



LiveLight

Crowd-Generated Highlights



Contents

- Motivation & Main Tasks
- Solution
 - Related Work
 - System Architecture
- System Walkthrough
- Results
 - User Study
 - Highlights Comparison with Gold Standard
 - User Feedback
- Discussion
 - Limitations
 - Possible Improvements



Motivation & Main Tasks





Live is fun



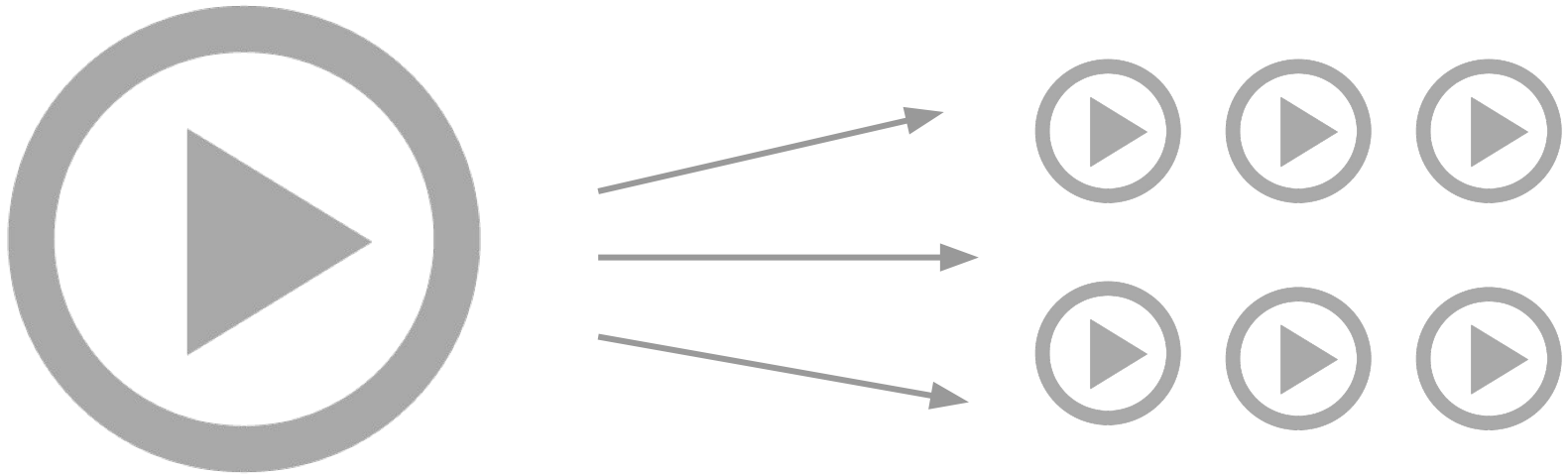
But it is usually too long



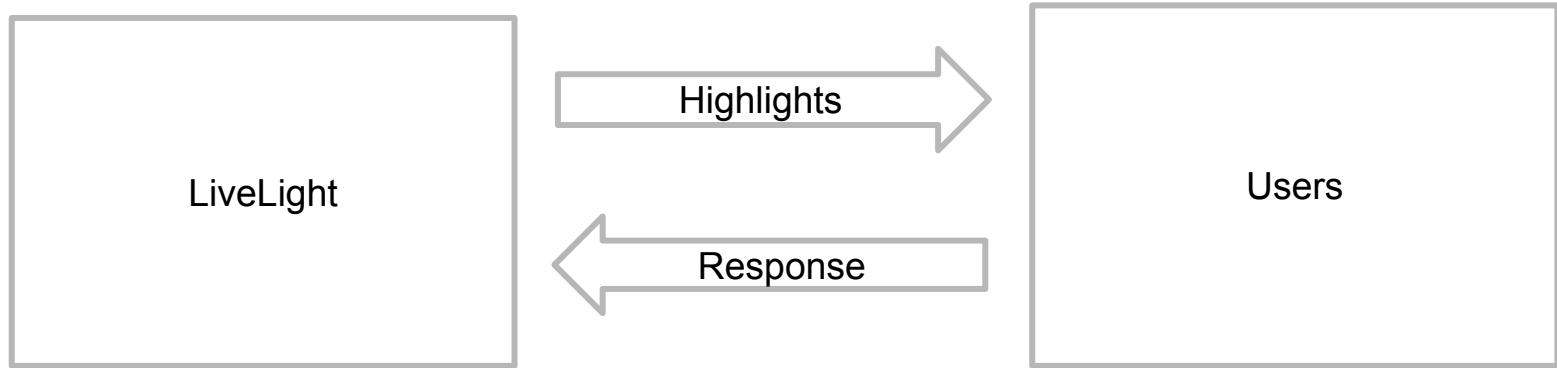
Interesting moment passes fast



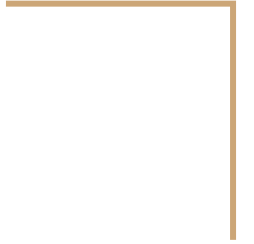
Summary of video



Immediate & Interactive Highlights



Solution



Related Works and their Limitations

Highlight generation with machines

Those system are taught for specific type of videos

- GoPro like FPV videos
- Soccer Matches
- Video Games
- Baseball Games



Related Works and their Limitations

Highlight generation with machines

Usually, those systems try to rely on specific signs like...

- Kill logs or kill messages
- Baseball field detection
- FIFA logos detection



Figure 2: Good (top row) and bad (bottom) detected text regions.

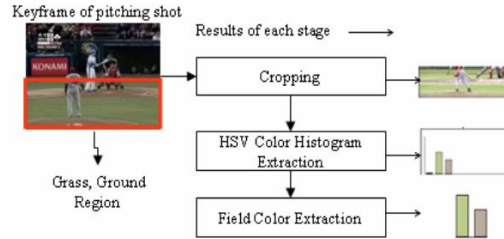


Fig. 8. Field color detection algorithm



Figure 9. Sample Logo Images from our Video Data Set

Related Works and their Limitations

Highlight generation with crowdsourcing

- Epic Play: Crowd-sourcing Sports Video Highlights
 - Based on the # of tweets
 - **Not suitable** for so-called **long-tailed videos**
- 꿀잼각: AfreecaTV's interesting-moment-vote system
 - User press the button when they think it is fun (voting)
 - The moderators choose and cut the videos **manually** and post it **several days later**



꿀잼각TV 2016-12-13 18:57

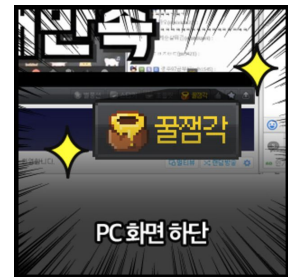
유저들이 선정한 꿀잼각! 킹기훈의 쪼꼬북 우결아닌 우리 꿀잼있...

꿀잼각 버튼은 막 누르면 아니되오!!! 정말 재밌거나 핫하거나 이슈다 싶을때 버튼을 눌러주세요 우결이 아닌 우탈ㅋㅋㅋㅋㅋ 킹기훈 : ht...

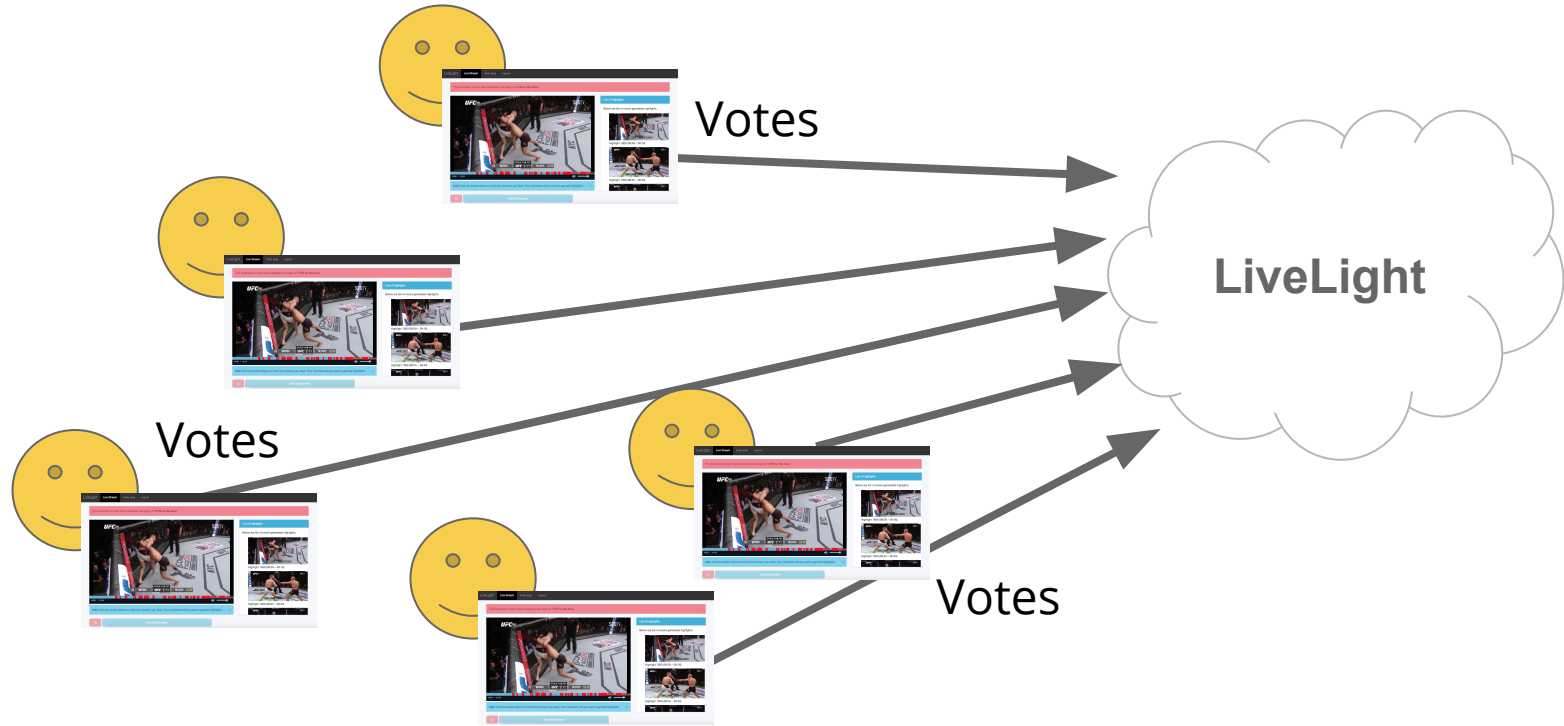
▶ 51,748

💬 51

➦ 공유하기



LiveLight: Crowd-Generated Highlights



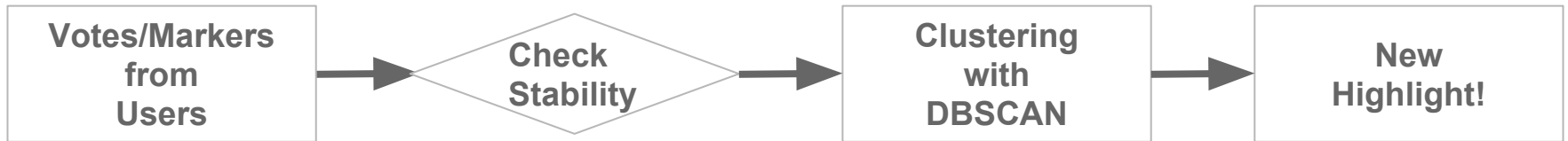
LiveLight: Crowd-Generated Highlights



LiveLight: Crowd-Generated Highlights

Aggregation to generate highlights

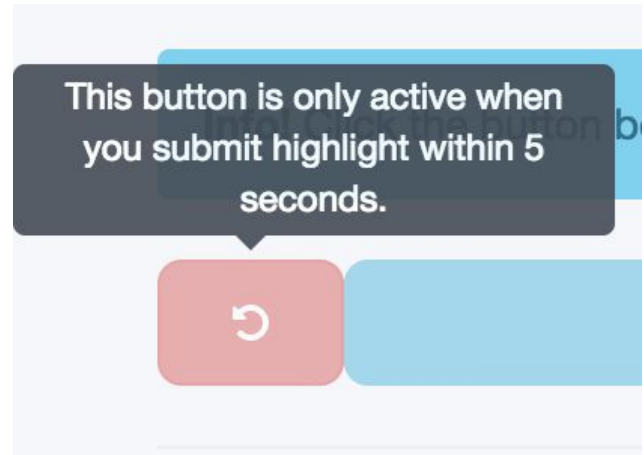
1. User submit their votes/markers to server
2. When the markers are considered **unchangeable**, then server runs **DBSCAN** algorithm in order to make clusters
3. When the new cluster is made, it is now it is notified to clients as a new **HIGHLIGHT !!**



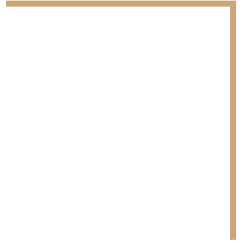
LiveLight: Crowd-Generated Highlights

Quality Control

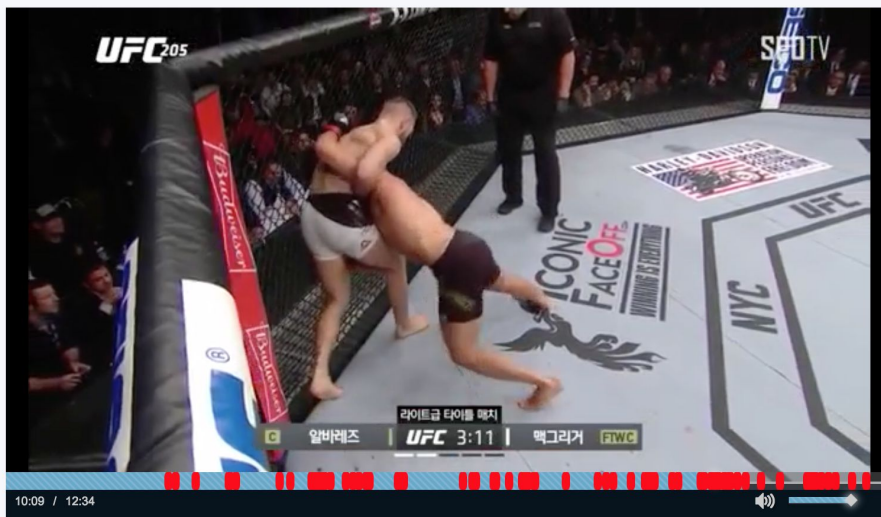
- Undo Button
 - Helping users' self quality control
- Time limitation to prevent button mashing
 - 5 seconds button freezing in pressing the button
 - Also, Undo is available during that time
- The power of numbers
 - Good users' participation beat malignant behaviors
- Intrinsic motivation as quality control
 - The intrinsic motivation of showing users' emotion makes them do things properly
 - Social pressure not to show weird behavior



System Walkthrough



This livestream is over. Next livestream will begin at 17:00 on the hour. ✕



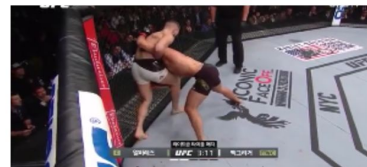
Info! Click the button below to mark the moment you liked. Your moments will be used to generate highlights. ✕



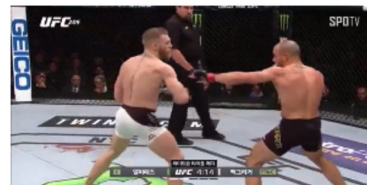
Add this Moment

List of Highlights

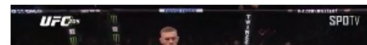
Below are list of crowd-generated highlights.



Highlight 1609 (08:58 ~ 09:16)



Highlight 1608 (08:25 ~ 08:40)



<https://live-light.herokuapp.com>

System Walkthrough

System walkthrough video

<https://youtu.be/wGowHQCgngg>

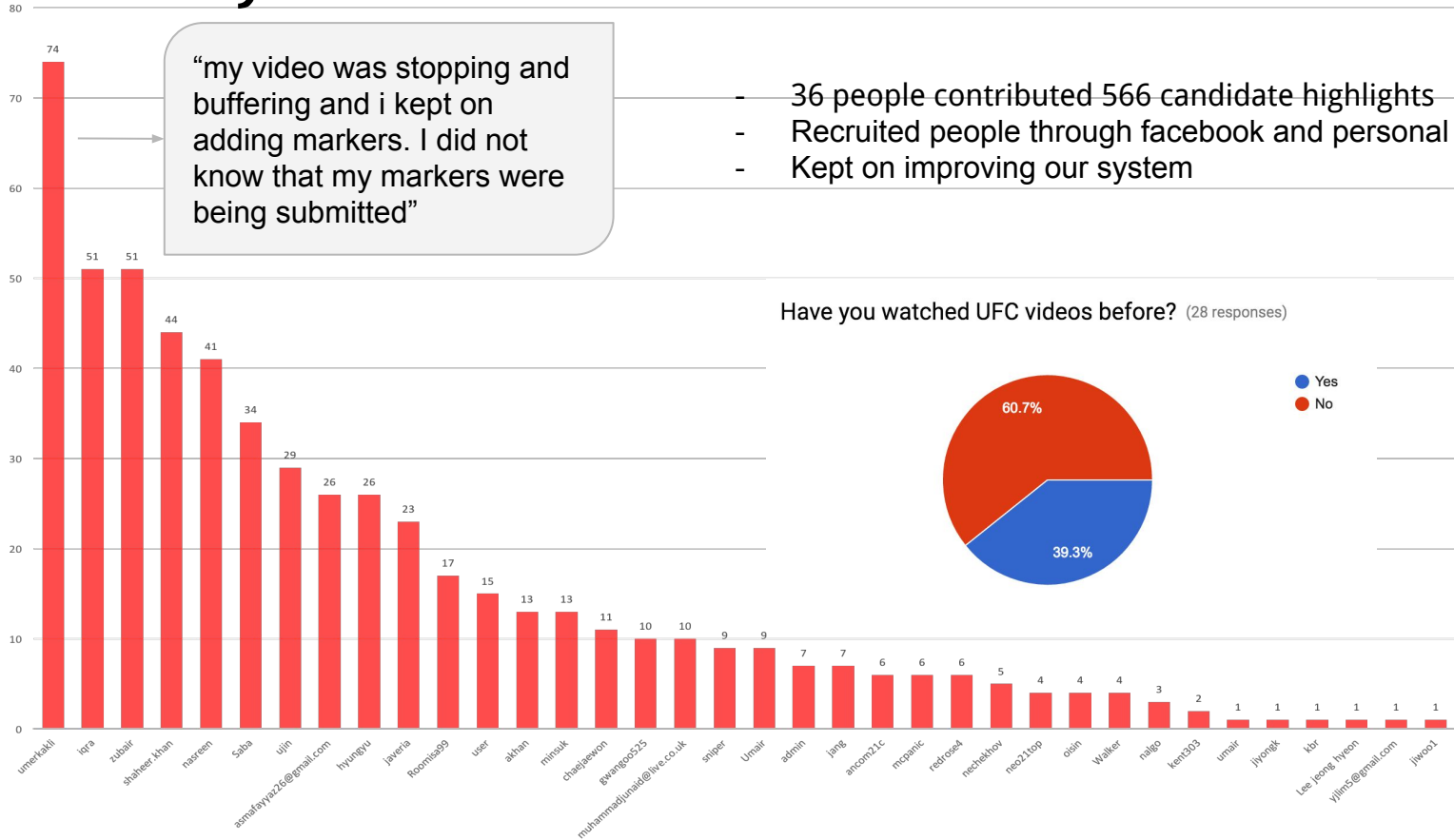
What the real system looks like?

<https://live-light.herokuapp.com>

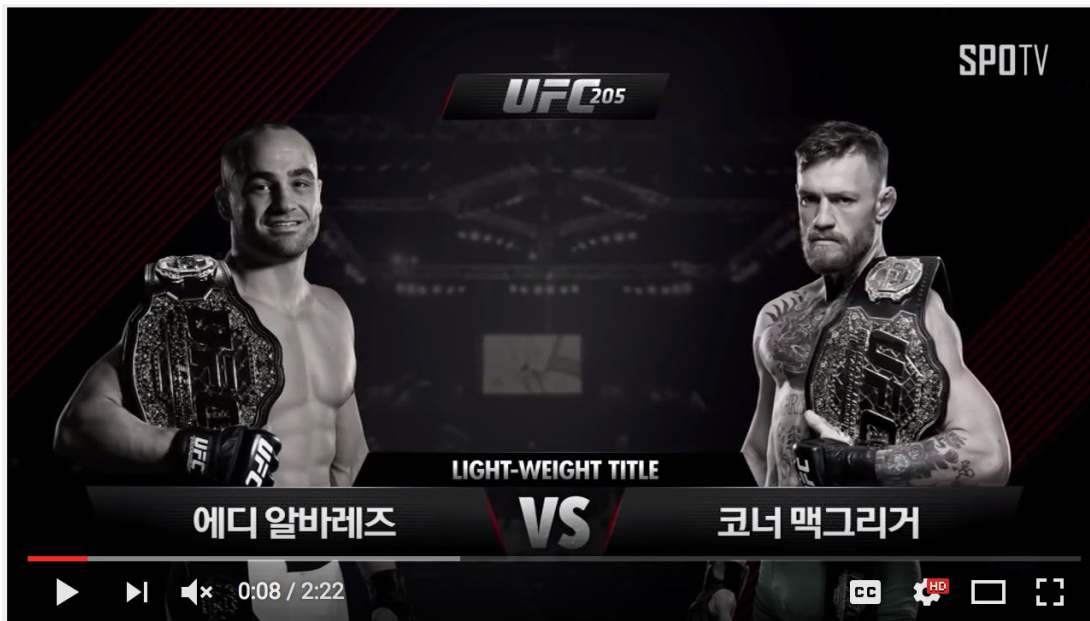
Results



User Study



Highlights Comparison with Gold Standard



Expert-generated highlights as gold standard

<https://live-light.herokuapp.com/result>

User Feedback

How do you feel about adding your favorite moments during the video?

"It feels amazing. This allows me to **capture my favourite moments and allows me to watch them later** so i can later on show them to my friends and have a discussion on their favourite moments"

"Cool to see that **other people also see my moment**"

"Waiting 5 seconds is too long. I want to **repeatedly push button fastly!!**"

"**Interesting to see that other people are also feeling interesting** on the point that I'm interested too."

User Feedback

Tell us what do you feel about watching highlights generated by other people like you?

"Gives me a **perspective on the individual likes of different persons**. Though some of their highlights were exactly the same as mine."

"It was kind of interesting, because **our opinions affect to official highlights**."

"Good that I can watch it **simultaneously with watching the live video**."

"It could be a good summary for me, but I feel sad because I **can't capture the context** (or flow)."

"It will be good to see what people find interesting."

User Feedback

How do you feel about creating highlights for others?

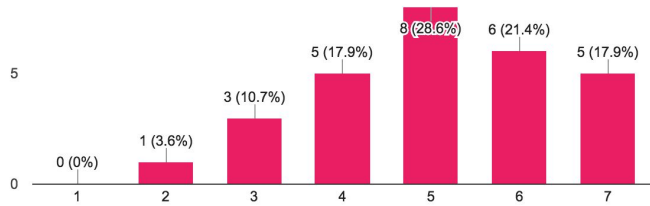
"I enjoyed it. It was **interactive**."

"Gives me a chance to **share my favourite moments with others**. It allows me to open up a discussion on the game itself."

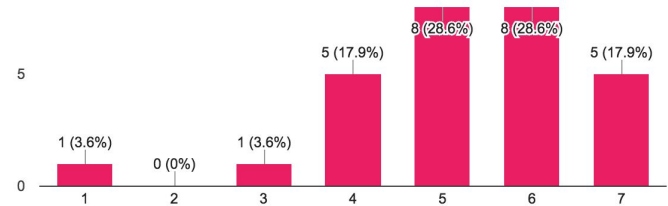
"I don't feel like "creating highlights for others", but it **motivates me to concentrate on the video**."

User Feedback

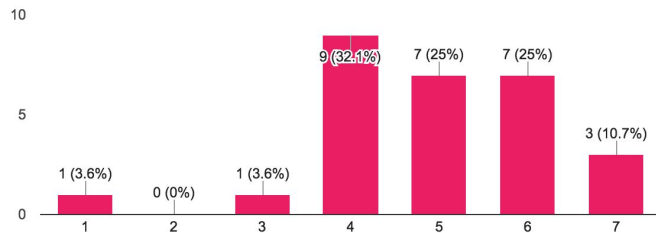
Does adding moments during the video increased your concentration?
(28 responses)



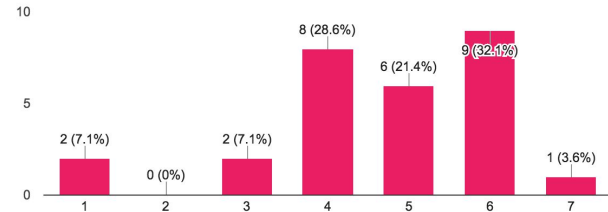
Are LiveLight's crowd generated highlights enjoyable? (28 responses)



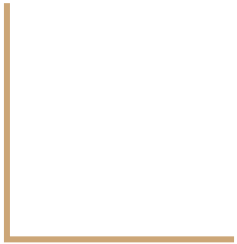
Are LiveLight's crowd generated highlights useful? (28 responses)



Does LiveLight's crowd generated highlights represent your perception of highlights?
(28 responses)



Discussion



Limitations

- Lack of visual aids
- Context of highlights
- Session based videos
- Quantitative analysis

Possible Improvements

- Complementing interactions in interface
- Algorithm parameters configuration
- Implementing quantitative methods
- Test system with Youtube live videos
- Lecture-Scape style 2D timeline

Thanks



What other videos should be added in future?(22 responses)

Thanks for
your
participation

Game related video.

게임 영상(LoL, 히어로즈 오브 스톰)

대중적인 영상이었으면...

음... 영상은 달라져도 기능은 똑같을거라서..

농구 동영상

Hmm... Computer game like LOL.

sports games, political speeches, national geographic videos

Any sports videos

Dumb vidoes

잘 모르겠다

Sports, Debates

NBA, 해축, MLB

쇼미더머니 같은 방송 영상

농구, 축구, LOL등의 영상

movie clips, video songs animation

New ones.

Different videos so that people enjoy it even more

Science videos

Sports (EPL, UEFA...)

Any kind of interesting videos will be appreciated

Some videos in English

korean dramas!