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Social Media Mining for Postpartum Depression Prediction

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Abstract. This study investigated the feasibility of a postpartum depression predictor based on social media writings. The current broad use of social media networks generates a large amount of digital data, which, when coupled with artificial intelligence methods, have the potential to disclose significant health related insights. In this paper we explore the use of machine learning for prediction of postpartum depression on a corpus created from Reddit posts.

Keywords. postpartum depression, social media, machine learning, mental health, women's health

1. Introduction

Despite the widespread use of prenatal care and the increasing adoption of ante- and post-partum depression screening tools, post partum depression (PPD) often goes undiagnosed or untreated. For example, Ko et. al [1] estimated nearly 50% of of pregnant women who experienced a major depressive episode in the past year received treatment, and Vesga-Lopez et al. [2] estimated the prevalence for untreated, postpartum mood disorders to be 85%. Clearly, there is an opportunity to enhance existing screening tools and protocols to detect PPD, and to promote better treatments. Here, this study considers the use of social media as an early intervention tool by accelerating the potential diagnosis of mothers at risk of PPD and thus the implementation of early interventions.

2. Methods

We build a corpus of postpartum depression related posts matched with control posts using the Reddit API[2]. We collected public posts from PPD related subreddits, along with posts from parenting subreddits as controls. We conducted this study as a binary classification question. Prior to post classification, the preprocessing of the Reddit posts followed standard approaches in text classification. The posts were lowercased and tokenized, after removing all non-alphabetic characters. Stopwords were filtered. We considered Bag of Words (BoW) features as predictors and we applied counts and tf-idf based feature weighting. All experiments were managed using the scikit-learn machine learning framework [3]. Additionally, our experiment targeted the relation between gen-

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[2]https://www.reddit.com/dev/api/

eralized depression and postpartum depression. For this purpose, we employed a model previously trained on a dataset containing writings of depressed Reddit users, matched with control users, the Reddit Self-reported Depression Dataset (RSDD) proposed by Yates et al. [4].

3. Results

We performed experiments with two different estimators, under different configurations, Passive Aggressive and Perceptron, as well as the model trained on RSDD. We present the best results in Table 1. These results demonstrate that it is possible to distinguish postpartum depression related context from generalized user writings with quite a high degree of confidence. Moreover, as expected, there is a clear connection between the writing style of people suffering from depression, independently of their age and sex, and recent mothers that go through postpartum depression.

Table 1. Comparative results on classifying postpartum depression.

Method	Prec.	Rec.	F1	Acc
Perceptron	0.83	0.87	0.85	0.89
Passive Aggressive (loss=*sqrt_hinge*)	0.90	0.89	0.9	0.93
RSDD trained model	0.95	0.43	0.6	0.8

4. Conclusions

The preliminary results that we present in this paper serve as a motivation for safely exploring social media networks as enablers of early risk interventions for mothers suffering from postpartum depression. As future work, we will focus on extending the collected corpus with more user histories and identifying psycholinguistics features that differentiate the postpartum depression group from the control group within our corpus.

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