Analyzing Clinical Depressive Symptoms in Twitter

Amir Hossein Yazdavar, 1Hussein S. Al-Olimat, 1Tanvi Banerjee, 1Krishnaprasad Thirunarayan, 1Jyotishman Pathak, 1Amit Sheth

1Ohio Center of Excellence in Knowledge-enabling Computing (Kno.e.sis), Wright State University, Dayton, OH, USA
2Division of Health Informatics, Weill Cornell Medical College, New York, NY, USA
3[amir,tanvi,hussein,krishnaprasad,amit]@knoesis.org, /jyp2001@med.cornell.edu

Abstract

Clinical depression is the leading cause of disability worldwide and affects at least 350 million people worldwide. An estimated 1.5% of the world’s population suffers from clinical depression that is responsible for more than 300,000 suicides each year. Our work identifies depressive symptoms using Twitter social media.

Aim

(Aim 1) - Study and identify clinical depressive disorders using explicit and implicit expression of depression on social streams.

(Aim 2) - Build a reliable platform to automatically detect depressive behavior in social media that emulates and extends the functionality of PHQ-9 to monitor user depressive behaviors.

(Aim 3) - Evaluate our approach on self-reported profiles on social media.

Approach

Twitter provides a rich source for studying people’s mood in order to detect depressive behaviors.

- We developed a novel technique to unsupervisedly analyze individual posts in social media to detect signs of depression that can be utilized to build a proactive and automatic screening tool for early recognition of clinical depression.

- Leveraging clinical definitions of depression, we build a depression lexicon that contains common depression symptoms determined by experts such as the established clinical assessment questionnaire PHQ-9.

- We expanded the terms expressing the nine PHQ-9 depression symptoms categories using Urban Dictionary and Big Huge Thesaurus.

- The lexicon contains depression-related symptoms that are likely to appear in the tweets of individuals either having depressive disorders or suffering from depression.

- A subset of highly informative word pairs is selected from this depression lexicon for creating depression-related twits. For each twit, we calculate its association with all the variations of the term “depressed” using Pointwise Mutual Information (PMI) and Chi-squared test to quantify their correlation and thereby rank their order.

We leverage Twitter, our social media analysis platform, to study language, sentiment, emotions, topics and people content network of depressed individuals.

Conclusion

We demonstrated the potential of social media for examining clinical depressive symptoms in individuals that can be leveraged to improve the current questionnaires that are validated using clinical interviews or other behavioral assessment tools.

- Our results indicate that there are significant differences in the topic preferences and user engagement patterns of our dataset that are distinguished from random users in our dataset.

- This analysis framework could benefit future research on building a warning system which can predict the onset of major depressions.

- Current clinical approaches are mainly focused on individual cases; our findings can be utilized to automatically assess public health on community level for determining health risks based on social tendencies and help warning behavior.