






# Analysis of Cyberbullying Tweets in Trending World Events

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# Introduction (1)

- Social media
  - Common practise among children and adolescents
  - Any website enhanced with some form of social interaction feature     
- 95% of teenagers are now online
  - 81% use some kind of social media
- 74% of adults that are online use a social networking site of some kind

# Introduction (2)

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- Risks encountered by people when using Social Media:
  - Inappropriate content;
  - Lack of knowledge regarding online privacy issues
  - Outside influences from 3<sup>rd</sup> party advertisements
  - **Cyberbullying and online harassment**
  - Sexting
  - Social network depression



# Introduction (3)

- 55% of teens using Social Media have witnessed outright bullying via that medium
- Trending world events:
  - Generate interest amongst online Web users
  - Can cause controversy thus leading to several acts of cyberbullying
- Analyse cyberbullying online posts in trending world events to tackle this issue

# Motivation (1)

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- Two real world events caused & brought controversy and media attention in 2014:
  - Ebola virus outbreak in Africa
  - Shooting of Michael Brown in Ferguson, Missouri



# Motivation (2)

- Analysis conducted on cyberbullying online posts can be universally applied in novel real-world applications:
  1. Cyberbullying online post detector
    - Monitors social network feed of current trending world events in real time
  2. Social network users' matcher
    - Cyber bullies that have similar personality and social traits when posting abusive messages

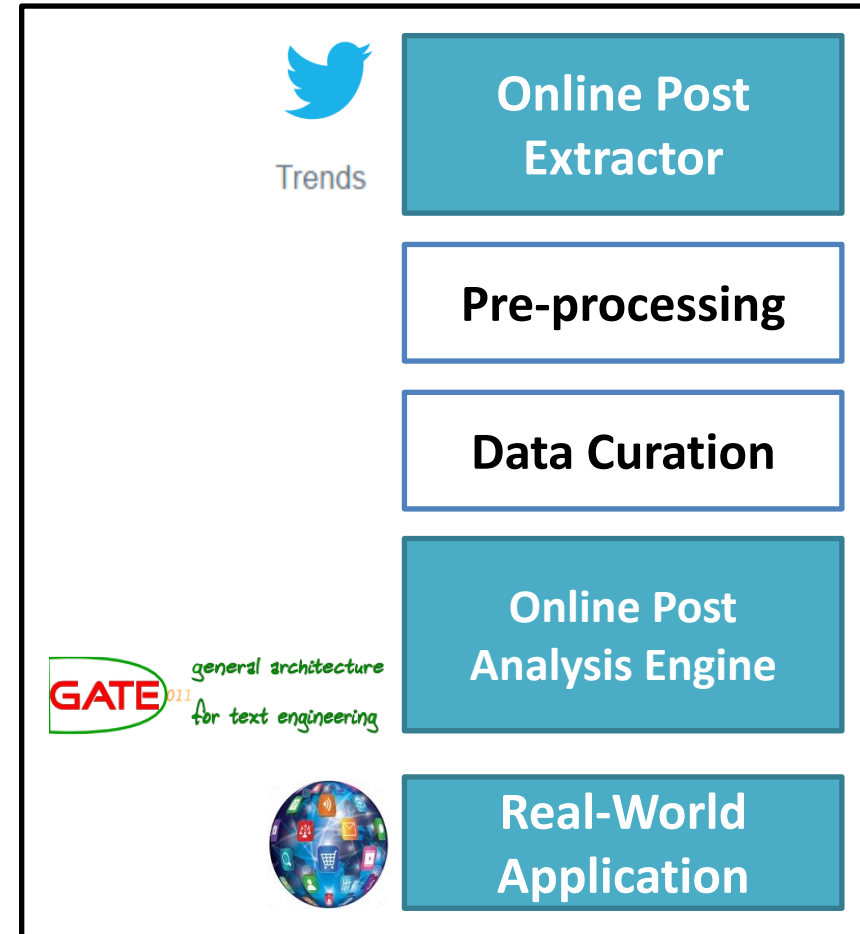
# What is Cyberbullying?

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- “the use of technology to harass, threaten, embarrass, or target another person” *S. Chadwick*
- Cyberbullying Types:
  - Text-based name calling (including homophobia)
  - Harassment
  - Cyberstalking
  - exclusion and false pretention
  - Sending and posting humiliating photos/videos
  - sharing videos of physical attacks on individuals
- As technology continues to develop, new forms of cyberbullying continue to emerge



1. Trending World Event  
Hashtags Selection
2. Cyberbullying Key  
Terms Selection
3. Data Collection
4. Tweets Pre-  
processing
5. Tweets Curation





## 1| Trending World Event Hashtags Selection

- Ebola virus outbreak: [#ebola](#)
- shooting in Ferguson: [#ferguson](#)

## 2| Cyberbullying Key Terms Selection

- Top 10 terms identified from the work by Kontostathis et al.
- 8 insult & swear words: whore, hoe, bitch, gay, fuck, ugly, fake, slut
- 1 reaction word: thanks
- 1 personal pronoun youre

## 3| Data Collection

- Twitter
- Tweets containing a hashtag and one of the cyberbullying key terms
- Twitter Search API used
- Criteria set for collecting tweets:
  - Popular & real time results in response
  - English tweets only
  - Tweets posted within a date range of 3 months from mid-August to mid-November

## 3| Data Collection - Dataset

- Total: 2607 tweets
- Ebola virus outbreak: 1480 tweets
- Shooting in Ferguson: 1127 tweets
- Primary aim:
  - 200 tweets per key term for each trending world event
  - Some key terms were not as popular

## 4| Tweets Pre-processing

- Removal of unnecessary characters
- Conversion of tweets to lowercase
- Removal of exact tweet duplicates
  - Retweets, mentions and replies kept
- Dataset after pre-processing:
  - Total: 1544 tweets
  - Ebola virus outbreak: 908
  - Shooting in Ferguson: 636

## 5| Tweets Curation

- Two data curators to label and verify cyberbullying tweets
- Hyperlink resolution on URLs in tweets
- Dataset of cyberbullying tweets after curation:
  - Total: 843 tweets
  - Ebola virus outbreak: 468
  - Shooting in Ferguson: 375

## Hashtags – Ebola outbreak

#tcot, #isis, #obama, #tbyg : correlated to the topic of politics

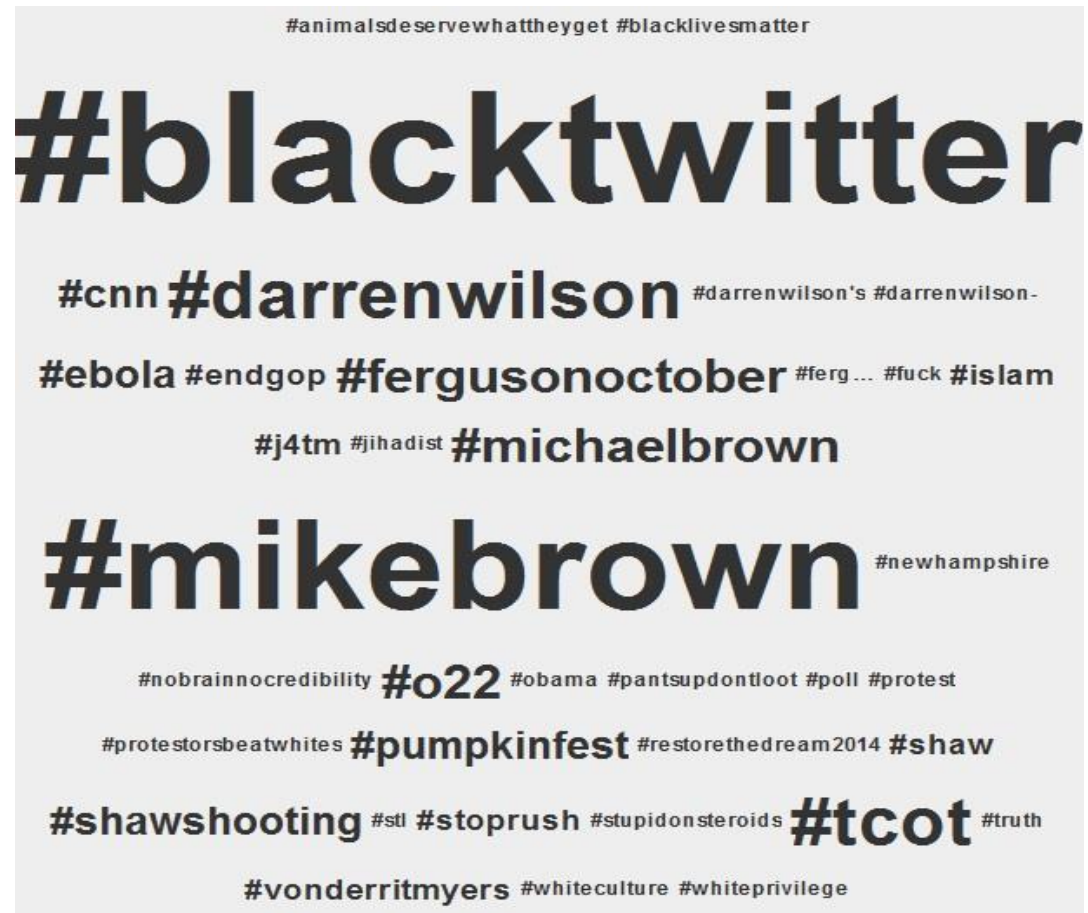
Some things seemingly unrelated i.e. health vs. politics are related on Twitter

#666 #africa #africans #applejuice #back #bbcqt #benghazi **#bitch** #bolabrothers #breaking #bushmeat **#cdc**  
 #cinnamonapple #cnn #cunt #cured **#dallas** #dirty #disease #east **#ebolainnyc** **#ebolaoutbreak**  
 #ebo... #enterovirus #exposed #fail **#fake** #falseflag **#ferguson** #foxnews #fuck #fucked **#funny**  
 #gamergate **#gay** #gays #getaway #god #gop #gunsense #halloween #hiv **#hoe** #hug  
**#isis** #issa #jk #kacihickox #killer **#lgbt** #libcrib **#lmyhbt** #lol #lostho #meangirls  
 #nevertrust #newjersey #nfl #nigeria **#ninapham** #notonemore **#nra** #nwobama  
**#nyc** #nycebola **#obama** #obola #ouijarollup  
**#outbreak** **#p2** #pjnet #prayers **#quarantine** #quarantined #replaceananimetitlewithass  
 #sarahpalin #shitslutssay\* **#slut** #stoprush #tanzania **#tbyg**  
**#tcot** #teaparty **#texas** #tgdn #thankyou **#uniteblue** #up #vaccine

## Hashtags – shooting in Ferguson

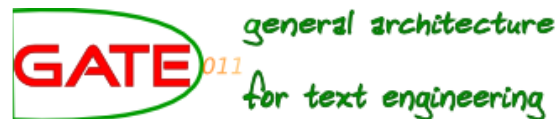
#o22: refers to Oct 22, 2014 – national day against police brutality

Relationships between hashtag topics i.e. event, politics and society are more correlated and apparent



## Named Entities (NEs) - Specifics

- Five entities: *Person, Location, Organisation, UserID, URL*
- 20 different experiments conducted
- TwitIE: IE pipeline for Microblog Text used for Named Entity Recognition over tweets





## Named Entities (NEs) - Results

- Ebola outbreak
  - *Location*: NE most frequently used
  - Several locations were related to Ebola
    - Africa: effected by the virus
    - United States: some patients treated there
- Shooting in Ferguson
  - *Person*: NE most frequently used
    - Michael Brown: victim
    - Darren Wilson: culprit

## Named Entities – Results for both events

- “fuck” key term:
  - most *Location*, *Organisation* and *URL* entities
- “gay” key term:
  - most *Person* and *UserID* entities
- *Person* NE: mostly used in tweets
- *Location* NE: 2<sup>nd</sup> mostly used in tweets

- Result of NE analysis correlates to some of the ones obtained in the hashtag analysis
- Tweets incorporating the following key terms:
  - “fuck” & “gay”: contain the highest number of common NEs (*Person, Location, Organisation*)
  - “bitch” & “fuck”: have the highest of Twitter entities (*UserID, URL*)
- Majority of cyber bullies that use insult and swearing words in their tweets generally include a reference to one NE or more

- Put results obtained from this analysis into practise as part of a real-world application, that of a **cyberbullying online post detector**
  - Feature analysis to find out most valuable features for cyberbullying identification
  - Train a classification algorithm on the dataset of collected tweets
  - Apply trained model on tweets extracted from other trending world events and make an evaluation
- Collect online posts from other social networks
  - Facebook: valuable source – hashtags allowed in posts
- Publish online post dataset for academic use

- **Novel Approach**

- Trending events used to capture cyberbullying cases vs. naïve method that surfs the Web for random cyberbullying posts

- **Evaluation Analysis**

- Observing trending world events might lead to the identification of cyber bullies
- Cyber bullies are not necessarily only a threat to people in their personal circles

# Thank You

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