Would tech be able to help?

- Suicide prevention

IST 736 Final Project

Bomin Powers

Suicide is the 12th leading cause of death in the US

More so, suicide is the 2nd leading cause of death for ages 15-29

Source: https://afsp.org/suicide-statistics/

Meta

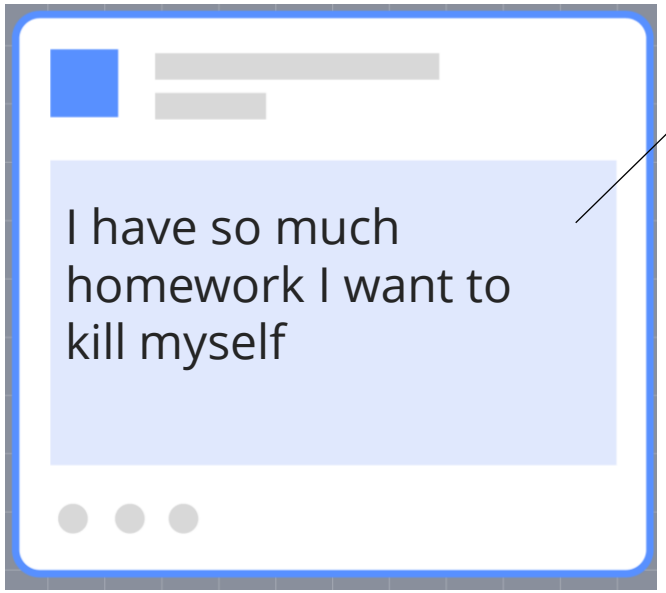
How Facebook AI Helps Suicide Prevention

- Facebook is scanning nearly every post on the platform in an attempt to assess suicide risk.
- Facebook passes the information along to law enforcement for wellness checks.
- The number of Facebook users who see support content for suicide prevention has doubled since the company switched on a detection system.

"We feel like it's very important to get people help as quickly as we possibly can and to get as many people help as we can"

Dan Muriello, a software engineer on Facebook's compassion team

Source: https://www.cnbc.com/2018/02/21/how-facebook-uses-ai-for-suicide-prevention.html



False positive

Comment example - linguistic nuance to consider

potentially less-urgent posts

- Call anytime
- I'm here for you

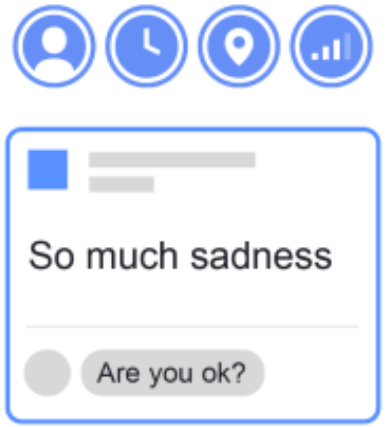
serious cases of people in imminent harm

- Tell me where you are
- Has anyone heard from him/her?

Meta

How text and comment classifiers work

Signals



Post details
e.g. post type, time posted, day posted

Classifiers[1]

Main text classifier

```
{
"so": 0.01,
"much": 0.02,
"sadness": 0.90,
"so much": -0.3,
"much sadness": 0.88,
"so much sadness": 0.99,
"s": 0.02,
"o": 0.04,
"m": -0.01,
"u": -0.09,
...
}
```

0.89[2]

Comment classifier

```
{
...
}
```

0.82[2]

Random forest learning algorithm[3]

Post flagged for additional review

Reviewed by Community Operations

Take Action

Send tips + resources

Escalate to local authorities in serious situations

Meta

Data Source

Text mining on posts in online communities

r/SuicideWatch

r/depression

WordCloud of suicidal and non-suicidal post

Suicidal

non-suicidal

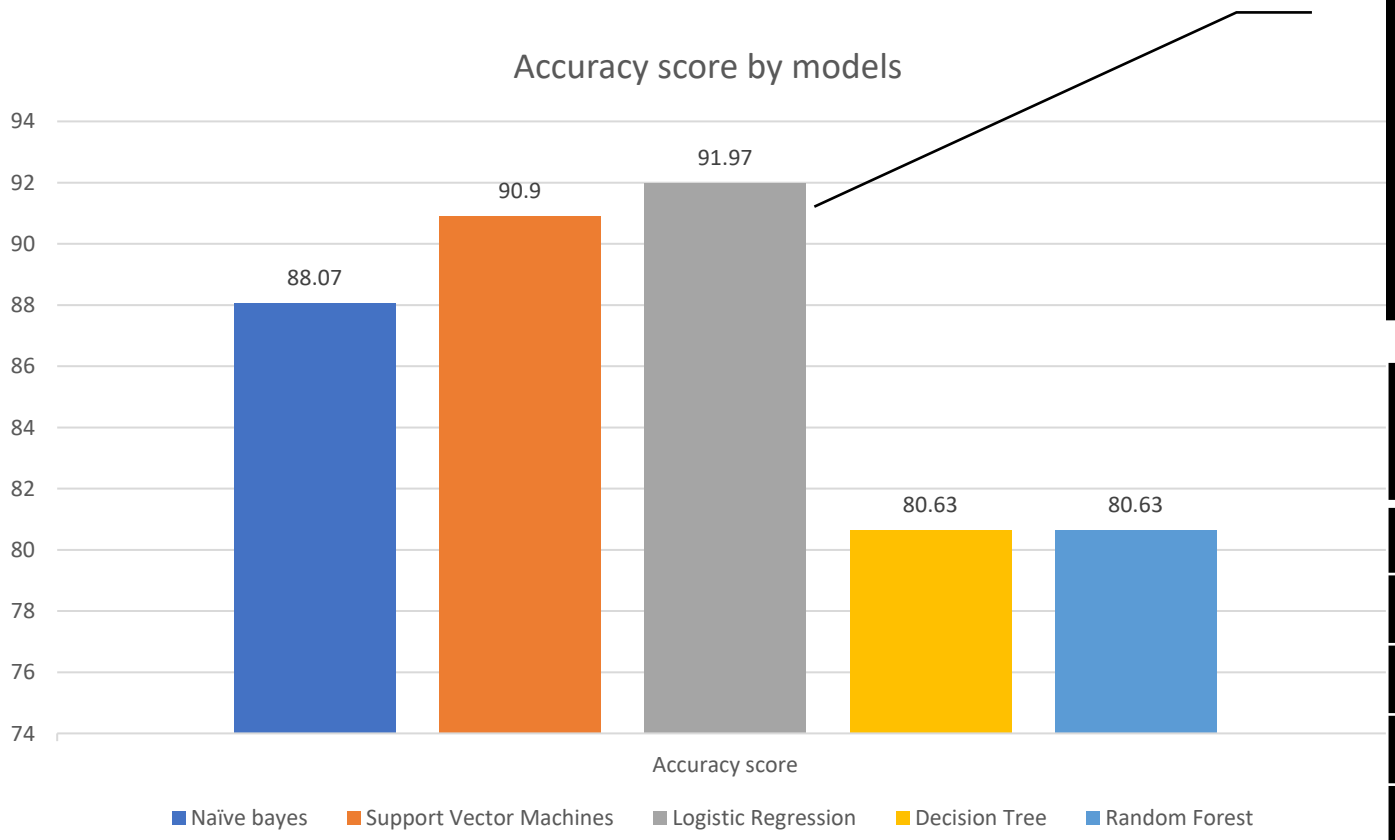
 # top 20 words from the suicidal document

```
1  [('want', 14004),
2   ('feel', 13293),
3   ('like', 11839),
4   ('know', 10811),
5   ('life', 9839),
6   ('think', 8086),
7   ('time', 7311),
8   ('people', 6346),
9   ('year', 6288),
10  ('try', 6070),
11  ('friend', 5941),
12   ('day', 5048),
13   ('get', 4949),
14   ('live', 4876),
15   ('help', 4776),
16   ('tell', 4729),
17   ('kill', 4603),
18   ('good', 4448),
19   ('bad', 4183),
20   ('die', 4178)]
```

 # top 20 words from the non suicidal document

```
1  [('like', 4651),
2   ('know', 2530),
3   ('want', 2316),
4   ('day', 1987),
5   ('jake', 1944),
6   ('paulfuck', 1941),
7   ('think', 1934),
8   ('people', 1930),
9   ('friend', 1831),
10  ('feel', 1754),
11  ('time', 1656),
12   ('get', 1633),
13   ('good', 1611),
14   ('talk', 1377),
15   ('tell', 1317),
16   ('school', 1291),
17   ('year', 1263),
18   ('guy', 1252),
19   ('girl', 1249),
20   ('come', 1228)]
```

Suicide detection models results



Best Fit Model: 91.97% Accuracy
Classification type: Logistic Regression
Solver: liblinear

LR on text data Report	Precision	Recall	F1-score	support
non-suicide	0.898170	0.948464	0.922632	2018.0
suicide	0.944355	0.890515	0.916645	1982.0
accuracy	0.919750	0.919750	0.919750	0.91975
macro avg	0.921263	0.919489	0.919638	4000.0
weighted avg	0.921055	0.919750	0.919665	4000.0

conclusion

- There is always a possibility that AI will misjudge a person at risk of suicide
- "false positive" means that someone is identified as at risk, but it is not. In this case, it implies a mis-attention to someone at risk of suicide
- "false negation," people at risk are not flagged
- The use of technology for detecting suicide risk can be one promising solution. We are able to address many of the limitations of traditional detection and treatment of suicide risk
- However, we must understand that there are risks and still lots of problems that we must solve, such as privacy concerns and ethical issues

Thank you