ENHANCING THE DETECTION OF POTENTIAL THREATS USING MACHINE LEARNING

MDATAGOV SYMPOSIUM 2019

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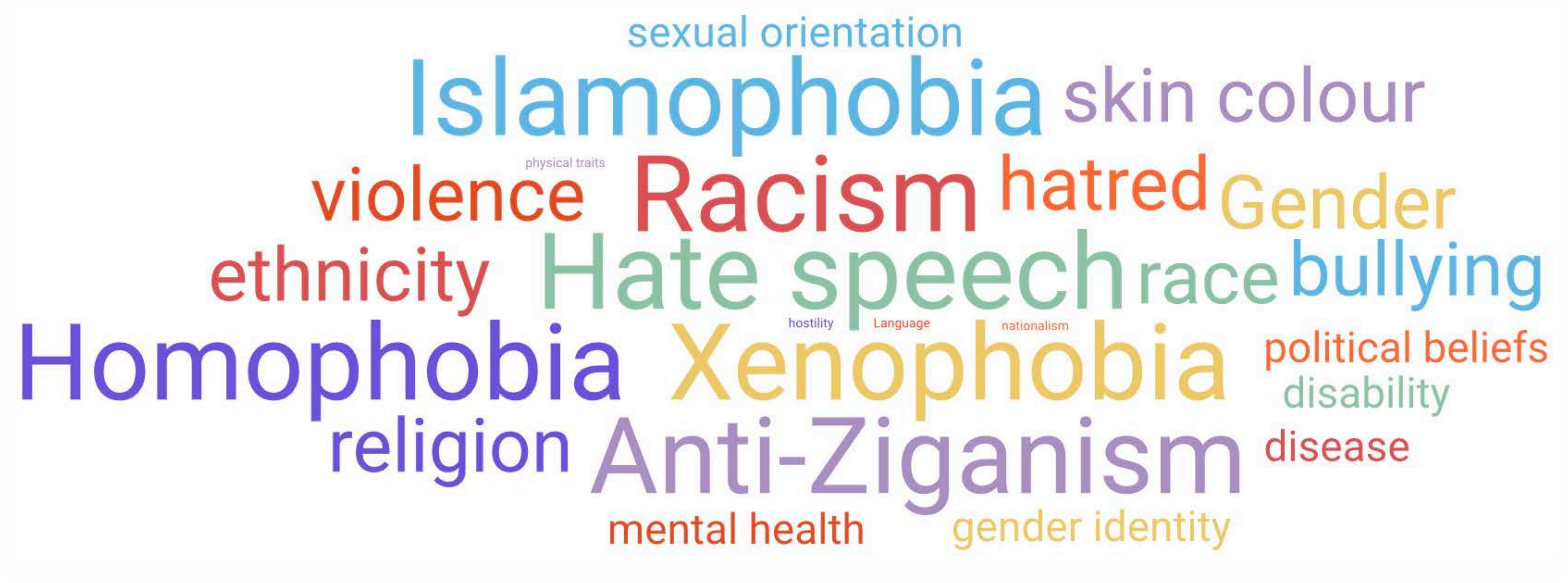
Acknowledgement

BACKGROUND

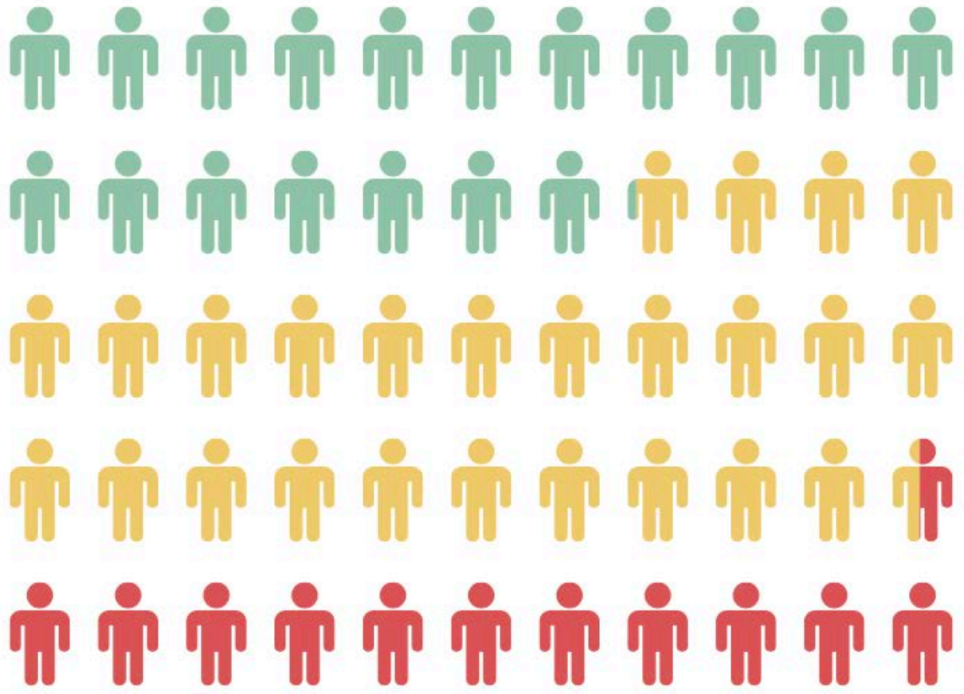
- Rapid increase in social media usage
- 2.47 Billion active social media users [1]
- Abundant user generated data
- Association between social media and suicidal behavior [2]

CYBERHATE


sexual orientation
Islamophobia
skin colour
physical traits
violence
Racism
hatred
Gender
ethnicity
Hate speech
race
bullying
hostility
Language
nationalism
Homophobia
Xenophobia
political beliefs
disability
religion
Anti-Ziganism
disease
mental health
gender identity

HATE MATERIALS

15 – 18 Years



67%

Exposed to hate materials[3]

21%

Victims

MISOGYNY

- Hate speech that is targeted towards women
- Online abuse has been linked to offline domestic violence against women

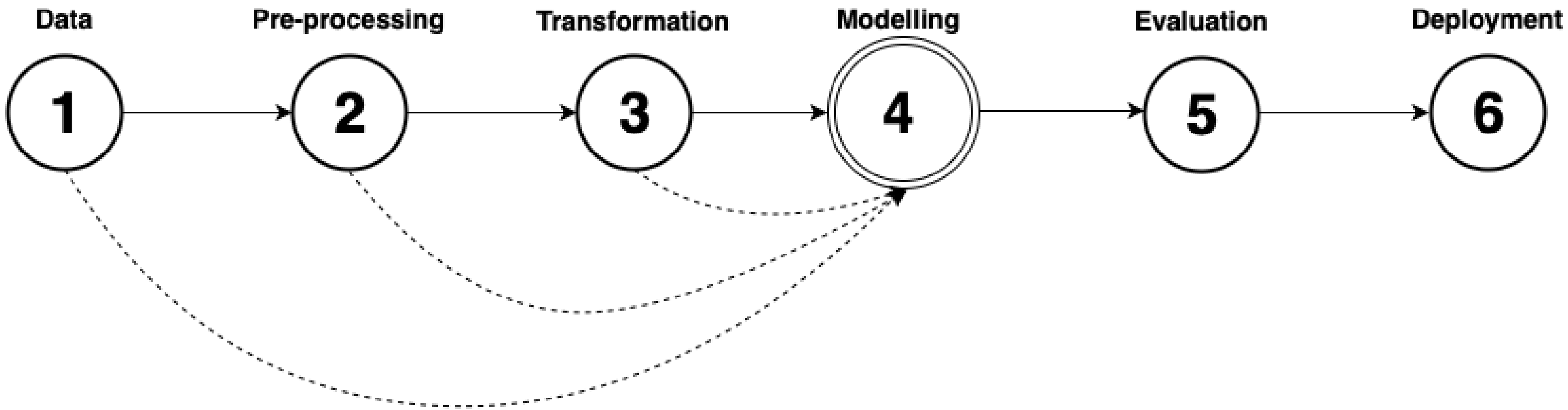
United Kingdom

48%

Experienced online abuse or harassment after leaving an abusive relationship[4].

RESEARCH

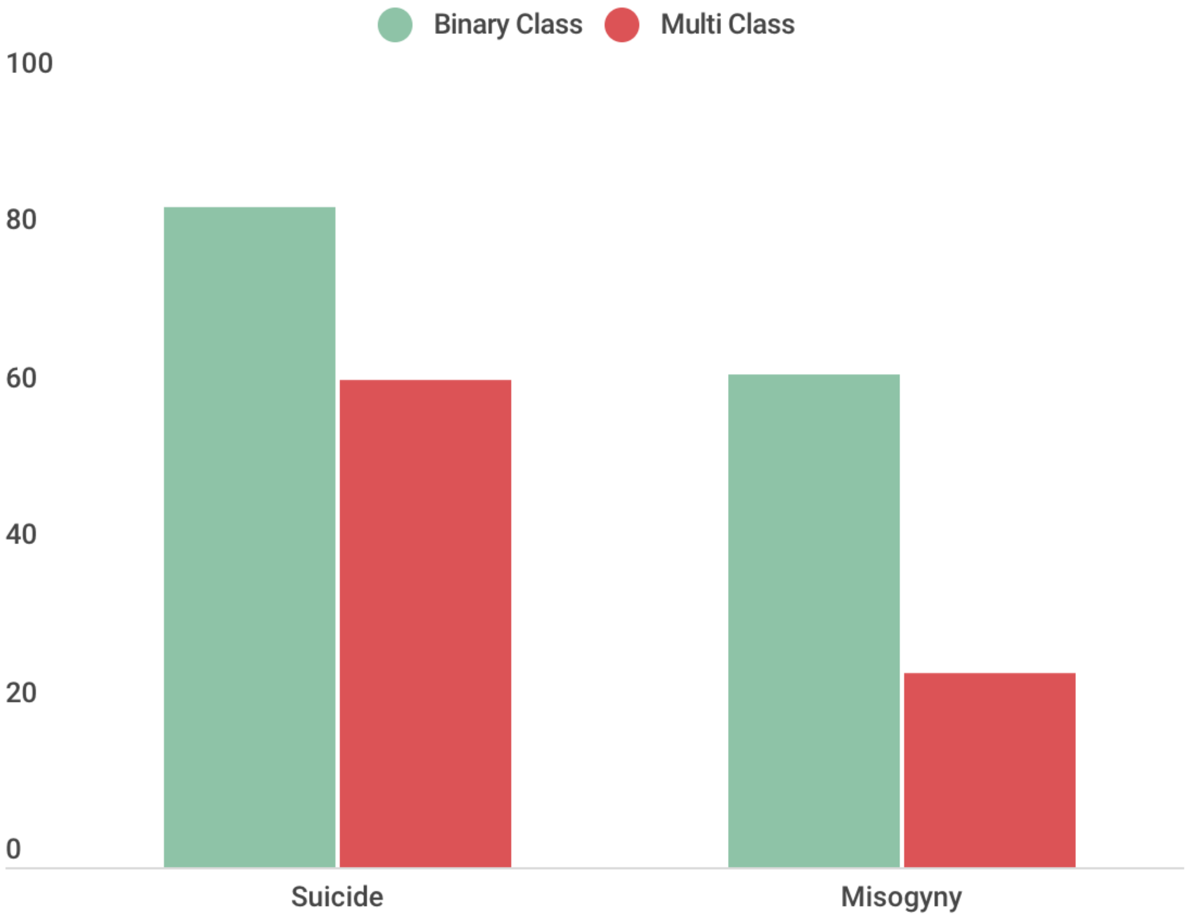
- How can machine learning be used for possible intervention?
- Improve the identification and classification of text containing worrying languages.
- Case studies: suicide related and misogynistic tweets (independently)



APPLICATION

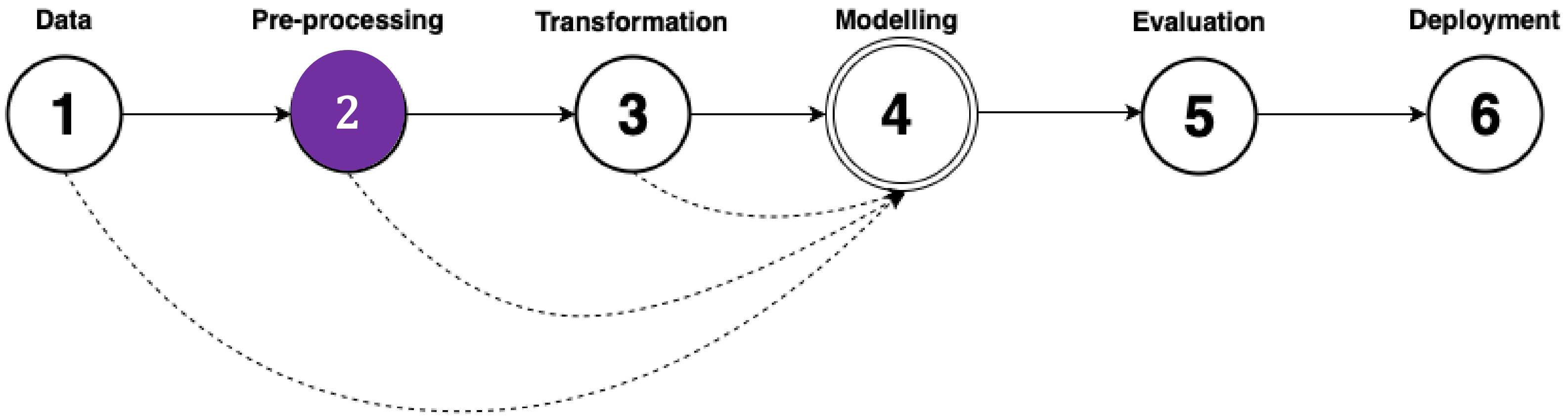
- Labelled tweets for suicide related communications and misogyny
- Measured the performance of existing machine learning approaches and techniques
- Impact of data manipulation
- Ensemble learning, rule-based learning
- Dimensionality reduction techniques

RESULT



PLACEMENT

- PyGrams: Python based app for extracting popular terms from large documents.
- Implement automated stop words
- 176 in-built English stop words e.g. I, any, haven't

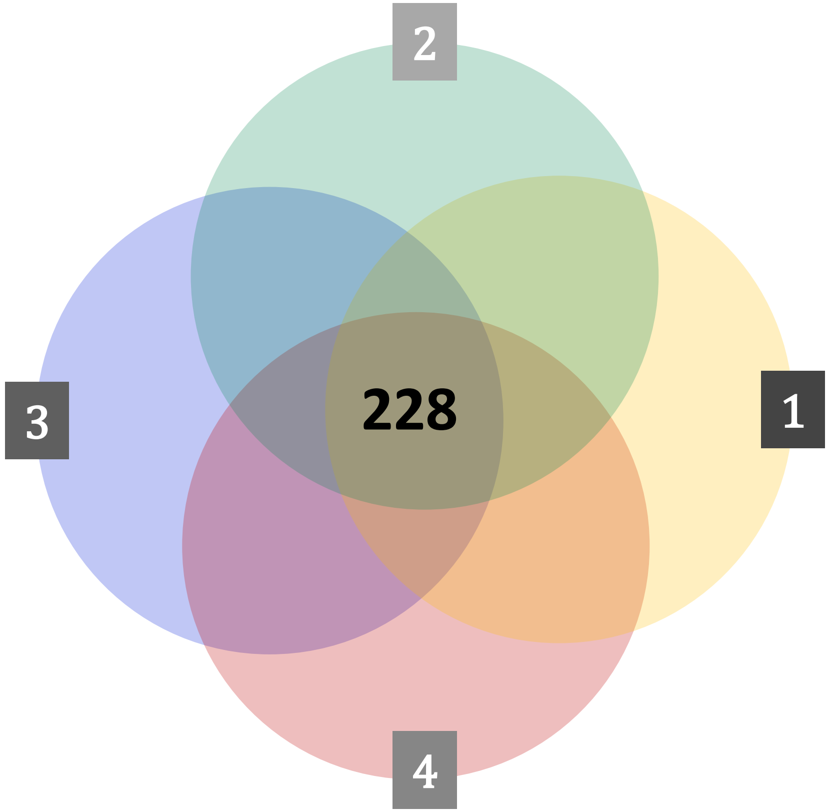


APPROACH

Sample Data: 3,526 words

Existing Methods	1	2	3	4
Entropy	🟨		🟦	
Term Frequency (TF)		🟩	🟦	🟥
TF1 (Singleton words)		🟩		
Inverse Document Frequency (IDF)		🟩		
TF/IDF	🟨			
Variance			🟦	🟥
Total Stop words	260	2613	319	500

Approach



RESULT

In-built		Auto-generated		Stop Words
176	+	228	=	404

NEXT

Placement

- In-built and auto-generated stop words
- Deploy auto-generated stop words

Research

- Auto-generated stop-words
- Rule-based learning
- Target and/or minority classes
- Domain specific

THANK YOU

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