Possibilities to detect violent lone offenders in digital communication

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1. Psychological warning behaviours – find them in social media

2. Analyze texts written by violent lone offenders – identify common linguistic markers

3. Let the computer read and analyze text written by violent lone offenders and find out what is important
Identifying warning behaviours in social media
Warning behaviours

• Behaviour that may precedes an act of targeted violence,
• Used as a part of a threat assessment
Warning behaviours (Meloy et al. 2012)

(i) pathway warning behaviour,
(ii) fixation warning behaviour,
(iii) identification warning behaviour,
(iv) novel aggression warning behaviour,
(v) energy burst warning behaviour,
(vi) leakage warning behaviour,
(vii) last resort warning behaviour, and
(viii) directly communicated threat warning behaviour.
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Fixation

Any behavior that indicates an increasingly pathological preoccupation with a person or a cause.

• Increase in perseveration;
• strident opinion;
• negative statements about the target(s);
• increasing anxiety and/or fear in the target;
• an angry emotional undertone
• accompanied by social or occupational deterioration.
Fixation expressed in text

The FED is a JEW controlled, PRIVATE corporation. JEWS create wars to divide and conquer. AMERICA'S MASS MEDIA is in JEW hands. ... JEWS control your mind.

James von Brunn
Identification

- indicate a desire to be a “pseudo-commando,”
- have a warrior mentality,
- closely associate with weapons or other military or law enforcement
- identify with previous attackers or assassins,
- identify oneself as an agent to advance a particular cause
Identification in pictures
Leakage

• Communication of an intent to do harm to a third part.

• Leakage has been shown to occur in many different cases of target violence - everything from school shootings to attacks on public figures.
Warning behaviours in the wild

• *Where* are we looking for warning behaviours?
• What about *false positives*?
Linguistic Analysis of Violent Lone Offender Manifestos
Given texts written by lone offenders before an attack. Can we find some kind of linguistic markers that are common for all lone offenders?
Computerized text analysis
words
words
words
words
words
words

LIWC

Written text
LIWC Dimensions

- Summary variables
- Language metrics
- Function words
- Other grammar
- Informal speech
- Affect words
- Social words
- Personal concerns
- Drives and Needs
- Time orientation
- Cognitive processes
- Perceptual processes
- Biological processes
LIWC Dimensions

- Summary variables
- Language metrics
- Function words
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- Positive emotion
- Negative emotion
- Anger
- Sadness
- Anxiety
LIWC Dimensions

- Summary variables
- Language metrics
- Function words
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- Affect words
- Social words
- Personal concerns
- Drives and Needs
- Time orientation
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- Informal speech

LIWC Dimensions

- Positive emotion
  - happy
  - pretty
  - good
  - ...
- Negative emotion
  - Anger
    - protests
    - punish*
    - revenge*
    - ...
  - Sadness
    - crushed
    - cry
    - empty
    - ...
  - Anxiety
    - awkward
    - afraid
    - confuse
    - ...

Cognitive processes

Perceptual processes

Biological processes
The study includes subjects who:

• Alone, or with minimal help from others have perpetrated a violent act with the intent caused severe (fatal) personal damage, and
• Prior to perpetrating this act, have stated their points of view in written communication that has subsequently been made public, either by themselves or by police investigations.
Subjects

1. Nidal Malik Hasan
2. James von Brunn
3. Anders Behring Breivik
4. Dylan Roof
5. Elliot Rodger
6. Christopher Dorner
7. Jim David Adkisson
8. Lucas Helder
9. Ted Kaczynski
10. Andrew Joseph Stack III
Linguistic markers
Personal pronouns

- Increased use of third person plural (they, them, their etc) in a group suggests that the group is dening itself to a large degree by the existence of an oppositional group.

- The use of 3rd person plural is the best single predictor of extremism (Seyle & Pennebaker, 2004)
Expression of emotion

- Natural conversation contains almost twice as many positive than negative emotion words
- Extremist material is often more negative
Drives - power

• Example: leader, follower, superior, demand, weak
• High level indicates that a person is driven by a need for power.
• Language of violent terrorist groups express more power motives than others
Use of big words

• Previous research states that a high percentage of big words correlates with psychological distancing or detachment - characteristics that have been identified among terrorists.
Cognitive processes - certainty

• Example: absolute, apparent, clear, commit, complete, correct

• Certainty words are likely to be used more by a person who is cognitively rigid and prone to simplification of complex matters, something that also applies to most terrorists
Findings as a group

- Certainty
- 3rd person plural
- Sixltr
- Anger
- Negative emotion
- Power
- Friend
- Positive emotion
Thoughts

• Very small sample, can we really draw any conclusions?
• Are the subjects too different?
• What do we compare with? What is normal writing?
A machine learning approach towards detecting lone offenders
How?

• Let the computer identify what is important
How?

• Let the computer identify what is important
• Train a model using real data and features that we think are important
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Data

• Manifestos written by violent lone offenders (10)
• Words from school shooters (36)
Other

• Texts from Stormfront-users
• Blogs
• Texts from Boards.ie
87% of the cases the computer could recognize text written by lone offenders.
Important features:

- The use of articles (*a, an* and *the*) and prepositions (*to, with* and *above*)
- The use of pronouns
- Emotions (anger)
- Perceptual processes
Caveats

• Very small study – can we even draw any conclusions from it?
Hope for the future?

• Machine learning has successfully been used to predict suicides using medical journals
• Our study indicates that there is way forward if we can get more data
• (Luckily) not enough real examples – we need to come up with ideas on how to work around this
Concluding remarks

• Technology exists - needs to be adopted to relevant domain
• Need to work together – domain knowledge is the key
• Understand the opportunities and limitations with technology
Thank you!

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