mp4  video_1.mp4   video_23.mp4
team5@labs445-2:~/public_html/video_segments$
```

Reliable delivery

Throttling to slow down upload speed

Name	Status	Type	Initiator	Size	Time	Waterfall
client_side.html	200	docum...	Other	2.8 kB	5 ms	
style.css	200	styleshe...	client_side.html	882 B	5 ms	
scripts.js	200	script	client_side.html	3.3 kB	5 ms	
single-file-hooks-frames.js	200	script	singlefile.js:70	8.4 kB	6 ms	
ws	101	websoc...	client_side.html...	0 B	Pending	
favicon.ico	404	text/html	Other	453 B	4 ms	
save_video.php	200	xhr	scripts.js:78	304 B	32.64 s	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	
save_video.php	(pending)	xhr	scripts.js:78	0 B	Pending	



Even after stopping the stream the videos get uploaded to Concordia server

Name	Status	Type	Initiator	Size	Time	Waterfall
client_side.html	200	docum...	Other	2.8 kB	5 ms	
style.css	200	styleshe...	client_side.html	882 B	5 ms	
scripts.js	200	script	client_side.html	3.3 kB	5 ms	
single-file-hooks-frames.js	200	script	singlefile.js:70	8.4 kB	6 ms	
ws	101	websoc...	client_side.html...	0 B	Pending	
favicon.ico	404	text/html	Other	453 B	4 ms	
save_video.php	200	xhr	scripts.js:78	304 B	32.64 s	
save_video.php	200	xhr	scripts.js:78	304 B	35.84 s	
save_video.php	200	xhr	scripts.js:78	304 B	34.54 s	
save_video.php	200	xhr	scripts.js:78	304 B	33.49 s	
save_video.php	200	xhr	scripts.js:78	304 B	32.11 s	
save_video.php	200	xhr	scripts.js:78	304 B	29.02 s	
save_video.php	200	xhr	scripts.js:78	303 B	30.02 s	
save_video.php	200	xhr	scripts.js:78	303 B	26.98 s	
save_video.php	200	xhr	scripts.js:78	303 B	23.98 s	
save_video.php	200	xhr	scripts.js:78	303 B	23.15 s	