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Digital Detection of Suicide Risk on Social Media

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ABSTRACT: *Early detection of suicide risk is very important for preventing suicide death*

have conducted research on digital detection of suicide risk, and in this paper, we summarize our recent research on examining the possibility of identifying suicide risk in real-time on social media,

Suicide is a global public health concern. Each year, almost one million people died by suicide worldwide (Organization & Organization, 2011) Moreover, the effect of completed suicide on friends and family members are often devastating (Clark & Goldney, 2000; Jordan & McIntosh, 2011).

Early detection of suicide risk is effective in reducing suicide death. However, due to suicide stigma and poor suicide literacy, people may refuse to disclose their suicidal thoughts and seeking professional help. Therefore, it is important to identify suicide risk from observation instead of self-report. Moreover, traditional methods (e.g. self-report ratings, structured interview, and clinical judgment) cannot identify suicide risk in real-time which might lead to delayed reporting (McCarthy, 2010). For instance, for Web-based Injury Statistics Query and Reporting System (WISQARS) of Centers of Disease Control and Prevention in the United States, the suicide data report delays almost 3 years. To address this problem, we need to develop new method to identify suicide ideation effectively and timely.

The emergence of social media may shed light on this direction. (a) Social media has a large number of users. In China, the most popular Chinese microblogging service provider, Sina Weibo (weibo. com), has over 500 million registered users, producing more than 100 million microblogs per day. (b) Social media data is publiclyavailable and updated in real time. All posts can be downloaded and processed in real time. (c) Social media data is informative. Social media users are motivated to discuss their health issues online (Park, Cha & Cha, 2012; Prieto et al., 2014) and some individuals even have disclosed their suicide thoughts and plans (Murano, 2014).

In view of these advantages, we have conducted research to detect suicide risk through social media, and our recent research confirmed the possibility of identifying suicide risk in real-time.

First, we found behavioral and linguistic characteristics of social media users with suicide risk, which can be used as indicators to detect suicide risk. For example, individuals with suicide risk are less likely to interact with others and are more likely to express themselves negatively using words indicative of cognitive differentiation, death, and religion (Guan et al., 2015).

Furthermore, we examined the possibility of detecting suicide risk of individual and post, respectively. (a) To differentiate between groups with higher and lower levels of suicide risk, we used algorithms (e.g. Simple Logistic Regression (SLR) and Random Forest (RF)) to train classification models. Results showed that the models can retrieve over 70% of the labeled high-risk individuals (Guan et al., 2015). (b) To screen for posts with suicidal ideation, we trained topic models to extract linguistic features for training models. Results indicated that the model < Ə Ɛ Internet-Based Profl Model. *JMIR Mental Health, 2*(2), e17.

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