

# Computational Approaches to Mental Illnesses Detection

Doctoral Program in Computer Science

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- more than **1 in 10 people** were **living with mental health disorders** in 2017, with women being the most affected
- more than **264,000,000** people of all ages **suffer from depression**
- more than **700,000** people **take their own life** every year, and even more people attempt suicide
- 17% of adolescents** had been **involved in self-harm** at least once



With the rise in **social media** use, more people started discussing their mental health problems and seeking support online. This allowed Natural Language Processing and Psychology researchers to use social media data to search for cues of mental illnesses.

## Main objectives

- Contribute to the understanding of the manifestation of mental illnesses in social media
- Find novel features uncovered from the exploratory analysis of texts and from our collaboration with the researchers from psychology
- Provide insights and tools for the psychology community

Mentions of depression symptoms

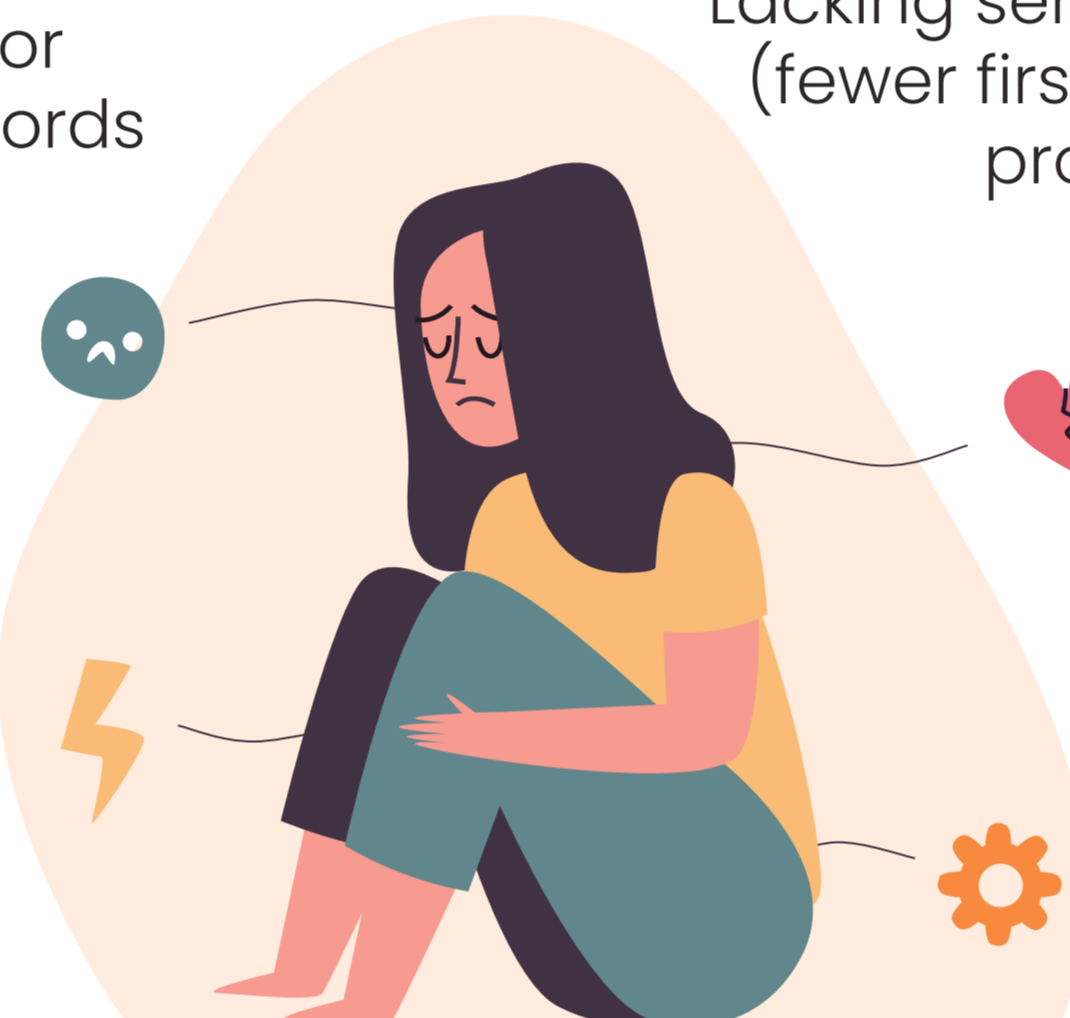
Greater use of negative or absolutist words

Lacking sense of belonging (fewer first-person plural pronouns)

Self-focused attention tendency (greater use of personal pronoun "I")

Rumination (greater use of past tense verbs)

Anhedonia (fewer verbs at future tense)

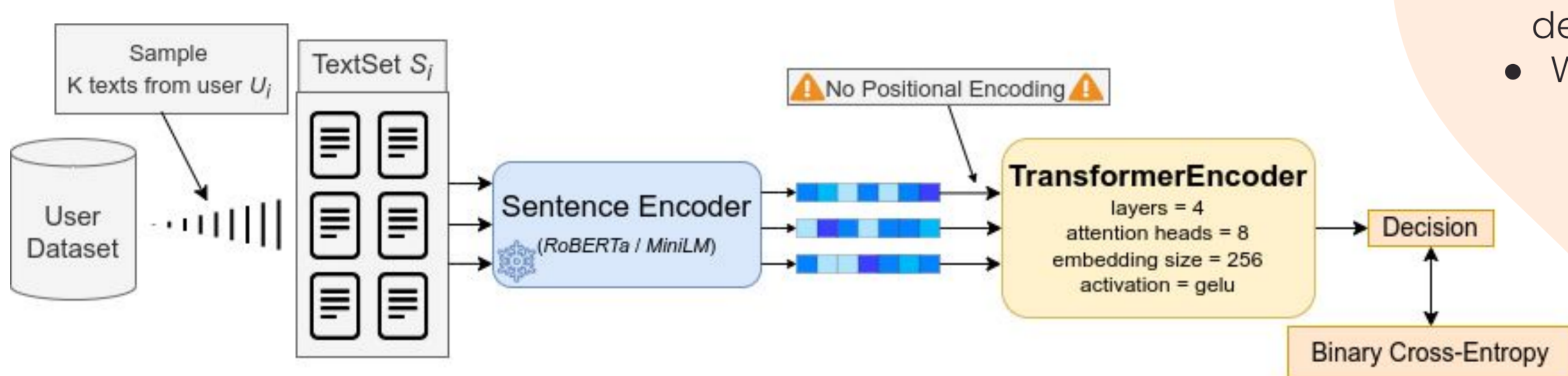
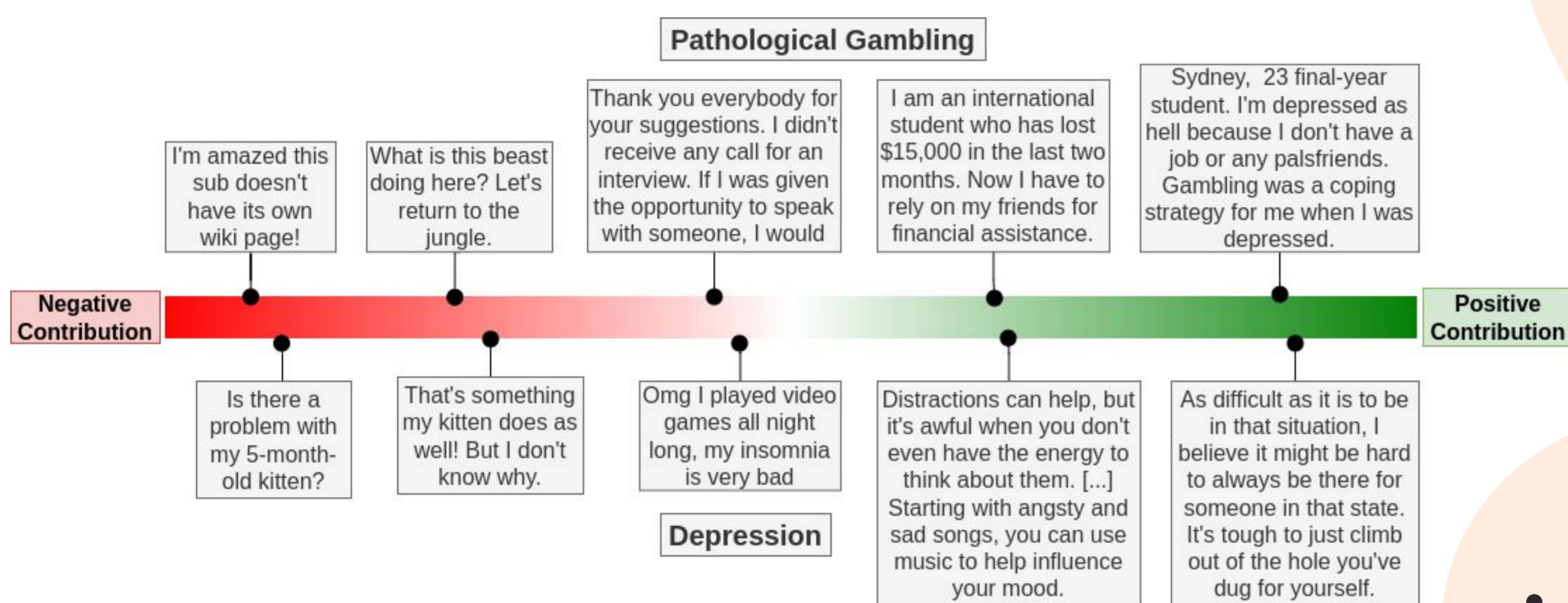


## Exploring the relation between offensive language use and depression

- The first study to apply state-of-the-art offensive language identification to mental health datasets.
- Users with self-reported depression diagnosis are more likely to use offensive language** in their posts compared to the control group.
- Posts from depressed users** or posts containing signs of depression are **less likely to contain targeted offensive language**.

## Pathological gambling and depression detection

- A **transformer architecture for user-level classification** of gambling addiction and depression that is **trainable end-to-end**.
- We filter uninformative posts in a user's history using **Integrated Gradients**.
  - Our method obtains the **best ERDE5** score of 0.015 in the eRisk 2022 Lab from CLEF.



## How much do we understand about the happy moments of depressed individuals?

Depression			Control		
Category	Score	Example words	Category	Score	Example words
FRIENDS	1.81	friend, love, boyfriend, girlfriend, mate, bud, neighbor	TV	1.74	ad, show, movie, tv, actor, video
MUSIC	1.48	song, sing, band, rap, listen, music	BODY	1.21	eye, heal, breath, pregnant, cheek, skin
SLEEP	1.47	night, bed, sleep, dream, woke, nap	MONEY	1.41	fee, owe, rent, bought, pay, invest
FAMILY	1.45	dad, kin, ex, son, great, family, mom	DEATH	1.02	die, dead, decay, dying, ashes, terminate
SEXUAL	1.38	sex, bi, love, stud, fuck, hug	RELIGION	0.99	sin, christ, hell, god, angel, bless
SELF	1.36	I, me, my, we, us, our, mine	SPORTS	0.97	play, game, ski, team, running, sport, exercise

"I've been training regularly with my entire family for 3 months now and I love every bit of it"  
 "I'm with a woman I love and I have really supportive friends and family"  
 "I read a bit from my book and listened to music."

"Knowing I make more money than you does make me happy."  
 "Eating pop corn and seeing movie."  
 "I bought a new controller and worked perfect."  
 "I have been able to increase dead lifts from 70 kg to 100kg."  
 "I killed 5 King Black Dragons."

## Future work

- Work on multimodal social media data for mental illnesses detection
- Gather an extensive Romanian language dataset for mental health problem detection
- Explore the suicide cues found in online data and develop methods for detecting shift to suicide ideation of online users

## References

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