







### **EMOLIS App and Dataset to Find Emotionally Close Cartoons**

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LREC - Colling - 2024

## **Presentation outline**

#### EMOLIS Dataset

• Content and goals

#### EMOLIS App

• Functionalities and architecture

# **EMOLIS** Dataset - Content

- Dataset of emotional annotations and physiological signals (ECG, breathing, eye movements)

- Ekman's emotions felt by viewers : Joy, Anger, Fear, Sadness, Disgust, Surprise
- Young audiences and people with Autism Spectrum Disorder
- References to 62 cartoon scenes (short context)

# Vidéos sélectionnées

Image

- 2 hours 8 minutes 38 seconds, 62 scenes, 8 cartoons
- Modalities : text, picture, audio
- Scenes segmented into sequences (turns of speech, silence of at least one second)





Texte

Audio

Elsa? Do you wanna build a snowman? Come on, let's go and play.

Extract from Walt Disney's Frozen

### Temporal representation of sequences from an extract of Frozen

	Sequence 1	Sequence 3	Sequence 5
Anna	Sure you can. I know you can! 'Cause for the first time in forever, you don't have to be afraid.	We can work this out together. We'll reverse the storm you've made.	Don't panic. There's so much fear! We'll make the sun shine bright.
Elsa	I'm such a Fool!I can't be Free! 	I can't control the curse! Anna, ————————————————————————————————————	You're not safe here!
	Sequence 2	Sequence 4	Sequence 6

#### Sequence 7

Anna	We can face this thing together	·	
Elsa	Nooooooooooooooooooooooooooooooooooooo	000!	—— I can't !
	Sequence 8	Sequence 9	sequence 10

### Extract of EMOLIS Dataset file to align subtitles with video

Scene	Sequence	Character	StartTime	EndTime
6	1	Anna	00:57:02	00:57:15
6	2	Elsa	00:57:10	00:57:17
6	3	Anna	00:57:17	00:57:25
6	4	Elsa	00:57:20	00:57:28
6	5	Anna	00:57:28	00:57:32
6	6	Elsa	00:57:28	00:57:33
6	7	Anna	00:57:33	00:57:35
6	8	Elsa	00:57:33	00:57:35
6	9		00:57:35	00:57:41
6	10	Elsa	00:57:41	00:57:45

# Capture of physiological signals



Experimentations diagram

### EMOLIS Dataset - Features from physiological signals

#### Eye movements

- pupil size
- eye position
- number of eye blinks
- average duration of eye blinks
- eye fixation points and duration
- eye saccades and duration
- rotation angle between the starting

point and the two successive saccades

Electrocardiogram

- Pre-trained features
- for emotion recognition

#### Breathing

- Frequency domain
- of ultrasound

### **EMOLIS** Dataset - Annotation extract

			Most representative emotions					Frequency of emotions									
Film	Scene	Timeline of emotions	A n g e r	D i g u s t	J o y	F e r	S u r p r i s e	S a d n e s s	O t e r	N o n e	A n g e r	D s g u s t	J o y	F e r	S u r p r i s e	S a d n e s s	O t e r
Frozen	1	jjjdjjjsa	0	0	1	0	0	0	0	0	0	1	6	0	0	1	0

The annotator felt 3 times joy, then disgust once, then joy again 3 times and sadness once. The most representative emotion for him is joy

# **EMOLIS App - Functionalities and Architecture**

- Real-time display of perceived emotions
- Suggestion of emotionally close videos from features of physiological signals and videos



# EMOLIS App - Views



Timeline (Full video)

The most emotionally close videos





Vaiana Te Fiti

2



Treasure planet Story



Pocahontas Storm



Inside out Joy comforts Sadness



Mulan At the matchmaker's

# **EMOLIS** App - Video Suggestions

Calculation Frobenius distance between the reference video and the other videos in the dataset :





# Conclusion and perspectives

#### **EMOLIS Dataset :**

- References to cartoon scenes
- Features from physiological signals
- Annotations of felt emotions

#### EMOLIS App:

- Real-time display of perceived emotions
- Suggestion of emotionally close videos

#### Perspectives :

- Wider experimentation
- Evaluation of the approach
- Application on persons with Autism Spectrum Disorder

### EMOLIS App - Prediction model of emotions



Siriwardhana, S., Kaluarachchi, T., Billinghurst, M., & Nanayakkara, S. (2020). Multimodal emotion recognition with transformer-based self supervised feature fusion. *Ieee Access*, *8*, 176274-176285.

# Evaluation of the video suggestions

# Majority vote on the annotations

## User ratings

