

# MSc Project 2021

Title: Estimating personality in communication  
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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								Finished			
	5-1. Predict (A) from (B) body pose			5-1								Finished			
	5-2. Predict (A) from (C) facial feature points			5-2								Finished			
	5-3. Predict (A) from (B) body pose + (C) facial feature points			5-3			Improving the accuracy of the model!				Finished				
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						Running			
7	Write a paper					7						Running			

# 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								Running
		• Discuss the main features of your design and how it evolved							Running
		• In your implementation part							Running
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							-

# Research Steps (Updated on week 5)

week6

## Data Preparation

1-1. capture a dataset that contains people talking and the text of what they say.



Youtube



【Updated on week3】  
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

## Implementation (Using a pre-trained model)

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



①

Positive/  
Negative

【Updated on week3】  
Use as training data

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 week5】  
I will predict the emotion frame by frame first.  
If I have time, I will predict the emotion in  
sentences. (Using LSTM or Transformer)

【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

## Evaluation

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

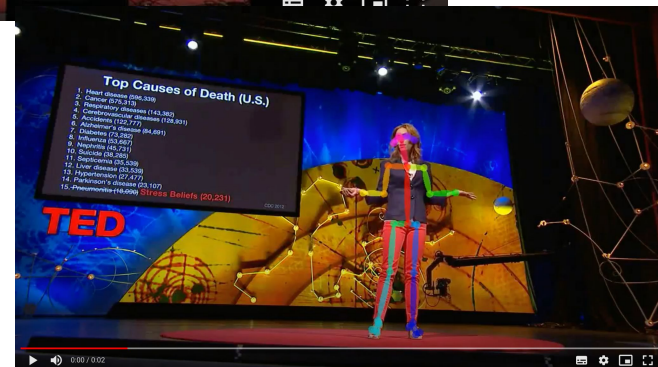
1-1. Extracted body pose feature points from the body using OpenPose

1-2. Created the model and predicted emotions from facial features

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

# 1-1. 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.



1-2. Created the model and predicted emotions from facial features.

I predicted emotions from facial features using LogisticRegression().

Model	accuracy
LogisticRegression()	0.6858

### **What's next?**

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

## 2. Summary of work done & results this week

2-1. Using Pytorch, I have created the following models to predict emotions

1. Facial features (OpenFace)
2. Body Pose features (OpenPose)
3. Facial features + Body Pose features (OpenFace + OpenPose)

2-2. Dissertation: I have written a draft version of Chapter 2 ([Analysis/Requirements part](#))



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

I predicted emotions from facial features and body pose features using LogisticRegression() and Pytorch. (but I didn't conduct features selection yet.)

Model	Accuracy	
	LogisticRegression()	Pytorch, model? <span>NEW</span>
OpenFace	0.686	0.684 <span>NEW</span>
OpenPose	0.720 <span>NEW</span>	0.044 <span>NEW</span>
OpenFace+OpenPose	0.821 <span>NEW</span>	0.043 <span>NEW</span>

### What's next?

1. Collecting videos (to reduce variability in emotional categories)
2. Data pre-processing (to reduce variability in emotion categories, to generate new features)

### 3. Questions to be discussed during the meeting

3-1. Do you have any advice on building a model of Pytorch?

→ I will look for some papers about Pytorch. document, tutorial

## 4. Proposed objectives for next week

no 4-1. Collecting videos (to reduce variability in emotional categories)

4-2. Data pre-processing (to reduce variability in emotion categories, to generate new features)

4-3. Improving prediction accuracy

4-4. Dissertation: Chapter 3

## 5. Articles read this week

5-1. Recognizing Emotions Expressed by Body Pose a Biologically Inspired Neural Model

<https://www.sciencedirect.com/science/article/pii/S0893608008000944>

5-2. Converting text into agent animations: assigning gestures to text

<https://dl.acm.org/doi/10.5555/1613984.1614023>

5-3. Emotion Recognition Based on Physiological Changes in Music Listening

[https://www.researchgate.net/publication/23456155\\_Emotion\\_Recognition\\_Based\\_on\\_Physiological\\_Changes\\_in\\_Music\\_Listening](https://www.researchgate.net/publication/23456155_Emotion_Recognition_Based_on_Physiological_Changes_in_Music_Listening)

End

## 2-3. Data collection procedure and modules

week6

step	Action item	Manual/Automatic	Modules (ipynb, sh)
1	Find a Youtube video	Manual	-
2	Download the video	Automatic	<a href="#">01_youtube_downloader.ipynb</a>
3	Get subtitles for the video and paste them into Excel	Manual	-
4	Organise start times and sentences on one line in Excel	Automatic	<a href="#">02_organized_excel_file.ipynb</a>
5	Find the end time and the difference ( <b>end time - start time</b> )	Automatic	<a href="#">03_adding_time_information.ipynb</a>
6	Looking for emotion in every sentence	Automatic	<a href="#">04_emotion_extraction_from_subtitles.ipynb</a>
7	Cut out videos ( <b>mp4, avi</b> ) using playing time and differences	Automatic	<a href="#">05_ffmpeg.ipynb</a>
8	Extract facial feature points from the head using OpenFace	Automatic	<a href="#">06_run_openface.ipynb</a> , <a href="#">run_openface_videoXX.sh</a>
9	Data pre-processing	Automatic	To be updated
10	Merge csv files output by OpenFace	Automatic	<a href="#">08_openface_result_merged.ipynb</a>
11	Extract body pose points from the head using OpenPose	Automatic	<a href="#">09_run_openpose.ipynb</a> , <a href="#">09_jsontocsv.ipynb</a> , <a href="#">run_openpose_videoXX.sh</a>
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

# 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	<a href="#">Why I Don't Use A Smart Phone   Ann Makosinski   TEDxTeen</a>	TED	209	129	61.72%	52	24.88%	17	8.13%	6	2.87%	4	1.91%	1	0.48%	0	0.00%
2	<a href="#">How to speak so that people want to listen   Julian Treasure</a>	TED	228	145	63.60%	41	17.98%	16	7.02%	17	7.46%	7	3.07%	0	0.00%	2	0.88%
3	<a href="#">How to spot a liar   Pamela Meyer</a>	TED	405	288	71.11%	53	13.09%	18	4.44%	32	7.90%	12	2.96%	2	0.49%	0	0.00%
4	<a href="#">Robert Waldinger: What makes a good life? Lessons from the longest study on happiness   TED</a>	TED	212	148	69.81%	32	15.09%	18	8.49%	1	0.47%	12	5.66%	1	0.47%	0	0.00%
5	<a href="#">How to make stress your friend   Kelly McGonigal</a>	TED	284	178	62.68%	71	25.00%	20	7.04%	6	2.11%	5	1.76%	4	1.41%	0	0.00%
6	<a href="#">How to Get Your Brain to Focus   Chris Bailey   TEDxManchester</a>	TED	306	227	74.18%	41	13.40%	18	5.88%	11	3.59%	7	2.29%	0	0.00%	2	0.65%
7	<a href="#">Funniest Moss Moments   The IT Crowd   Part 1</a>	Drama	182	130	71.43%	21	11.54%	10	5.49%	11	6.04%	7	3.85%	1	0.55%	2	1.10%
8	<a href="#">10 Hilarious Comedy Bits of Series 10   Live at the Apollo   BBC Comedy Greats</a>	Comedy	527	391	74.19%	66	12.52%	19	3.61%	28	5.31%	12	2.28%	10	1.90%	1	0.19%
9	<a href="#">That Song In Every Musical That No One Likes - Sarah Smallwood Parsons</a>	Musical	61	46	75.41%	8	13.11%	5	8.20%	2	3.28%	0	0.00%	0	0.00%	0	0.00%
10	<a href="#">Michael McIntyre on Google Earth   Michael McIntyre's Comedy Roadshow   BBC Comedy Greats</a>	Comedy	56	42	75.00%	9	16.07%	1	1.79%	4	7.14%	0	0.00%	0	0.00%	0	0.00%
					69.80%		15.95%										
			2470	1724	%	394	%	142	5.75%	118	4.78%	66	2.67%	19	0.77%	7	0.28%

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%.