



SocialScanner



The Problem



50 PERCENT

of Americans will meet the criteria for a diagnosable mental health condition sometime in their life, and half of those people will develop conditions by the age of 14.²

The New York Times

'It's Life or Death': The Mental Health Crisis Among U.S. Teens

Depression, self-harm and suicide are rising among American adolescents. For one 13-year-old, the despair was almost too much to take.

"From 2015 to 2019, prescriptions for antidepressants rose 38 percent for teenagers compared with 15 percent for adults."

DEPRESSION, SUICIDE RATES RISING

"LIFE OR DEATH": THE MENTAL HEALTH CRISIS AMONG U.S. TEENS

CNN

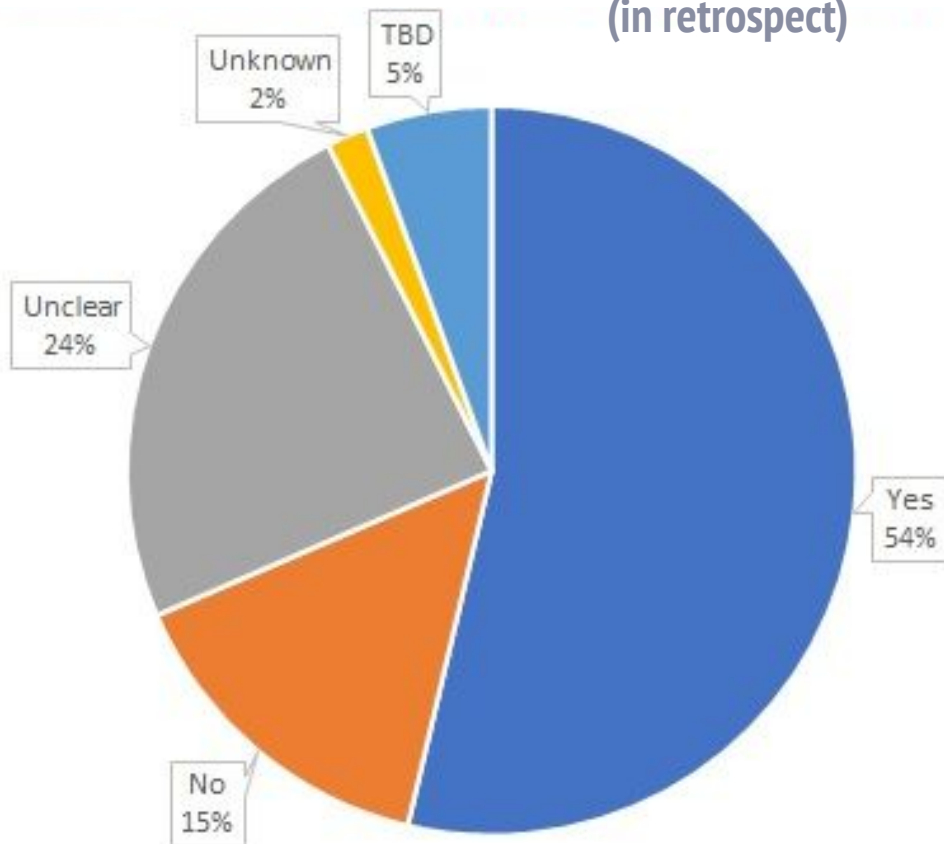
Published April 23, 2022 Updated April 26, 2022

One evening last April, an anxious and free-spirited 13-year-old girl in suburban Minneapolis sprang furious from a chair in the living

SMERCONISH

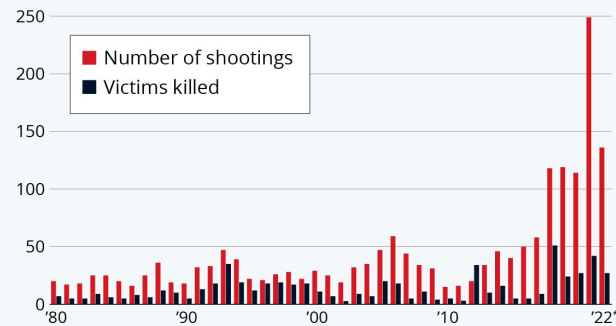


Mental Health Signs for Mass Shooters (in retrospect)



Gunfire on School Grounds Sees Sharp Increase

Number of shootings at K-12 schools
and their victims in the U.S. (1980-2022)



* prior to May 24, 2022

Source: Department of Homeland Defense and Security K-12 Shooting Database

The Washington Post
Democracy Dies in Darkness

More than
370,000
students have experienced gun
violence at school since
Columbine

There have been 404 school shootings since 1999, according to Post data



Research



From ‘broken child’ to mass killer



By [Drew Griffin](#), [Scott Glover](#), [Jose Pagliery](#) and [Kyung Lah](#), CNN

🕒 5 minute read · Updated 8:09 AM EST, Fri February 16, 2018

Some of Cruz’s most alarming behavior was exhibited online.

He had two Instagram accounts featuring weapons and photos. In one picture he is wearing a kerchief over his face and a Make America Great Again hat. Another photo is taken from behind a gun sight looking out the window.

There are online posts in which he writes:

“I wanna shoot people with my AR-15” and “Im going to be a professional school shooter”

The latter post, made with Cruz’s name attached to it, was reported to the FBI. But FBI officials said they were unable to determine who was responsible.

This summer a Nikolas Cruz made an online comment in response to a story about a disgruntled doctor in New York who used an AR-15 to shoot seven people, killing one and wounding six others.

“Man, I can do so much better,” he wrote.

The comment was linked to one of Cruz’s YouTube accounts, which have since been removed in the wake of Wednesday’s shooting.





National Institute
of Mental Health

Transforming the understanding
and treatment of mental illnesses.

What are the signs and symptoms of depression?

If you have been experiencing some of the following signs and symptoms, most of the day, nearly every day, for at least 2 weeks, you may have depression:

- Persistent sad, anxious, or “empty” mood
- Feelings of hopelessness or pessimism
- Feelings of irritability, frustration, or restlessness
- Feelings of guilt, worthlessness, or helplessness
- Loss of interest or pleasure in hobbies and activities
- Fatigue, lack of energy, or feeling slowed down
- Difficulty concentrating, remembering, or making decisions
- Difficulty sleeping, waking too early in the morning, or oversleeping
- Changes in appetite or unplanned weight changes
- Physical aches or pains, headaches, cramps, or digestive problems without a clear physical cause that do not go away with treatment
- Thoughts of death or suicide or suicide attempts





Instagram photos reveal predictive markers of depression

[Andrew G Reece](#)  & [Christopher M Danforth](#) 

EPJ Data Science **6**, Article number: 15 (2017) | [Cite this article](#)

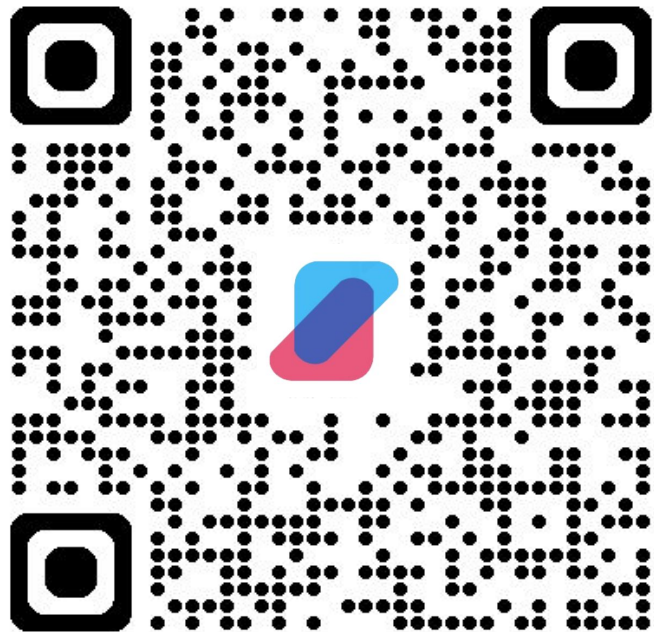
244k Accesses | **216** Citations | **3274** Altmetric | [Metrics](#)

1.1 Photographic markers of depression

Photographs posted to Instagram offer a vast array of features that might be analyzed for psychological insight. The content of photographs can be coded for any number of characteristics: Are there people present? Is the setting in nature or indoors? Is it night or day? Image statistical properties can also be evaluated at a per-pixel level, including values for average color and brightness. Instagram metadata offers additional information: Did the photo receive any comments? How many ‘Likes’ did it get? Finally, platform activity measures, such as usage and posting frequency, may also yield clues as to an Instagram user’s mental state. We incorporated only a narrow subset of possible features into our predictive models, motivated in part by prior research into the relationship between mood and visual preferences.

In studies associating mood, color, and mental health, healthy individuals identified darker, grayer colors with negative mood, and generally preferred brighter, more vivid colors [16–19].

By contrast, depressed individuals were found to prefer darker, grayer colors [17]. In addition, Barrick, Taylor, & Correa [19] found a positive correlation between self-identification with depression and a tendency to perceive one’s surroundings as gray or lacking in color. These findings motivated us to include measures of hue, saturation, and brightness in our analysis. We also tracked the use of Instagram filters, which allow users to modify the color and tint of a photograph.





Consequences for the Student

Mental health problems can affect a student's energy level, concentration, dependability, mental ability, and optimism, hindering performance.² Research suggests that depression is associated with lower grade point averages, and that co-occurring depression and anxiety can increase this association.² Depression has also been linked to dropping out of school.²

Many college students report that mental health difficulties interfere with their studies. On the American College Health Association 2015 survey, college students identified the following mental health issues as negatively impacting their academic performance within the last 12 months:³

- » Stress (30% of students)
- » Anxiety (22%)
- » Sleep difficulties (20%)
- » Depression (14%)





Our Solution

What Are We?

Mental health screening tool aimed at analyzing the following:

- Grades (change across quarters)
- Written text (e.g., essays)
- Speech (counselor sessions)
- Social media accounts (students' posts and bio)

From this we can get a preliminary insight into someone's mental wellbeing



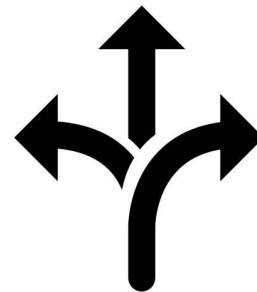
Requirements



Intuitive



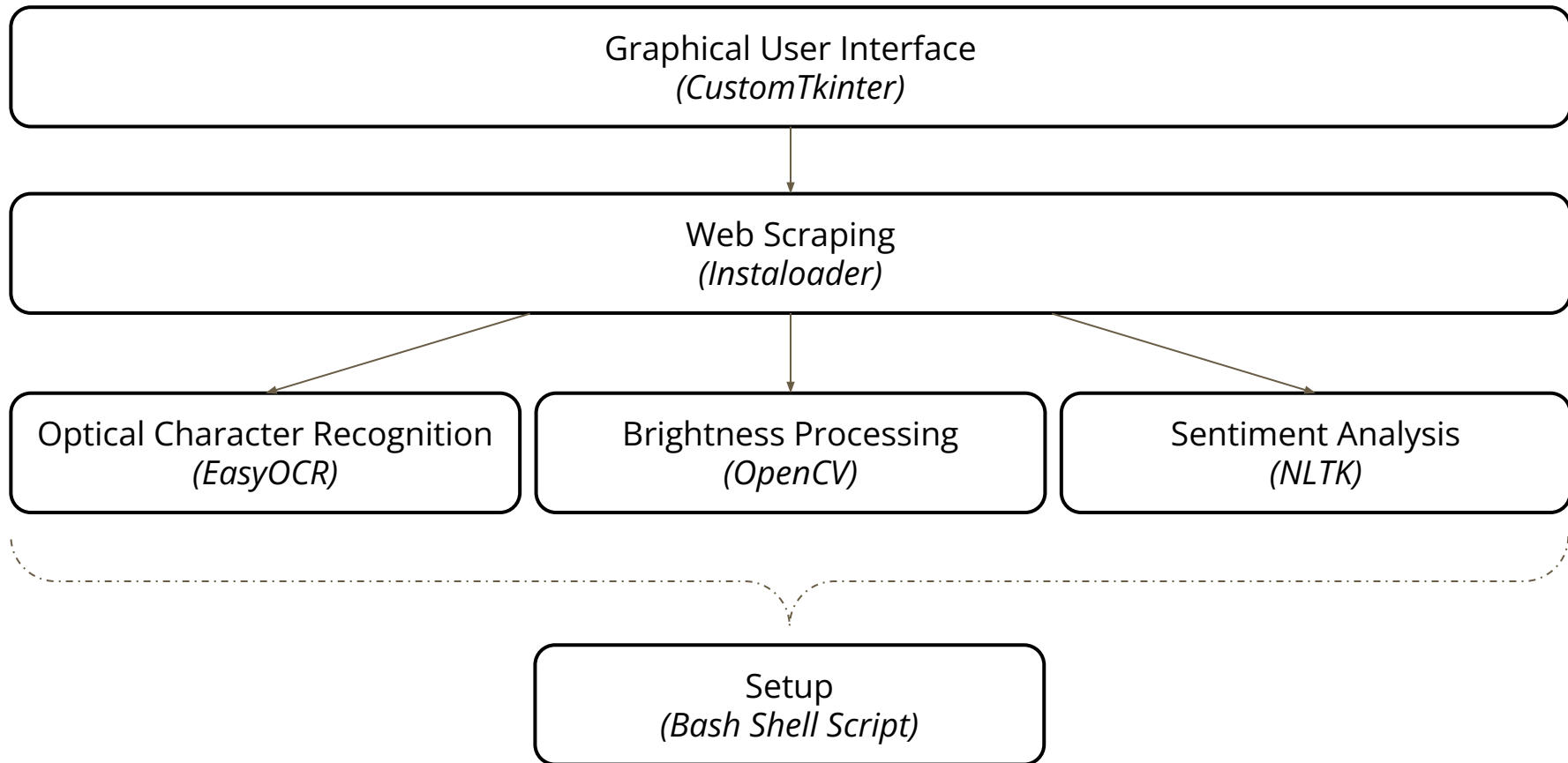
Private



Flexible



Technologies





Live Demo



Testing



```
class TestTextHealthAssessment(unittest.TestCase):
    def test positivity(self):
        positive text = "I love life. I am so happy. The world is beautiful."
        positive results = main.text health analysis(positive_text)
        self.assertGreater(positive_results, 0.5)

    def test negativity(self):
        negative text = "I hate the world. I am so sad. Life is terrible."
        negative results = main.text health analysis(negative_text)
        self.assertLess(negative_results, - 0.5)

class TestInstagramHealthAssessment(unittest.TestCase):
    def test positivity(self):
        main.analyze brightness.set( True)
        main.analyze images.set( True)
        six am success results = main.instagram health assessment( "6amsuccess") # A page that posts motivational quotes
        self.assertGreater(six_am_success_results.overall_health_score, 0.5)

    def test negativity(self):
        main.analyze brightness.set( True)
        main.analyze images.set( True)
        # A page written by a person obsessed with serial killers
        serial killers podcast results = main.instagram health assessment( "serialkillerspodcast")
        self.assertLess(serial_killers_podcast_results.overall_health_score, - 0.5)

class TestGradesHealthAssessment(unittest.TestCase):
    def test positivity(self):
        grade improvement = [{"math": 0.5, "science": 0.6, "english": 0.7}, {"math": 0.7, "science": 0.7, "english": 0.7}]
        grade improvement results = main.grades health assessment(grade improvement)
        self.assertAlmostEqual(grade_improvement_results.overall_health_score, 0.1)

    def test negativity(self):
        grade decline = [{"math": 0.7, "science": 0.7, "english": 0.7}, {"math": 0.5, "science": 0.6, "english": 0.7}]
        grade decline results = main.grades health assessment(grade decline)
        self.assertAlmostEqual(grade_decline_results.overall_health_score, - 0.1)
```



Testing Results

✓ Test Results		35 sec 929 ms	✓ Tests passed: 6 of 6 tests – 35 sec 929 ms	
✓ test		35 sec 929 ms	<pre>/Users/prashamshah/anaconda3/envs/SocialScanner/bin/python /Users/prashamshah/Applications/PyCharm Professional .app/Contents/plugins/python/helpers/pycharm/_jb_unittest_runner.py --path /Users/prashamshah/CodeProjects/GitHub/Mine/Python/SocialScanner/test.py Testing started at 6:11 PM ... Launching unittests with arguments python -m unittest /Users/prashamshah/CodeProjects/GitHub/Mine/Python/SocialScanner/test.py in /Users/prashamshah/CodeProjects/GitHub/Mine/Python/SocialScanner</pre>	
✓ TestGradesHealthAssess		1 ms		
✓ test_negativity		1 ms		
✓ test_positivity		0 ms		
✓ TestInstagrarr		35 sec 927 ms		
✓ test_negat		19 sec 776 ms		
✓ test_positiv		16 sec 151 ms		
✓ TestTextHealthAssess		1 ms		



Automated Setup



requirements.txt

```
Brotli==1.0.9
certifi==2024.6.2
charset-normalizer==3.3.2
click==8.1.7
contourpy==1.2.1
cycler==0.12.1
easycocr==1.7.1
editdistance==0.8.1
efficientnet==1.0.0
essential-generators==1.0
filelock==3.13.1
fonttools==4.53.0
fsspec==2024.3.1
gmpy2==2.2.2
idna==3.7
imageio==2.34.1
imgaug==0.4.0
installoader==4.11
jax==0.4.30
jaxlib==0.4.30
Jinja2==3.1.4
joblib==1.4.2
Keras-Applications==1.0.8
kivisolver==1.4.5
lazy-loader==0.4
libclang==18.1.1
MarkupSafe==2.1.3
matplotlib==3.9.0
mkl-fft==1.3.8
mkl-random==1.2.4
mkl-service==2.4.0
ml-dtypes==0.4.0
mpmath==1.3.0
networkx==3.3
ninja==1.11.1
nlTK==3.8.1
numpy==1.26.4
opencv-python==4.10.0.84
opencv-python-headless==4.10.0.84
packaging==24.1
pillow==10.3.0
pip==24.0
pyclipper==1.3.0.post5
pyparsing==3.1.2
PySocks==1.7.1
python-bidi==0.4.2
python-dateutil==2.9.0.post0
PyYAML==6.0.1
regex==2023.10.3
requests==2.32.3
scikit-image==0.24.0
scipy==1.13.1
setuptools==69.5.1
shapely==2.0.4
six==1.16.0
sympy==1.12
tensorflow-io-gcs-filesystem==0.37.0
tifffile==2024.6.18
torch==2.2.2
torchaudio==2.2.2
torchvision==0.17.2
tqdm==4.66.4
typing_extensions==4.11.0
urllib3==2.2.2
validators==0.28.3
wheel==0.35.1
```



setup.sh

```
# Install the right version of pytorch depending on your system (see https://pytorch.org/get-started/locally)
# Uncomment the appropriate line
# Linux/Windows with CUDA 12.1:
# pip install torch torchvision --index-url https://download.pytorch.org/whl/cu121
# Linux/Windows with CUDA 11.8:
# pip install torch torchvision --index-url https://download.pytorch.org/whl/cu118
# Linux with ROCm 6.0
# pip install torch torchvision --index-url https://download.pytorch.org/whl/rocm6.0
# Linux/Windows/MacOS with only CPU (not recommended):
# pip install torch torchvision --index-url https://download.pytorch.org/whl/cpu
pip install instaloader
pip install nltk
pip install opencv-python
pip install easyocr
# OR
# pip install -r requirements.txt
python prepare.py
```

prepare.py

```
import nltk

nltk.download('all')
```


Possible Uses

- Run scan on essays, counselor sessions, and grades
- With permission from students and Instagram, perhaps run on student accounts once in a while
- We have support for parsing files into our application, so this could easily be run using school records without manual input
 - We just need to be given the format that is most convenient for the school so we can modify our parsing logic
- Again, no data leaves the decide, so privacy issues are minimized with our solution as compared to other cloud-based AI applications

Future Goals

- Development
 - Add physical health analysis and include it into calculation
 - Add surveys and other cognitive tests
 - All of these features will be **optional** and will be stored locally to reduce security concern
 - Video analysis for sites like YouTube & TikTok using OCR & CV technology, currently hard to implement due to lack of processing (very resource heavy)
- Scaling
 - Present to tech companies and local government for funding
 - Gain access to more resources and processing power to help scale further
 - Expand compatibility to more social media sites

Disclaimer

- This app is meant to be a **flagging tool!**
 - None of the information from the app should be used as an end-all-be-all
 - This is meant to just flag students to be subject to further, more thorough inspection
- Webscraping policy
 - Currently, Instagram prohibits webscraping, which is the main social media site we currently base this app on
 - However, we are working to get explicit permission, and we are confident on being able to get it as the data is going to be used for educational & domestic security purposes

If Instagram does not grant permission, the software could still be used for counselor meetings, automated essay scans, grade review, and more to help counselors target the student who need help the most. We are going to try to expand to other social media regardless of what happens with Instagram.



Questions?