Kno.e.sis Publications

The Ohio Center of Excellence in Knowledge-Enabled Computing (Kno.e.sis)

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Identifying Depressive Disorder in the Twitter Population

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Identifying Depressive Disorder in the Twitter Population

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Overview

Depression is a highly prevalent **public health challenge** and a major cause of disability across the globe.

- Annually **6.7%** of Americans (that is, more than **16 million**)[1]
- Traditional approaches to curb depression involve survey-based methods via phone or online questionnaires
  - Large temporal gaps and cognitive bias

Social media **provides a method** for learning users' feelings, emotions, behaviors, and decisions in real-time.

→ 1) How well do tweets express depressive behavior and can they be detected automatically?

→ 2) How well does geographical information serve as the basis for effective community-level management of depression and location of mental health services?

Dataset

of Self Reported Users: **33,719**

# of users in the Gold Standard dataset*: **16,194**

# of depressed profiles: **4823**

# of non-depressed profiles: **7739**

*Users judged depressed by human annotators

Self Reported Users

FAT
@Walisnghoters3
16 | girl | OCD | depression | self-harm |
secret account | CW 137.7 GW1 135
GW2 125 GG3 110 UGW 100 |

Deathdate
@dmswrengrmydre
I was born this way and its killing me.
This is my fucked up life, not that anyone
cares. suicide attempts 6
♡ Where you cant fucking find me

sad girl
@xvidepressed
whats going to happen when i get sick of
myself? depressed hopelessly inlove w
my razor. no one can save me
♡ hate myself

Anxiety Queen
@depressed_cutie
Anxiety disorder | 5 moths clean | falling
back down [15]
Joined November 2013

- Profiles collected using the Social-media Depression Detector (SDD)[2]
- SSD is based on PHQ-9 – a multipurpose instrument for screening, diagnosing, monitoring, and measuring the severity of depression.
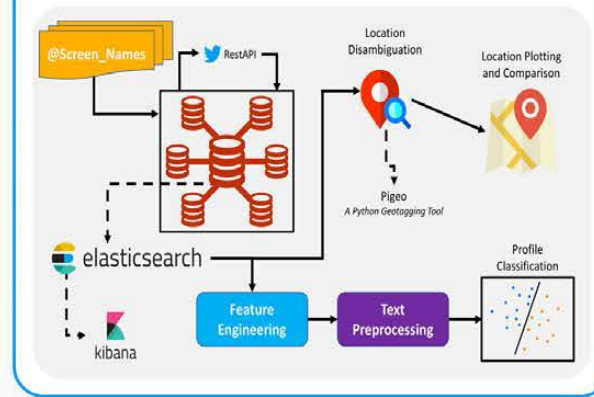
The Patient Health Questionnaire (PHQ-9)

Patient Name _____   Date of Visit _____

Over the past 2 weeks, how often have you been bothered by any of the following problems?	Not At all	Several Days	More Than Half the Days	Nearly Every Day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed or hopeless	0	1	2	3
3. Trouble falling asleep, staying asleep, or sleeping too much	0	1	2	3

System Architecture

@Screen_Names — RestAPI

Location Disambiguation

Location Plotting and Comparison

Pigeo
A Python Geotagging Tool

elasticsearch

kibana

Feature Engineering → Text Preprocessing → Profile Classification

Feature Engineering

Prediction model:

- Automatically detect depressed users leveraging a multimodal feature set:
  - # of tweets
  - # of followers
  - # of friends
  - tweet content
  - Levenshtein distance between screen name and lexicon of depressive symptoms
  - text from image
  - emotion from images
  - tweeting time
  - ego-network

Geographical Analysis

Map of hospital inpatient and outpatient mental health centers from the *Substance Abuse and Mental Health Services Administration* (SAMHSA)

Map of user profiles collected by our platform

Map Key:

- Red pointer = users with geo-enabled tweets
- Teal pointer = users with places or locations in tweets or profile
- Green pointer = location determined by *Pigeo, A Python Geotagging Tool*

Brainstorm

Please tell me your interest and your thoughts about this study!

- *What are possible features that used to classifying profiles?*

Email me @ goonmeet.bajaj@gmail.com
Project website: rebrand.ly/depressionProject

References: [1] http://bit.ly/2okBKNy, [2] Yazdavar, Amir Hossein, et al. "Semi-Supervised Approach to Monitoring Clinical Depressive Symptoms in Social Media."