

# MentSum: A Resource for Exploring Summarization of Mental Health Online Posts

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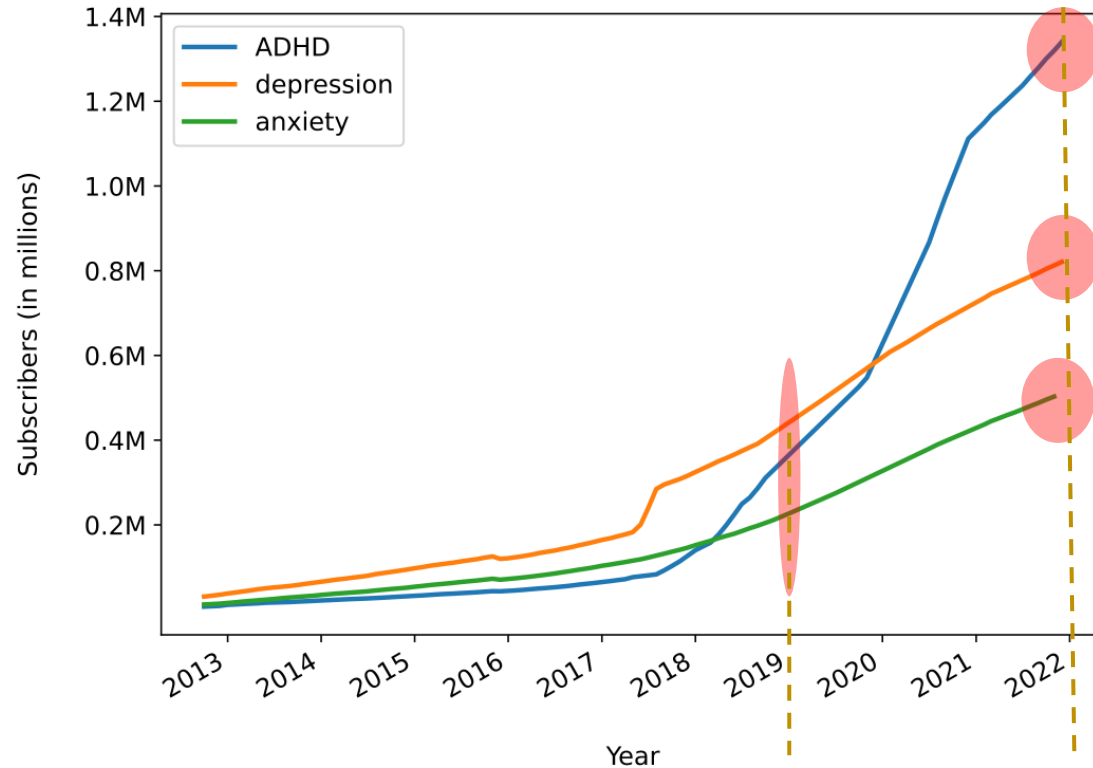
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GEORGETOWN UNIVERSITY

# Mental Health; a global challenge for many years...





## What a user's mental health post addresses?

It may address issues of concerns or an elaboration of the user on the situation



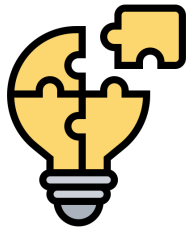
## Reading time?

Longer posts take more time from counselors to read, leading to fatigue or delay in response

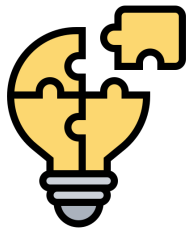


## What a mental health post summary offers?

A short yet informative summary of user's post provides the counselors with the important information before reading the details.



## Can we create an informative and concise summary of mental health posts?



# Can we create an informative and concise summary of mental health posts?

## User's Post

Out of all the time I've been on this earth which isn't very long considering the fact that I'm a teen **I've always been an over achiever.** [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] School has been stressing me out so much lately to the point where those expectations for myself have gotten even higher. I want to rip my hair out everytime **I see my grades and my mind immediately jumps to suicide.** I know it's a stupid thing to **get suicidal** over but I just can't help it. [REDACTED]  
[REDACTED] and they've all told me to stop being so hard on myself and that it isn't the end of the world if I get a few low grades but to me it quite literally is the end of the world.

## Generated TLDR Summary

been an **over achiever** and i'm constantly **failing at school** and **it's making me want to kill myself.**

Goal:

**Reducing counselor's reading time**

Need Dataset with **Gold:**

I just **feel so invalid and inadequate all the time because of my grades** and it sucks [REDACTED]  
[REDACTED] but none of them seem to get it . I legit can't help it .  
**[Missing: Suicide thoughts]**





The data comes from Reddit's mental health discussion forums



Using Pushshift repository to download Reddit's data dumps



Filtering them to include mental health-related posts



Separating user's post and summary based off **TLDR-style keywords**.



Regular expression beginning with uncased "TL", ending with uncased "DR", and up to 3 chars in-between.

User's Post

~~~~~  
~~~~~  
~~~~~  
~~~~~  
~~~~~  
~~~~~  
~~~~~  
~~~~~



...  
TLDR  
tl-dr  
TL;DR  
TL;Dr  
tl;;dr  
...



Post's Summary

~~~~~  
~~~~~  
~~~~~  
~~~~~

**TLDR-style keywords**

# MentSum dataset statistics

(Users' posts and human written summaries)

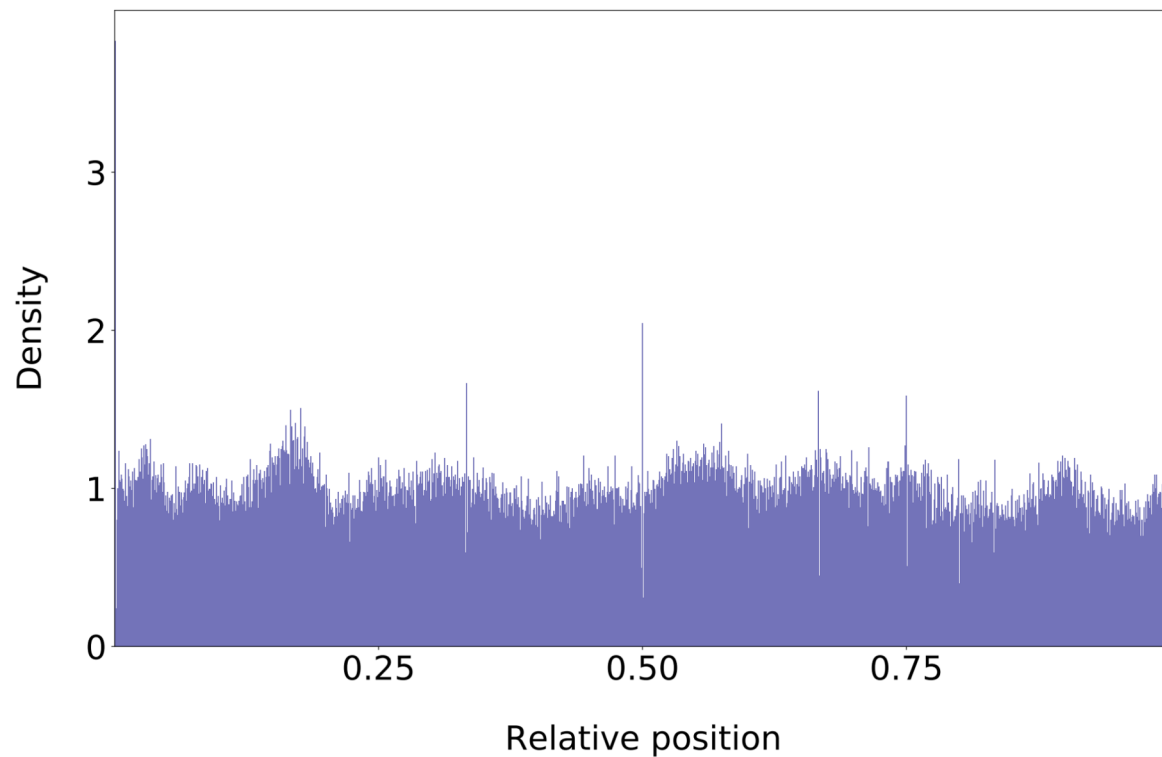
|                                     |                   |
|-------------------------------------|-------------------|
| Dataset size                        | 24,119 posts      |
| Training set size                   | 21,695 posts      |
| Subreddit coverage                  | 43 subreddits     |
| Average post length (word/sent.)    | 327.5 / 16.9      |
| Min post length (word/sent.)        | 50 / 1            |
| Max post length (word/sent.)        | 2,979 / 192       |
| Median post length (word/sent.)     | 267.0 / 14.0      |
| Average TLDR length (word/sent.)    | 43.5 / 2.6        |
| Min TLDR length (word/sent.)        | 15 / 1            |
| Max TLDR length (word/sent.)        | 596 / 36          |
| Median TLDR length (word/sent.)     | 35.0 / 2.0        |
| Average sentence length (post/TLDR) | 19.4 / 18.3 words |
| Median sentence length (post/TLDR)  | 17.0 / 16.0 words |
| Compression ratio (average)         | 7.5               |

|                                  |              |
|----------------------------------|--------------|
| Total vocabulary size            | 76,411 words |
| Occurring 10+ times              | 17,486 words |
| Training vocabulary size         | 49,037 words |
| Validation vocabulary size       | 13,609 words |
| Test vocabulary size             | 13,765 words |
| Training/Test vocabulary overlap | 91.4%        |

Vocabulary statistics over distinct uncased terms.

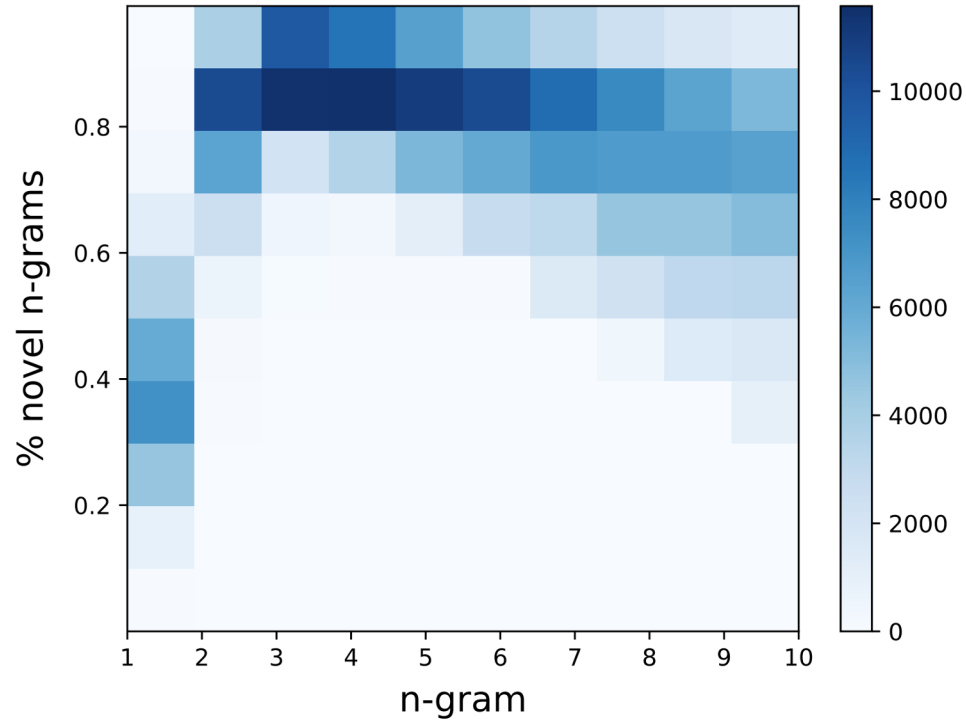


**Data will be available for research  
using Data Usage Agreement!**



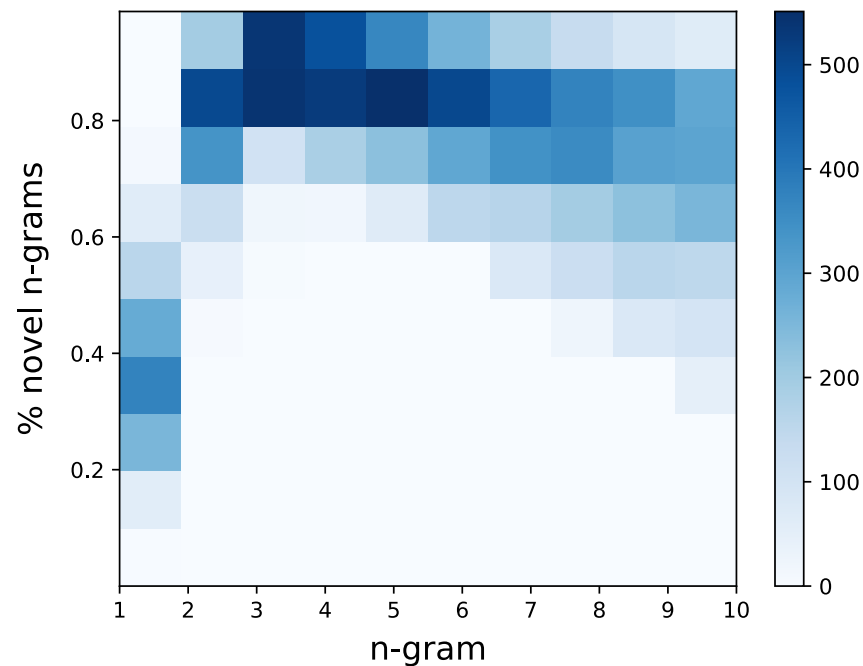
The relative position of word bigrams of the Human-TLDR across users' post in MentSum dataset



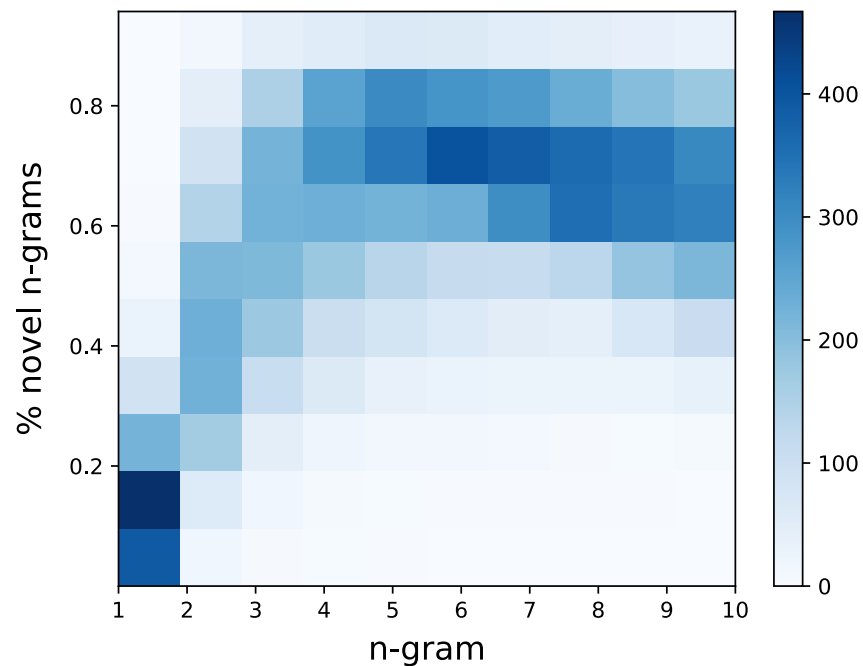


Percentage of novel n-grams in User-written TLDR in respect to users' posts

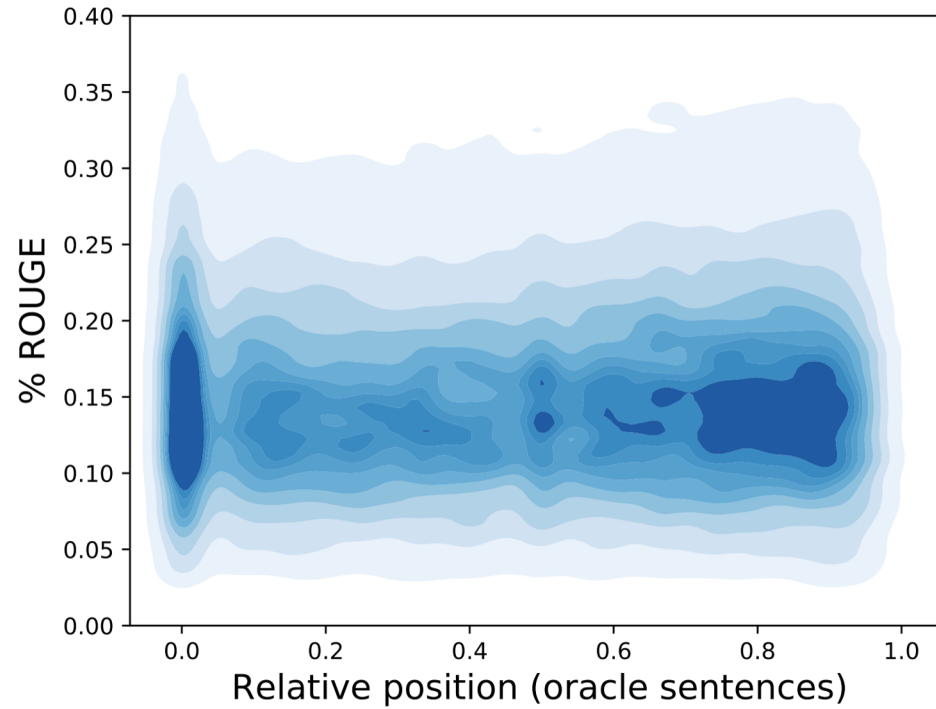
# % of novel n-gram in TLDR summary (test set)



User-written TLDRs



System-generated TLDRs



Kernel density estimation diagram of oracle sentences' relative position and the respective Rouge score of oracle sentences.

# Baseline Results

| Method                               | RG-1         | RG-2        | RG-L         |
|--------------------------------------|--------------|-------------|--------------|
| LEAD-2                               | 20.09        | 3.57        | 13.70        |
| ORACLEEXT                            | 35.98        | 11.59       | 23.21        |
| <hr/>                                |              |             |              |
| LSA (Steinberger and Ježek, 2004)    | 22.96        | 3.98        | 14.50        |
| LEXRANK (Erkan and Radev, 2004)      | 23.21        | 4.42        | 15.19        |
| BERTSUMEXT (Liu and Lapata, 2019)    | 24.64        | 5.83        | 16.66        |
| MATCHSUM (Zhong et al., 2020)        | 26.29        | 6.32        | 17.12        |
| <hr/>                                |              |             |              |
| BERTSUMABS (Liu and Lapata, 2019)    | 25.35        | 6.49        | 17.11        |
| BERTSUMEXTABS (Liu and Lapata, 2019) | 25.75        | 6.80        | 17.48        |
| BART (Lewis et al., 2020)            | <b>29.13</b> | <b>7.98</b> | <b>20.27</b> |

# Qualitative analysis



## Fluency

Is the summary well-written and easy to understand?



## Informativeness

Does the TLDR summary provide useful information (i.e., the most important information) about user's post?



## Conciseness

Does the summary briefly provide comprehensive information (i.e., majority of important information) about user's post?

- 100 randomly picked from test set
- 2 annotators (3<sup>rd</sup> to break a tie) to score (1=worst, 5=best) cases

| System | Fluency     | Info.       | Conc.       |
|--------|-------------|-------------|-------------|
| BART   | <b>4.60</b> | <b>3.65</b> | <b>3.51</b> |
| User   | 4.28        | 3.46        | 3.15        |

Evaluation scores (average)

| System | Fluency | Info. | Conc. |
|--------|---------|-------|-------|
| BART   | 17.4%   | 28.2% | 28.0% |
| User   | 19.5%   | 25.2% | 24.6% |

Agreement rate: moderate

| System | Win rate | Fluency | Info. | Conc. |
|--------|----------|---------|-------|-------|
| BART   | 59%      | 17%     | 64%   | 19%   |
| User   | 41%      | 8%      | 81%   | 11%   |

Distribution of leading criteria for summary selection in evaluation process:

# Sample System-generated Short Summaries, TL;DR

✓ been an **over achiever** and i'm constantly **failing at school** and **it's making me want to kill myself**.

✓ **my friends are ignoring me** for **being closed off and depressed** and i don't know what to do, **i'm on medication** and going to therapy, nothing has worked so far. i've been struggling with a lot of other shit too like **add, adhd, and** [REDACTED]

✗ i **can't** **function normally during the day** because my **head is**  
✓ **clear and i'm "out " my mind**, but once it **gets dark out** my brain turns into a **constant internal struggle**

✗ i think it's better to **not** have a child now than **never having one**.

# Challenges of baseline...

## Fluency

- (-) Complex structure
- (-) Repetition

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I got a scar on my face from a fight **and** people judgment me because of it **and** I ca'nt take it **and** it embarrasses me in public **and** I do'nt know what to do. (complex structure)

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I'm having massive **mood swings** and **mood swings**, I grind my teeth and clench muscles, and i am very snappy and moody during these times. how can I get back to feeling normal? (repetition)

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## Informativeness

- (-) Inference

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User-written TLDR

was diagnosed with **anxiety** [REDACTED]

[REDACTED]

[REDACTED]

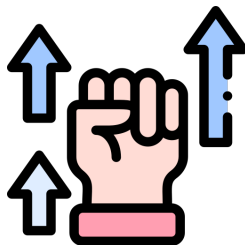
[REDACTED] **Happy hopeful noises**

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System-generated TLDR

diagnosed with **anxiety**, **gad** and **agoraphobia** 7 years ago, been on meds and seeing a psych for a while, now finally going to the dr for help.

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Encouraging to improve the  
baselines!