

MSc Project 2021

Title: Estimating personality in communication
Name: Yuichi Midorikawa

weekX

This indicates when it was done

X-X

This corresponds to the mindmap number

Time Plan		Oct				Nov					Dec	My Progress	
Step	Task	4	11	18	25	1	8	15	22	29	6	Status	Question (res/No)
		week1	week2	week3	week4	week5	week6	week7	week8	week9	week10		
1	capture a dataset that contains people talking and the text of what they say.	1					buffer				buffer	Finished	
	1-1. Find a dataset to use	1-1										Finished	
2	using the conversation text, do sentiment analysis (A)	2										Finished	
	2-1. Find a model to use	2-1										Finished	
	2-2. Using the model and its data set, perform sentiment analysis		2-2									Finished	
3	from the videos, extract people and body pose (B)	3										Finished	
	3-1. Find a model to use	3-1										Finished	
	3-2. Using the model and its data set, extract body pose		3-2									Finished	
4	from the head, extract facial feature points (C)	4										Finished	
	4-1. Find a model to use	4-1										Finished	
	4-2. Using the model and its data set, extract facial points		4-2									Finished	
5	Then train a model to predict (A) from (B)+(C)			5								Running	
	5-1. Predict (A) from (B) body pose			5-1								Running	
	5-2. Predict (A) from (C) facial feature points			5-2			Improving the accuracy of the model!					Finished	
	5-3. Predict (A) from (B) body pose + (C) facial feature points			5-3								Running	
6	evaluate and analyse the results.				6							Running	
	6-1. Decide a evaluation metrics				6-1							Running	
	6-2. evaluate and analyse the results					6-2						-	
7	Write a paper					7						Running	

week5



Youtube



No manual annotation for this project

1-2. Watch the video and manually annotate each subtitle/frame with a positive/negative. (A') (Use as training data)

Positive/
Negative

2. using the conversation text,
do sentiment analysis (A)

【Updated on week3】
Use as training data

①

Positive/
Negative

3. from the videos, extract people and body pose (B)



4. from the head, extract facial feature points (C)



5. Then train a model to predict (A) or (A') from (B), (C) and (B)+(C)

②

Positive/
Negative

【Updated on week4】I create three models to predict emotions.

(1) predicting emotions from facial feature points

(2) predicting emotions from body posture points

(3) predicting emotions from facial feature and body posture points

6. evaluate and analyse the results.

①

Positive/
Negative

②

Positive/
Negative

Evaluation metrics:
Accuracy,
Precision,
Recall, and
F1-score...

1. Summary of actions agreed during last meeting

- 1-1. Performed sentiment analysis on each sentence of youtube videos
- 1-2. Extracted facial feature points from the head
- 1-3. Organized the analysis procedure

1-1. Perform sentiment analysis on each sentence of a youtube video

(Reference) Youtube videos to use for this project

week5

	Title	Category	Number of sentences	neutral		joy		surprise		anger		sadness		fear		disgust	
				#N	%	#N	%	#N	%	#N	%	#N	%	#N	%	#N	%
1	Why I Don't Use A Smart Phone Ann Makosinski TEDxTeen	TED	209	129	61.72%	52	24.88%	17	8.13%	6	2.87%	4	1.91%	1	0.48%	0	0.00%
2	How to speak so that people want to listen Julian Treasure	TED	228	145	63.60%	41	17.98%	16	7.02%	17	7.46%	7	3.07%	0	0.00%	2	0.88%
3	How to spot a liar Pamela Meyer	TED	405	288	71.11%	53	13.09%	18	4.44%	32	7.90%	12	2.96%	2	0.49%	0	0.00%
4	Robert Waldinger: What makes a good life? Lessons from the longest study on happiness TED	TED	212	148	69.81%	32	15.09%	18	8.49%	1	0.47%	12	5.66%	1	0.47%	0	0.00%
5	How to make stress your friend Kelly McGonigal	TED	284	178	62.68%	71	25.00%	20	7.04%	6	2.11%	5	1.76%	4	1.41%	0	0.00%
6	How to Get Your Brain to Focus Chris Bailey TEDxManchester	TED	306	227	74.18%	41	13.40%	18	5.88%	11	3.59%	7	2.29%	0	0.00%	2	0.65%
7	Funniest Moss Moments The IT Crowd Part 1	Drama	182	130	71.43%	21	11.54%	10	5.49%	11	6.04%	7	3.85%	1	0.55%	2	1.10%
8	10 Hilarious Comedy Bits of Series 10 Live at the Apollo BBC Comedy Greats	Comedy	527	391	74.19%	66	12.52%	19	3.61%	28	5.31%	12	2.28%	10	1.90%	1	0.19%
9	That Song In Every Musical That No One Likes - Sarah Smallwood Parsons	Musical	61	46	75.41%	8	13.11%	5	8.20%	2	3.28%	0	0.00%	0	0.00%	0	0.00%
10	Michael McIntyre on Google Earth Michael McIntyre's Comedy Roadshow BBC Comedy Greats	Comedy	56	42	75.00%	9	16.07%	1	1.79%	4	7.14%	0	0.00%	0	0.00%	0	0.00%

This sentiment analysis is based on BERT's pre-trained model (GoEmotions).

<https://github.com/monologg/GoEmotions-pytorch>

GoEmotions: A Dataset of Fine-Grained Emotions

<https://arxiv.org/pdf/2005.00547.pdf>

In every video, '**neutral**' accounted for more than 60%.

The emotions of '**sadness**', '**fear**' and '**disgust**' accounted for less than 5%.

2-1. Perform sentiment analysis on each sentence of a youtube video (Reference) Youtube videos to use for this project

week5

	Title	Category	Number of sentences	neutral		joy		surprise		anger		sadness		fear		disgust	
				#N	%	#N	%	#N	%	#N	%	#N	%	#N	%	#N	%
1	Why I Don't Use A Smart Phone Ann Makosinski TEDxTeen	TED	209	129	61.72%	52	24.88%	17	8.13%	6	2.87%	4	1.91%	1	0.48%	0	0.00%
2	How to speak so that people want to listen Julian Treasure	TED	228	145	63.60%	41	17.98%	16	7.02%	17	7.46%	7	3.07%	0	0.00%	2	0.88%
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			61	46	75.41%	8	13.11%	5	8.20%	2	3.28%	0	0.00%	0	0.00%	0	0.00%
9	Smallwood Parsons		61	42	75.00%	9	16.07%	1	1.79%	4	7.14%	0	0.00%	0	0.00%	0	0.00%
10	Michael McIntyre on Google Earth Michael McIntyre's Comedy Roadshow BBC Comedy Greats	Comedy	56		69.80%		15.95%		5.75%	118	4.78%	66	2.67%	19	0.77%	7	0.28%

What's next?

- I will try to find other videos to balance the emotions.(especially, sadness, fear and disgust)
- I will reduce the number of 'neutral' before data analysis(training) to balance the emotional categories.

This sentiment analysis is based on BERT's pre-trained model (GoEmotions).

<https://github.com/monologg/GoEmotions-pytorch>
GoEmotions: A Dataset of Fine-Grained Emotions
<https://arxiv.org/pdf/2005.00547.pdf>

In every video, 'neutral' accounted for more than 60%.

The emotions of sadness, fear and disgust accounted for less than 5%.

2-2. from the head, extract facial feature points

I will use OpenFace which has close to human accuracy and allows me to get the facial feature 128-dimensional representation.

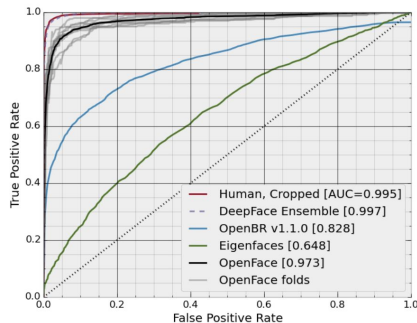


Figure 8: ROC curve on the LFW benchmark with area under the curve (AUC) values.



2-3. Data collection procedure and modules

week5

step	Action item	Manual/Automatic	Modules (ipynb, sh)
1	Find a Youtube video	Manual	-
2	Download the video	Automatic	01_youtube_downloader.ipynb
3	Get subtitles for the video and paste them into Excel	Manual	-
4	Organise start times and sentences on one line in Excel	Automatic	02_organized_excel_file.ipynb
5	Find the end time and the difference (end time - start time)	Automatic	03_adding_time_information.ipynb
6	Looking for emotion in every sentence	Automatic	04_emotion_extraction_from_subtitles.ipynb
7	Cut out videos (mp4, avi) using playing time and differences	Automatic	05_ffmpeg.ipynb
8	Extract facial feature points from the head using OpenFace	Automatic	06_run_openface.ipynb , run_openface.sh
9	Data pre-processing	Automatic	To be updated
10	Merge csv files output by OpenFace	Automatic	08_openface_result_merged.ipynb
11	Extract body pose points from the head using OpenPose	Automatic	To be updated
12	Data pre-processing	Automatic	To be updated
13	Merge csv files output by OpenPace	Automatic	To be updated
14	Merge csv files output by OpenFace and OpenPace	Automatic	To be updated

2. Summary of work done & results this week

2-1. Extracted body pose feature points from the body using OpenPose

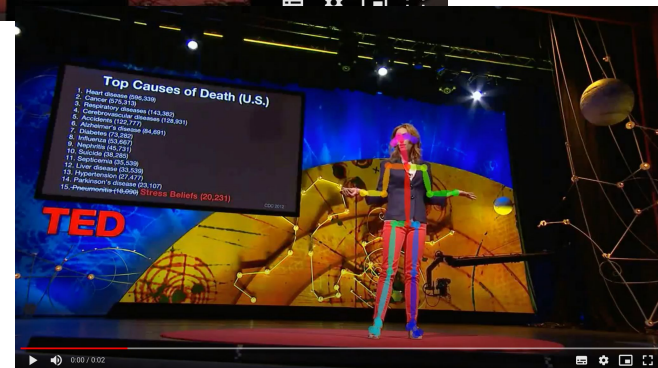
2-2. Created the model and predicted emotions from facial features.

2-3. Dissertation: I have written a draft version of Chapter 1 ([Introduction part](#)).

→ we will look at 'Time plan for writing my dissertation'

2-1. Extracted body pose feature points from the body

I will use OpenPose which has represented the first real-time multi-person system to jointly detect human body, hand, facial, and foot keypoints (in total 135 keypoints) on single images.



2-1. Extracted body pose feature points from the body

Output example

<https://drive.google.com/drive/folders/1wZNmikjedBjwPyTCUARVbabgZhJq0fMS>

2-2. Created the model and predicted emotions from facial features.

I predicted emotions from facial features using `LogisticRegression()`.

Model	accuracy
<code>LogisticRegression()</code>	0.6858

What's next?

1. I will try to use other models (`RandomForestClassifier()`, `GradientBoostingClassifier()`, `AdaBoostClassifier()`, `SVC()`, `LinearSVC()`) to get the accuracy. + NN
2. I will do feature selection.
3. I will do data pre-processing.

Time plan for writing my dissertation

Chapter	What should I write?		Nov					Dec	My Progress
			1	8	15	22	29	6	
	Level 1	Level 2	week5	week6	week7	week8	week9	week10	Status
1	Introduction							Buffer	Draft
		• Briefly explain the context of the project problem							Draft
		• Specify overall aim and objectives and report structure							Draft
2	Analysis/ Requirements								Draft
		• Problem Statement							Draft
		• Background Survey/Analysis							Draft
		• Effectively combine above in one chapter							Draft
3	Design & Implementation								-
		• Discuss the main features of your design and how it evolved							-
		• In your implementation part							-
4	Testing&Evaluation								-
		• Describe how you evaluated your solution/product							-
		• Summarise the evaluation results, and use them to critically evaluate your own work							-
		• Be honest about any shortcomings							-
5	Conclusion								-
		• Describe the status of your research/product							-
		• Summarize what you have achieved							-
		• Compare to what you originally set out to achieve							-
		• Relate your work to relevant previous work							-
		• Suggest further/future work that you think would be worthwhile							-
6	Bibliography								-
		• List, in alphabetical order by author and date, all articles that you have consulted							-
		• Use consistent style							-
		• Collect all the details when you access a document first							-

3. Questions to be discussed during the meeting

3-1. Is it better to predict emotions on **a frame-by-frame basis**? Or should it be done on **a sentence(= several frames)-by-sentence basis**?

→ In the future, I would like to predict emotion based on facial expressions and posture features in **a sentence**.

if frame-by-frame

3-2a. What kind of model is available for sentence-by-sentence prediction?

→ LSTM, Transformer

if sentence-by-sentence

3-2b. How is the data pre-processing for frame-by-frame prediction?

→ read research paper

4. Proposed objectives for next week

4-1. I will visualize data for feature selection

e.g.

1. Find features that are correlated with emotion (heat maps)
2. Get the variance and standard deviation for each emotion

4-2. I will conduct data pre-processing to facial feature points.

e.g.

1. Reduce the bias of the emotional categories (less neutral, more sadness)
2. Turn the face of the video to the front (turn a sideways face to the front)
3. Calculate the amount of change (movement) of the face coordinates and add it to the feature set.

4-3. Dissertation: Chapter 2 and Chapter 3

5. Articles read this week

5-1. Analysis of Emotion Recognition using Facial Expressions, Speech and Multimodal Information

<https://dl.acm.org/doi/10.1145/1027933.1027968>

End