

# Dr. Summarize: Global Summarization of Medical Dialogue by Exploiting Local Structures.

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## 1 Supplementary Material

### 1.1 Hyperparameters

The key hyperparameters introduced are the weighting factors used on the additional loss terms  $\lambda_m$ ,  $\lambda_n$  and  $\delta$  which were used to weight the concept, negation and  $p_{\text{gen}}$  loss were set at 1.0, 0.1 and 1.0 to scale the contribution of those terms to be roughly within the same range. For experiments with 3M models,  $\gamma$  the weight on the L1 loss term used to supervise  $p_{\text{neg}}$  was set at 2.0. While the  $p_{\text{neg}}$  supervision reduced the contributions of the other loss terms we found scaling up the other weights didn't have a material impact on the quantitative and qualitative performance. For simplicity we retained the same hyperparameters for all the models and runs. The bounds for each hyperparameter can be varied within an order of magnitude without significantly impacting the qualitative or quantitative metrics.

**DR:** what was your last period date ?

**PT:** feb 9th to 13th I have an average cycle of about 32-33 days.

**DR:** are/were you on any hormonal form of birth control apart from plan b?

**PT:** no

**DR:** Thanks for letting me know.

**DR:** how regular are your cycles usually?

**PT:** they can sometimes be off by a couple day's, give or take because i have hypothyroidism and am taking synthroid. but as of lately with my last two cycles, they had predicted to the day or a day late.

**DR:** okay . Is this the first time you are missing period this late?

**PT:** no . I've had it be late by two weeks and even have missed it twice.

**DR:** okay. Have you been trying to lose weight?

**PT:** I've been watching what I've been eating, so yes .

**DR:** any recent change in your physical activity?

**PT:** no

**DR:** when was the last time you had your thyroid panel checked/tested ?

**PT:** just last week. everything is as normal as can be.

**DR:** that's great to know.

### **Model Output Summary**

- period date feb 9th to 13th. average cycle of about 32-33 days
- no hormonal form of birth control apart from plan b.
- they can sometimes be off by a couple day. has hypothyroidism and am taking synthroid. has predicted to the day or a day late.
- had it be late by two weeks and even have missed twice.
- trying to lose weight. been watching what is eating, so yes.
- no recent change in physical activity
- had thyroid panel checked/tested just last week. everything is as normal.

### **Reference**

- last menstrual period is february 9th-13th. has average cycles of 32-33 days.
- not on hormonal form of birth control apart from plan b.
- cycles may be off by a couple days because of hypothyroidism and is taking synthroid. since last 2 cycles they are predicted to the day or a day late.
- not the first time missing period. has it late by 2 weeks and even missed it twice.
- is watching what he or she eats to loose weight.
- no recent chnages in physical activity.
- checked thyroid panel last week and everything is normal.

Figure 1: Example Medical Dialogue and Output Model Summary.

**DR:** For a while as in few weeks or months?

**PT:** I noticed it maybe a month ago I don't look at my chest that often because I've got a lot of dysphoria so I'm not really sure how long it 's been there

**DR:** and is it increasing in size?

**PT:** it's pretty big already so I can't tell

**DR:** Thank you. Are you able to hold the lump under skin with your two fingers?

**PT:** not really it seems attached to my sternum or whatever is under there

**DR:** How long have you been lifting heavy weights?

**PT:** like a month, I took a break this week though

**DR:** thanks for letting me know. Is this the first time you are lifting heavy weights?

**PT:** I haven't excersized since high school so yeah it's been like 10 years

**DR:** Alright. Does anything make the lump smaller or bigger? Say, for example, bending down, taking deep breaths, pressing on it, etc?

**PT:** the visibility of the lump changes when I move around but not necessarily the size in general

### **Model Output Summary**

- noticed it maybe a month ago . don't look at chest that often because 've got a lot of dysphoria. not sure how long it's been there in months .
- it's pretty big in size. can't tell it 's so increasing in size.
- not able to hold the lump under skin with two fingers. seems attached to sternum, whatever is under there
- lifting heavy weights a month , took break this week
- haven't excersized since high school and it 's been like 10 years.
- lump changes when move around but not necessarily the size in general.

### **Reference**

- noticed it a month ago . does not look at chest often because has dysphoria. not sure how long it has been there.
- it is pretty big and can not tell if it is increasing in size.
- not able to hold the lump under skin with two fingers. it seem attached to sternum.
- is lifing heavy weights since a month . took a break this week.
- has not exercised since high school. lifted heavy weights after 10 years.
- no change in lump size in general but visibility changes with moving around.

Figure 2: Example Medical Dialogue and Output Model Summary.

Models	Metrics		
	Negation F1	Concept F1	ROUGE-L F1
2M-BASE	71.2±1.4	70.2±1.1	53.2±1.4
2M-PGEN	76.9±0.5	72.2±0.9	55.4±0.6
2M-PGEN-NEG	74.4±2.6	71.3±1.5	54.4±1.0
3M-PGEN-NEG-CONCEPT	77.3±2.1	69.3±2.4	53.8±2.9

Table 1: Validation Performance

<p><b>DR:</b> Hi this is Dr. Cole and I am board certified in internal medicine. I am happy to help address your health concerns today. I have reviewed your chart and am wondering if you have anything to add or any specific questions for me?</p> <p><b>PT:</b> not for now. just the extreme fatigue and general feeling of being “off” nice to meet you.</p> <p><b>DR:</b> I am sorry you are experiencing this. Why are you taking propranolol?</p> <p><b>PT:</b> it was for migraines but I stopped taking it on tuesday I’m sorry, stopped taking it tuesday*</p>
<p><b>Model Output Summary</b></p> <ul style="list-style-type: none"> <li>• not for now. just the extreme fatigue and general feeling off”.</li> <li>• taking propranolol for migraines but stopped taking it on tuesday . stopped taking it tuesday*</li> </ul>
<p><b>Reference</b></p> <ul style="list-style-type: none"> <li>• has extreme fatigue and general feeling of being off.</li> <li>• taking propranolol for migraines and stopped taking it tuesday.</li> </ul>

Figure 3: Example Medical Dialogue and Output Model Summary.

Snippet	2M-BASE	3M
DOCTOR: do you have chest pain while coughing? PATIENT: yes and breathing. pretty much all the time	<b>no chest pain</b> while coughing. pretty much all time.	<b>has chest pain</b> while coughing a and breathing.
DOCTOR: did you take any medication for it? PATIENT: no	<b>took medication</b> for it.	<b>[NO] not taking any medication</b> for it

Table 2: Improvements on Negatives and Affirmatives with 3M compared to 2M-BASE