

# Chapter 30

## Recurrent Neural Network (RNN) to Analyse Mental Behaviour in Social Media

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### ABSTRACT

*A recent British study of people between the ages of 14 and 35 has shown that social media has a negative impact on mental health. The purpose of the paper is to detect people with mental disorders' behaviour in social media in order to help Twitter users in overcoming their mental health problems such as anxiety, phobia, depression, paranoia. The authors have adapted the recurrent neural network (RNN) in order to prevent the situations of threats, suicide, loneliness, or any other form of psychological problem through the analysis of tweets. The obtained results were validated by different experimental measures such as f-measure, recall, precision, entropy, accuracy. The RNN gives best results with 85% of accuracy compared to other techniques in literature such as social cockroaches, decision tree, and naïve Bayes.*

### 1. INTRODUCTION AND PROBLEMATIC

The human beings are under unprecedented competition pressures. Unavoidably, growing teenagers have to experience various adolescent psychological pressures, coming from study, communication, affection, self-recognition, etc. Facing the radical reform of society and economy, lot of persons get confused and become over-stressed due to their immature development of self-cognition and discrimination ability towards things (Koenig, 2018).

Instagram, Twitter, Facebook and Snapchat: these platforms attract the attention of 91% of 16-24 year olds. Between narcissism and harassment, creativity and self-expression, social networks are at the origin of a social revolution, especially among “millennials” (born between 95 and the early 2000s). Unfortunately the conclusion of StatusOfMind is that: social networks are, for the most part, bad for the morale

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of its young users. Thus, twitter is considered to be the most harmful followed closely by Snapchat, then Facebook and finally Instagram (Dragoni, 2018). According to a study by the public health foundation (Mental Health Foundation, 2015), the rate of anxiety and depression has jumped 70% among young people in the last 25 years when it correlated these figures with the increased use of social media. The study established a list of the negative consequences of social networks: cyber-harassment, Addiction (or the feeling of anxiety about missing something), Anxiety, depression, the feeling of loneliness, lack of sleep, physical ill-being. more than one in two (55%) say they have been embarrassed in their daily life by “symptoms of mental difficulty” (anxiety, phobia, depression, paranoia). Even more worrying: one in five young people (22%) say they have felt this discomfort significantly (HO, 2018).

In recent years, we are in a digital world where information is available in large quantities and in various forms. 80% of this mass of information was in textual form. It has only been recently that psychologists, interested in the psychological underpinnings of word usage, have begun using similar analyses of text to understand what words reveal about how people think and feel. For this reason, we need specific tools to access sentiments and meanings hidden in these data (Kazemian, 2018).

In this paper, we have applied the recurrent neural network in order to detect persons with abnormal mental behaviour through twitter analysis. The general structure of this paper will be as follows: we start with a state of the art for presenting the essential works in this topic, after we go on with a section to detail the adaptation of Recurrent Neural Network then an experimental and comparative study will be carried out for presenting the best results obtained. Finally, we will finish with a conclusion and describing some lines of thought that remain open and that we want to share them with you.

## **2. LITERATURE REVIEW (RELATED WORK)**

Microblogging websites have evolved to become a source of varied kind of information. This is due to nature of microblogs on which people post real time messages about their opinions on a variety of topics, discuss current issues, complain, and express positive sentiment for products they use in daily life. In fact, companies manufacturing such products have started to poll these microblogs to get a sense of general sentiment for their product.

The work of Hatzivassiloglou and McKeown in 1997 (Hatzivassiloglou, 1997) consists in using the coordinating conjunctions present between a word already classified and an unclassified word, followed by the contributions of researcher Nasukawa and his team in 2003 (Nasukawa, 2003) who proposed a new method for extracting associated concepts from segments and summing the orientations of the opinion vocabulary present in the same segment.

In the same year, researchers Yu and Hatzivassiloglou (Yu, 2003) used the probability of ranking a word to measure the strength of the orientation of the named entities. In 2006, researchers Kanayama and Nasukawa (Kanayama, 2006) as well as Ding and Liu (Ding, 2008) in 2008 proposed, for their part, a learning-based approach that uses the coordination conjunctions present between a word already classified and a word unclassified (Antonius, 2016).

The approaches of Pang et al introduced in 2002, and that of Charton and Acuna-Agost published in 2007 (pang, 2002) consist of classifying the texts according to a global polarity (positive, negative and neutral). These methods were optimized by Wilson and his research team in 2005 (Wilson, 2005). However, the difficulty lies in the constitution of these corpora of learning, which is a manual process to perform for each area studied. Finally, Vernier and his team (Vernier, 2009), have relied on a method

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