

Depression Detection

- Week 10

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Duration of the presentation: ~10 minutes

Agenda

1. Data Augmentation

1. Methodology per the paper
2. Results on Yuxin's code

2. Statistical Analysis: Chi-Square Test

3. Statistical Analysis: T-Test on Linguistic Metrics

4. PCA Visualization

5. Transformer-based Model

6. Tentative plan for next week

Data Augmentation

[1] Context-aware Deep Learning for Multi-modal Depression Detection (Lam et al, 2019) | [Paper](#) | [Code](#)

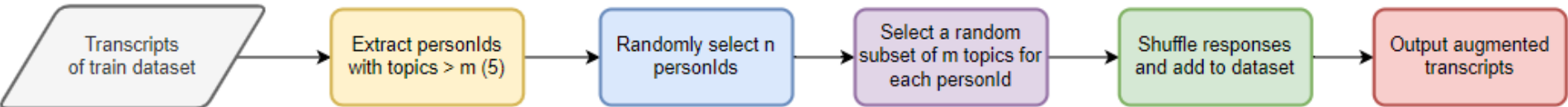


Fig 1: Method followed for data augmentation in line with [1]

Table 1: Dataset distribution after Augmenting

	Train	Dev	Test	Total
Original	107	35	47	189
Augment	307	35	47	389

Table 2: Results on Yuxin's code

	Precision	Recall	F1	Accuracy
Transcripts	0.63	0.67	0.65	0.66
Question based	0.62	0.64	0.63	0.62
Augmented	0.70	0.58	0.63	0.67

Statistical Analysis – Chi Square Test

Table 3: Observed Values per the DAIC-WOZ dataset

Gen / Dep	ND	D	Total
Female	56	31	87
Male	77	25	102
Total	133	56	189

Table 4: Expected values for each category

Gen / Dep	ND	D	Total
Female	61.22	25.78	87
Male	71.78	30.22	102
Total	133	56	189

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Calculated $\chi^2 = 2.7833$
Table Value = 3.841 ($\alpha = 0.05$)

χ^2 = chi squared

O_i = observed value

E_i = expected value

Statistical Analysis – T test on Linguistic Metrics

- T test is used to verify if there is a statistical difference between the means of 2 groups
- In our case, it is used to test if there is a difference between the means of the depressed and non-depressed classes for each linguistic attribute.

Table 5: P values for different linguistic attributes

Attribute	P-Value
Pronoun	0.035
Absolutist	0.313
Laugh	0.754
Um	0.803
sniffle	0.564
sigh	0.596
Depressive words	0.016
Negative words	0.009
Positive words	0.461

PCA Visualization

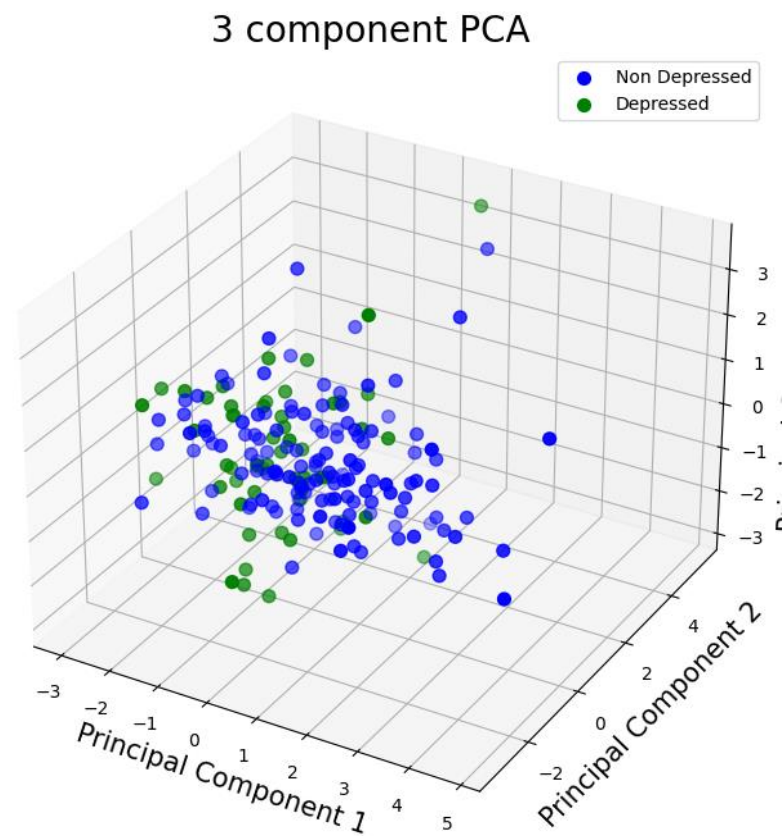
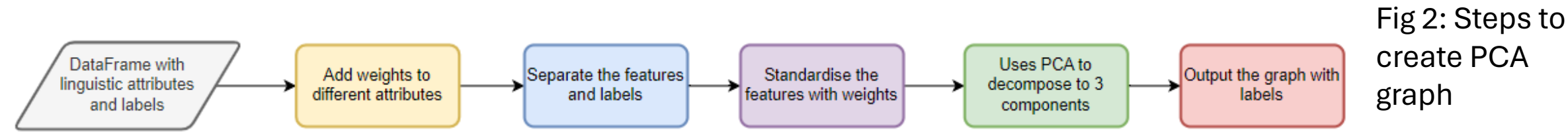


Table 6: weights for attributes

Attribute	Weight
Pronoun	2
Absolutist	1
Laugh	1
Um	1
sniffle	1
sigh	1
Depressive words	3
Negative words	4
Positive words	1

Fig 3: 3 component PCA visualisation

Transformer based Model

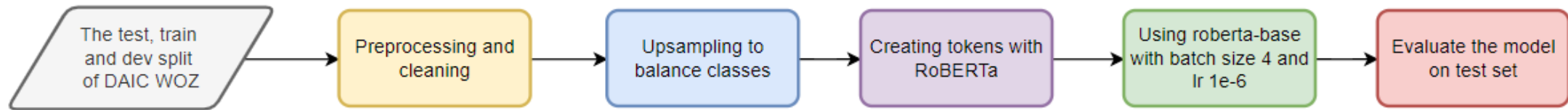


Fig 4: Steps in the transformer model

	Precision	Recall	F1	Accuracy
Topic Based	0.65	0.53	0.59	0.63
Augmented	0.70	0.58	0.63	0.67

Table 7: Results of running the model on different datasets

Tentative Plan

Plan for next week

1. Collaborating with Ankit to find relevant features for PCA
2. Building and iteratively improving upon a model

Relevant Links

1. Overall project plan and timeline: [Link](#)
2. Analysis and notes from relevant papers: [Link](#)
3. GitHub documenting everyone's presentations and codes: [Link](#)

End

