



MOHAMED BOUDIAF UNIVERSITY - M'SILA
FACULTY OF MATHEMATICS AND
COMPUTER SCIENCE



COMPUTER SCIENCE DEPARTMENT

A RESEARCH PAPER

**Submitted in partial fulfillment of the requirements for the Degree
of MASTER**

Domain: Mathematics and Computer Science

Branch: Computer Science

Specialty: Networks

By: BOUAFIA MOHAMED

TOPIC

Suicide detection in social networks

Publicly defended: 01/06/2016 before a Jury composed of:

Dr. T. Mehenni

Dr. L. Belabdelouahab

Mr. R. Yagoubi

Ms. A. bouzaroura

University of M'sila

University of M'sila

University of M'sila

University of M'sila

Supervisor

Chair

Examiner

Examiner

Academic Year: 2015 /2016

ACKNOWLEDGEMENTS



First of all I would like to thank Allah, the Merciful, for giving me the health and the strength to finish this search paper.

It is a great pleasure to me to thank the many people who in different ways have supported my graduate studies and contributed to the process of writing this memoir. First, I would like to thank my supervisor, Associate Professor and the Head of Computer Science Department Dr. **Tahar Mehenni** for his insightful direction and support during the period of writing the memoir. Also I would like to express my gratitude to the management and the staff of our university.

I would like to thank my family and friends for their sincere interest in our work and their moral support.

TABLE OF CONTENTS

Acknowledgement	i
Table of contents	ii
List of figures	iv
List of tables	iv
General introduction	1
CHAPTER 1: Suicide	3
1 Introduction	3
2 Suicidal Behavior	3
3 Understanding Suicide	3
4 Risk and Protective Factors	4
4.1 Risk factors	4
4.2 Protective factors	4
5 How does suicide affect health?	4
6 How suicide affects others	5
7 Why is suicide a public health problem?	6
8 Ten Commonalities of Suicide	6
9 Nonfatal Suicidal Thoughts and Behavior	7
10 Is it treatable?	9
11 What is going on in the mind of a suicidal person?	9
12 Suicide warning signs	9
13 What to Do?	11
14 Conclusion	12
CHAPTER 2: Social networks	13
1 Introduction	13
2 What is in SNS?	14
2.1 The Characteristics of Social Networks	15
2.2 A History of Social Network Sites	16
2.3 What do people do on SNS?	17
3 Social networks usage	17
4 Advantages and Disadvantages of Social Networking	18
4.1 Advantages of social networking	18
4.2 Disadvantages of Social Networking	18
5 Biological Impact of Social Networking	18

6	Its affects Work Productivity	19
7	Facebook Addiction Disorder	19
8	How to remain safe in SNS	21
9	Conclusion.....	22
CHAPTER 3: Predictive analysis and detection of suicide		23
1	Introduction	23
2	Early Detection.....	23
3	Warning Signs that could lead to suicide	24
4	The five domains that comprise the proposed risk factor matrix	26
5	Detection Levels.....	27
6	Protective factors.....	29
7	Assessment of suicidal behaviors.....	31
8	Myths and Facts about Suicide.....	31
9	Conclusion.....	33
CHAPTER 4: The system Implementation		34
1	Introduction	34
2	Human Language Technologies and Suicide Prevention.....	34
3	Mining Twitter for Suicide Prevention	35
4	Methodology	35
5	Collection of Twitter data	36
6	Implementation and Presentation of results	38
6.1	Learning machine.....	41
7	Conclusion:	42
General Conclusion		43
Bibliography		44
Appendix		47

LIST OF FIGURES

Figure 1.1 protective and risk vectors.	5
Figure 1.2 Suicide rates in the US.	6
Figure 1.3 Suicide rates by age group and sex United States, 2009.	8
Figure 1.4 Tweets	11
Figure 2.1 Timeline of the launch dates of many major SNSs	16
Figure 3.1 Overlap model (five domains).	26
Figure 3.2 A Conceptual Framework for Understanding Suicide.	30
Figure 4.1 the main interface (Detection).....	39
Figure 4.2 adding Tweets to Database interface.	40
Figure 4.3 adding suicide words to the database.....	41

LIST OF TABLES

Table 2.1 Top 10 social networking sites in the world.	13
Table 2.2 show participants' socio-demographic features and Facebook usage	20
Table 3.1 Level I-Detection Awareness.	28
Table 3.2 Level II - Major Problem Awareness.	29
Table 3.3 Level III--Major Psychiatric Disorder.....	29
Table 4.1 TF-IDF listing of first 25 tri-grams and five-grams.	37
Table 4.2 Keywords and phrases search terms.	38

GENERAL INTRODUCTION

At present, the suicide phenomenon is raising, having a relevant impact on our society. Each year about one million people die as a result of suicidal behavior becoming an economic, social and human problem. On the other hand, the use of Social Networks as a means of communication is becoming extremely popular, through which their emotional states and impressions are exchanged, and people find that writing about their feeling and sharing it to the world through this social networks is much easier then talking about it in real life so they will not be embarrassed or humiliated by other people, which they of course do not know their condition or they do know their conditions but do not care, and doing it any way for fun or other reasons. So people are more comfortable in these social networks and they feel more secure in it, especially when they talk anonymously, therefore, it is no surprise that more and more people with depression publish their suicide notes in these communication channels.

In this context, Information Technologies, Communications and more specifically Language Technologies play an important role in the early detection of suicide, their causes and their terrible consequences. Based on these considerations, it is mandatory to provide societal, environmentally approaches and solutions to tackle these societal challenges. This work is an exhaustive survey of the different researches in this scope, in order to explain which methodologies, technologies and resources are used in the detection of suicide by means of the Social Networks analysis as well as to preventing it.

Our program here has the same role, which is to detect suicidal people only from their publication in to social networks like Facebook or tweeter. In this search paper we are going to focus in the social network tweeter and we are going to mention all the reasons why we have chosen it, specifically in the later chapters, also we want to note that when we detect the suicidal person then we could prevent it is suicide, we can talk to him about his conditions, and perhaps he does not know that he is doing things which they are signs of suicide, or even we could recommend some authority or divisions or organization all over the world that take good cares of suicidal people, and treat them in where ever suicide level they are in, or where ever they are from, also whatever their financial state.

So we are going to talk about suicide in the first chapter, and all the risk factors and protective ones, and how it evolved over the years in two or three countries, and what are the reasons of its

growth especially in the twenty first century, after that we'll see if suicide effects health and or does it affect on others, other than the suicidal person, also we will take a tour in the suicidal person mind and how he thinks, and how all of them are divided in two parts, also how each of the parts think and want, we will mention the most common suicide warning signs that could happen to the suicidal person and in that point we could detect if there is suicidal thought or not, and by that we could interfere and prevent him or her from committing suicide, so before last we will say if its treatable or not and finally we will clarify what to do If someone you know exhibits warning signs of suicide.

In the second chapter, we will talk about social networks, in the beginning we define the meaning of social network sites SNS, its characteristics, its history and what people do on SNS also we will see the usage of social networks, and some advantages and disadvantages, we will talk about the impact and the affects of the SNS in work productivity, and finally we see some tips about how we could remain safe from SNS.

In the third chapter, we link between them between social networks and suicide that how we can detect or predict suicide or even prevent it, by using the new medium of communication which is social networks. So we will talk about the early detection and the meaning is that when the person started to think about committing suicide, and we can know that by analyzing the signs that could lead to suicide. Then we will explain each of the three levels in detection, and in here where our work start to be more and more clear, after that we mention some of the myths which are out there, and we correct them, then finally we jump to the protective factors where everyone can fort and protect himself to fall for this kind of things.

In the fourth chapter, the creation of our program or the implementation of the early work, so we will create a program which is capable of detecting suicide notes or tweets, and we will clarify why we use tweets, and we will make the program more adaptive which means that it can learn from the suicidal tweets that has been detected. And the tools that will help us create the program are the first and the main one is the Netbeans IDE version 8.0.2 with the latest JDK and we will use xampp which is an integrated server package of Apache, MySQL, PHP, Perl and it will help us with the creation of our database and the manipulation of it.

CHAPTER 1

SUICIDE

1 Introduction

Suicide is when people direct violence at themselves with the intent to end their lives, and they die as a result of their actions. Suicide is a leading cause of death in the United States.

A suicide attempt is when people harm themselves with the intent to end their lives, but they do not die as a result of their actions. Many more people survive suicide attempts than die, but they often have serious injuries. However, a suicide attempt does not always result in a physical injury.

Every year, almost one million people die by suicide around the world. Suicide remains a significant social and public health problem. In 1998, suicide constituted 1.8% of the total disease burden; this is estimated to rise to 2.4% by 2020. Young people are increasingly vulnerable to suicidal behaviors. Worldwide, suicide is one of the three leading causes of death among those in the most economically productive age group (15-44 years), and the second leading cause of death in the 15-19 years age group. At the other end of the age spectrum, the elderly are also at high risk in many countries. [1]

Suicidal behaviors can be conceptualized as a complex process that can range from suicidal ideation, which can be communicated through verbal or non-verbal means, to planning of suicide, attempting suicide, and in the worst case, suicide. Suicidal behaviors are influenced by interacting biological, genetic, psychological, social, environmental and situational factors.

2 Suicidal Behavior

Suicidal behavior includes:

- Suicidal ideation (thinking about ending one's life)
- Suicide attempt (non-fatal suicidal behavior)
- Suicide (ending one's life)

3 Understanding Suicide

Although some people may perceive suicide as the act of a troubled person, it is a complex outcome that is influenced by many factors. Individual characteristics may be important, but so

are relationships with family, peers, and others, and influences from the broader social, cultural, economic, and physical environments.

There is no single path that will lead to suicide. Rather, throughout life, a combination of factors, such as a serious mental illness, alcohol abuse, a painful loss, exposure to violence, or social isolation may increase the risk of suicidal thoughts and behaviors.

4 Risk and Protective Factors

4.1 Risk factors

They are characteristics that make it more likely that a person will think about suicide or engage in suicidal behaviors. Although risk factors generally contribute to long-term risk, stressful events, such as relationship problems, financial difficulties, or public humiliation could provide the impetus for a suicidal act.

4.2 Protective factors

They are not just the opposite or lack of risk factors. Rather, they are conditions that promote strength and resilience and ensure that vulnerable individuals are supported and connected with others during difficult times, thereby making suicidal behaviors less likely. [2]

Risk and protective factors for suicidal behaviors can be found at many levels, from the individual to the community and society at large. The social ecological model (see **Figure 1.1**) provides a useful framework for viewing these factors along four levels of influence: individual, relationship, community, and societal. The figure lists the major risk and protective factors for suicidal behaviors identified in the literature, [2] [3] and these factors can vary between individuals and across settings.

Suicide is closely linked with mental and substance use disorders [4] and shares risk and protective factors with other types of self-directed violence, interpersonal violence, 15 and other related problems. As a result, efforts to reduce the risk factors and to increase the protective factors for suicide are likely to also help prevent or reduce these and other problems. [5]

5 How does suicide affect health?

People who attempt suicide and survive may experience serious injuries, such as broken bones, brain damage, or organ failure. These injuries may have long-term effects on their health. People who survive suicide attempts may also have depression and other mental health problems.

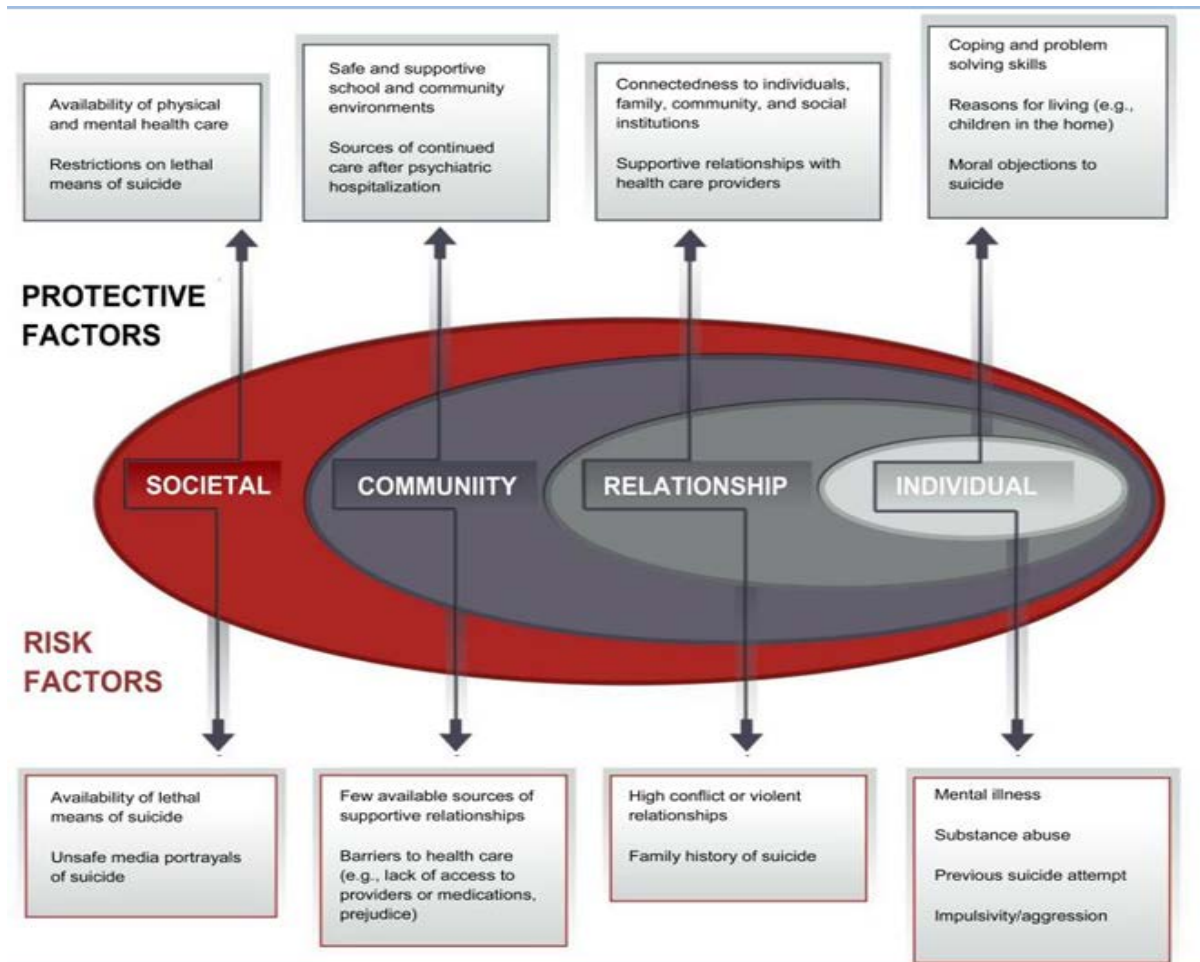


Figure 1.1 protective and risk vectors. [45]

Suicide also affects the health of others and the community. When people die by suicide, their family and friends often experience shock, anger, guilt, and depression. The medical costs and lost wages associated with suicide also take their toll on the community.

6 How suicide affects others

There is no blueprint for how we react to and cope after a suicide. We each have our own relationship with the person who died and we all grieve in our own way and at our own pace.

When someone grieves in a different way to you, it doesn't mean that they don't care – they are just finding their own way to cope. But it can be hard if they behave in a way that you can't relate to. It can also be difficult to express our own grief around others if they are reacting differently, especially if those people also had a close relationship with the person who died.

Patience and understanding is helpful and it is important that you try and find somewhere you can share your feelings. And remember that there is support available from others from outside

friends and family – this can provide a space to “be yourself” without having to worry about how others will react. [6]

7 Why is suicide a public health problem?

- Myth – Suicide in youth is not a problem
- Truth - Suicide in young people is a serious and prevalent problem:
 - ❖ Suicide is the 10th leading cause of death in the US.
 - ❖ Each year 42,773 Americans die by suicide. See the **(Figure 1.2)**
 - ❖ For every suicide 25 attempt.
 - ❖ Suicide costs the US \$ 44 Billion Annually
 - ❖ On average, there are 117 suicides per day.
 - ❖ 494,169 people visited a hospital for injuries due to self-harm.
 - ❖ Top methods used - firearms, suffocation, poisoning [7]

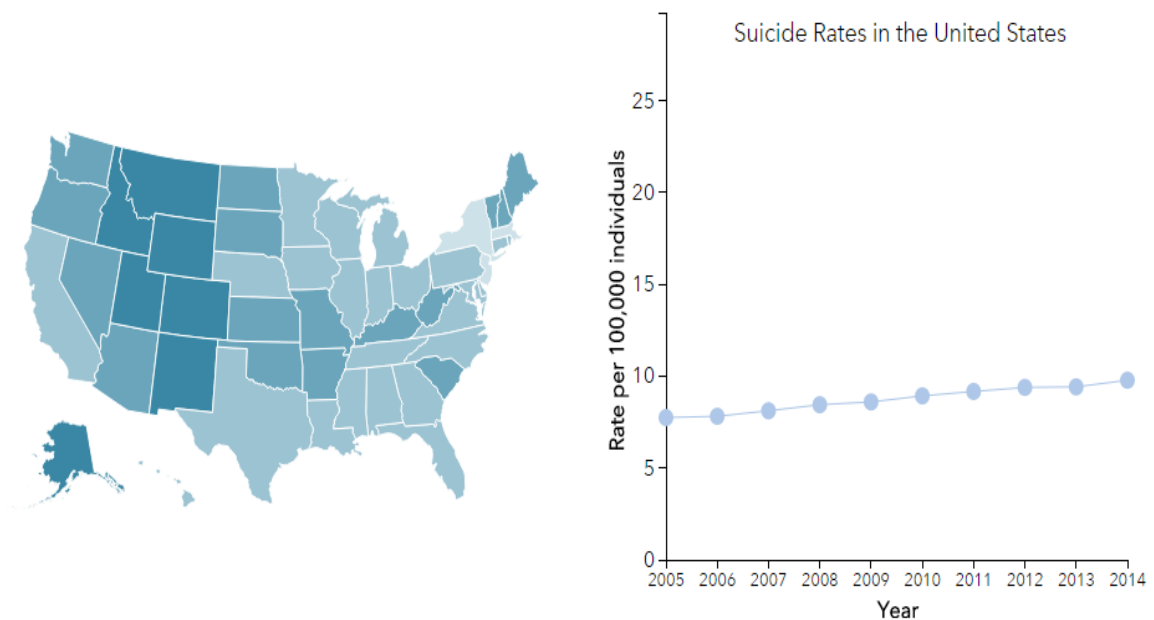


Figure 1.2 Suicide rates in the US. [7]

8 Ten Commonalities of Suicide

1. The common purpose of suicide is to seek a solution: A suicidal person is seeking a solution to a problem that is "generating intense suffering" within him or her.
2. The common goal of suicide is cessation of consciousness: The anguished mind of a suicidal person interprets the end of consciousness as the only way to end the suffering.

3. The common stimulus of suicide is psychological pain: Shneidman calls it "psychache," by which he means "intolerable emotion, unbearable pain, and unacceptable anguish."
4. The common stressor in suicide is frustrated psychological needs: A suicidal person feels pushed toward self-destruction by psychological needs that are not being met (for example, the need for achievement, for nurturance or for understanding).
5. The common emotion in suicide is hopelessness-helplessness: A suicidal person feels despondent, utterly unsalvageable.
6. The common cognitive state of suicide is ambivalence: Suicidal people, Shneidman says, "wish to die and they simultaneously wish to be rescued."
7. The common perceptual state in suicide is constriction: The mind of a suicidal person is constricted in its ability to perceive options, and, in fact, mistakenly sees only two choices—either continue suffering or die.
8. The common action in suicide is escape: Shneidman calls it "the ultimate egression (another word for escape) besides which running away from home, quitting a job, deserting an army, or leaving a spouse ... pale in comparison."
9. The common interpersonal act in suicide is communication of intention: "Many individuals intent on committing suicide ... emit clues of intention, signals of distress, whimpers of helplessness, or pleas for intervention."
10. The common pattern in suicide is consistent with life-long styles of coping: A person's past tendency for black-and-white thinking, escapism, control, capitulation and the like could serve as a clue to how he or she might deal with a present crisis. [8]

9 Nonfatal Suicidal Thoughts and Behavior

- ❖ Among adults aged ≥ 18 years in the United States during 2013:
 - An estimated 9.3 million adults (3.9% of the adult U.S. population) reported having suicidal thoughts in the past year.
 - The percentage of adults having serious thoughts about suicide was highest among adults aged 18 to 25 (7.4%), followed by adults aged 26 to 49 (4.0%), then by adults aged 50 or older (2.7%).
 - An estimated 2.7 million people (1.1%) made a plan about how they would attempt suicide in the past year.

- The percentage of adults who made a suicide plan in the past year was higher among adults aged 18 to 25 (2.5%) than among adults aged 26 to 49 (1.35%) and those aged 50 or older (0.6%).

An estimated 1.3 million adults aged 18 or older (0.6%) attempted suicide in the past year. Among these adults who attempted suicide, 1.1 million also reported making suicide plans (0.2 million did not make suicide plans). [9]

Gender Disparities:

- Males take their own lives at nearly four times the rate of females and represent 77.9% of all suicides. See the **Figure 1.3** [10]
- Females are more likely than males to have suicidal thoughts.
- Suicide is the seventh leading cause of death for males and the fourteenth leading cause for females.
- Firearms are the most commonly used method of suicide among males (56.9%).
- Poisoning is the most common method of suicide for females (34.8%).

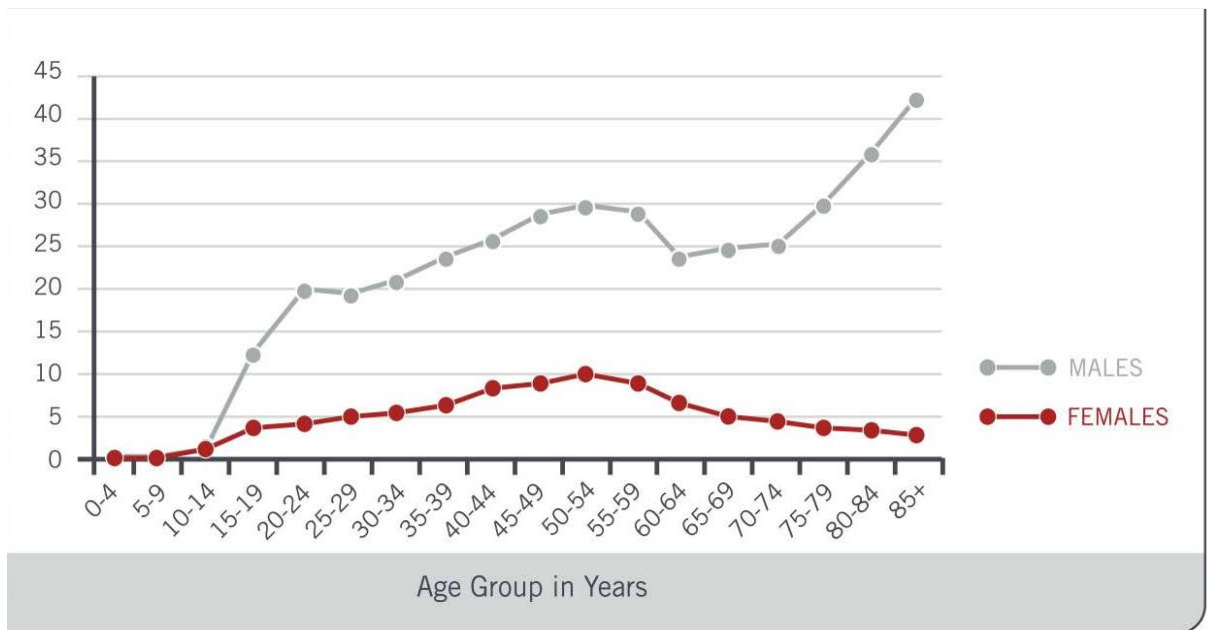


Figure 1.3 Suicide rates by age group and sex United States, 2009. [10]

Although white men 75 years of age and older have the highest rates of suicide, most deaths from suicide occur among white men in midlife, who make up a larger part of the population. Suicide rates among young people 15–24 years of age are generally not higher than among adults. However, because young people are less likely than older people to die from medical

conditions such as heart disease and cancer, suicide is one of the top three causes of death in this population, along with unintentional injuries and homicides. Moreover, suicidal behaviors are particularly common among some subgroups of youth. For example, it is estimated that 14 to 27 percent of American Indian/Alaska Native adolescents have attempted suicide. [11]

Having a mental and/or a substance use disorder can greatly increase the risk for suicidal behaviors. Suicide rates are particularly high among individuals with mood disorders such as major depression and bipolar disorders. Suicidal thoughts and/or behaviors are common among patients with bipolar disorders, and suicide rates are estimated to be more than 25 times higher for these patients than among the general population. [12] Another mental disorder that may increase the risk for suicide is schizophrenia. Suicide has been estimated to occur in approximately 5 percent of patients with this disorder. [13]

10 Is it treatable?

There are many misconceptions about suicide, one of them being that suicidal people want to die and cannot be helped. What both mental health professionals and the public should know is that the suicidal state is almost always transient and treatable. Therapists can prepare themselves for working with such clients by learning to implement the tools and techniques that have been found effective to assess and treat suicidal individuals.

11 What is going on in the mind of a suicidal person?

There are some who consider suicide a human right, and who therefore believe no one should interfere with a person's decision to consider suicide. But this thinking fails to understand that people are divided within themselves: One part of them wants to live and is goal-directed and life-affirming, while the other part is self-critical, self-hating and ultimately self-destructive. This ambivalence is always a factor when it comes to suicide. More than 3,000 people have leapt to their death from San Francisco's Golden Gate Bridge, but out of the 26 people who survived the jump, all 26 reported that the moment they leapt from the bridge, they regretted their action and wanted to live. [14]

12 Suicide warning signs

Before a person actually commits suicide, there are many detectable signs. (National Institutes of Health) NIH lists the Following as common symptoms of depression and suicidal thoughts:

- Extreme self-hatred: "You don't deserve to live."

- Personalized hopelessness: "Nothing matters anymore. You should just kill yourself."
- Pushing away friends and family: "What's wrong with you? Look at all this trouble you're causing the people who love you."
- Isolation: "Just be by yourself. You are better off alone."
- Thoughts of not belonging: "You don't fit in anywhere."
- Thoughts of being a burden to others: "You're just dragging everyone down. You are such a burden; they would be better off without you."
- The following are common behaviors that indicate suicide risk:
 - Past attempts.
 - Disrupted sleep patterns.
 - Increased anxiety and agitation.
 - Outbursts of rage or low frustration tolerance.
 - Risk-taking behavior.
 - Increased alcohol or drug use.
 - Sudden mood change for the better.
 - Any talk or indication of suicidal ideation or intent, planning or actual actions taken to procure a means. [14]

In fact, a lot of the warning signs of suicidal and depressed thoughts involve talking, or more usefully, expressing emotions through social media. As seen in **Figure 1.4**, searching for hash tags that you would expect to be associated with suicidal thoughts results in a lot of mixed results.

Anxiety can be caused by a particular situation like a job interview and not be a long term concern. Dramatic hash tags like want-to-die are usually used sarcastically. Hopefully no one is actually suicidal because they lost their fleecy bed sheets. The tags hopeless, stressed, and moodswings seemed best at finding posts that would be possible red flags for someone in need of clinical intervention. Obviously, you wouldn't want to bother a user who's having a bad day, but by watching a user's activity over time you could find repeated negative thoughts that might indicate they're at high risk for suicidal thoughts and behavior.

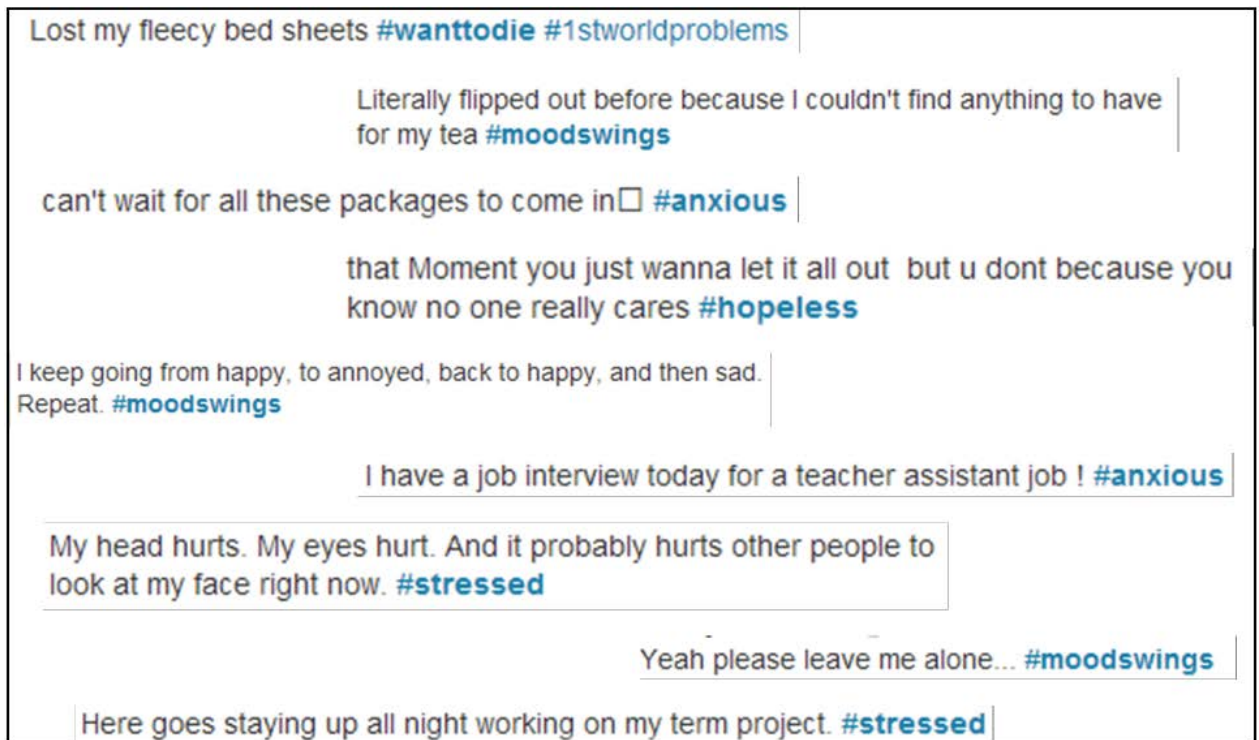


Figure 1.4 Tweets [14]

13 What to Do?

If someone you know exhibits warning signs of suicide:

- Do not leave the person alone;
- Remove any objects that could be used in a suicide attempt;
- Call the U.S. National Suicide Prevention Lifeline at 1–800–273–TALK(8255).
- Take the person to an emergency room or seek help from a medical or mental health professional. [15]

Individuals in some settings, systems, and professions may be at an increased risk for suicidal thoughts and/or behaviors compared to the general population. Suicide is often the most common cause of death in secure justice settings. [16] More than 400 suicides occur each year in local jails at a rate three times greater than among the general population, and suicide is the third leading cause of death in prisons. [17]

More research is needed to better understand why suicide rates may be particularly low among some groups, such as African American women. In 2009, the suicide rate among black women aged 20–59 years was 2.77 per 100,000, the lowest rate among adults in this age range. [11]

14 Conclusion

Suicide is a priority condition globally and has been identified as such by the World Health Organization (WHO). A national suicide prevention strategy should be developed through a stepwise approach. Such a strategy acknowledges, as a first step, that suicide is a major problem and that it is preventable. The process of developing a national strategy provides an impetus to suicide prevention by improving awareness among government representatives and local communities. The lack of resources (human or financial) can no longer remain an acceptable justification for not developing or implementing a national suicide prevention strategy. National governments have to focus on ways to use the available resources optimally and collaborate with state and local jurisdictions, as necessary. Once approved by the government, the implementation of the strategy, with its concrete action plans and programs, will greatly benefit from the broad participation in its development. Suicide prevention is a collective responsibility, and must be spearheaded by governments and civil society throughout the world.

CHAPTER 2

SOCIAL NETWORKS

1 Introduction

Social networks have become a global phenomenon and attracted extensive population from all around the world in different ages, cultures, education levels, etc. In addition to routinely checking e-mails, reading daily forums and newspapers or following instant message tools, people now also check their social network profiles by following others status changes, updating their profiles or looking at others profiles. Research has shown that many people connect to social network sites at least once a day either to check their profiles or to participate in different online activities. [18]

Social networks are defined as a body of applications that augment group interaction and shared spaces for collaboration, social connections, and aggregates information exchanges in a web-based environment. Facebook, Twitter, LinkedIn, Pinterest, and Google Plus+ are the most commonly known social network sites (SNSs) (shown in the **Table 2.1**) containing similar as well as different features. Facebook is handled among other social networks in this study because of being the most popular and most heavily visited social network website [19]

Rank	Sites	Estimated Unique Monthly visitors
1	Facebook	1,100,000,000
2	Twitter	310,000,000
3	LinkedIn	255,000,000
4	Pinterest	250,000,000
5	Google Plus+	120,000,000
6	Tumblr	110,000,000
7	Instagram	100,000,000
8	VK	80,000,000
9	Flickr	65,000,000
10	Vine	42,000,000

Table 2.1 Top 10 social networking sites in the world. [19]

Facebook is defined as “a social utility that helps people share information and communicate more efficiently with their friends, family and coworkers” (facebook.com). Despite the fact that Facebook was launched in 2004 as a Harvard-only Social Network site, it expanded to include

other high school students, professionals inside corporate networks, and eventually everyone who have access to the online world [20]. Facebook provides an opportunity to users, to create personalized profiles that include general information like education background, work background, and favorite interests and also to add links and song clips of their favorite bands, post messages on friend's pages, and post and tag pictures and videos, among other things [21]

While SNSs have implemented a wide variety of technical features, their backbone consists of visible profiles that display an articulated list of Friends who are also users of the system. Profiles are unique pages where one can "type oneself into being". After joining an SNS, an individual is asked to fill out forms containing a series of questions. The profile is generated using the answers to these questions, which typically include descriptors such as age, location, interests, and an "about me" section. Most sites also encourage users to upload a profile photo. Some sites allow users to enhance their profiles by adding multimedia content or modifying their profile's look and feel. Others, such as Facebook, allow users to add modules ("Applications") that enhance their profile. [22]

The visibility of a profile varies by site and according to user discretion. By default, Profiles on Friendster and Tribe.net are crawled by search engines, making them visible to anyone, regardless of whether or not the viewer has an account. Alternatively, LinkedIn controls what a viewer may see based on whether she or he has a paid account. Sites like MySpace allows users to choose whether they want their profile to be public or "Friends only." Facebook takes a different approach by default; users who are part of the same "network" can view each other's profiles, unless a profile owner has decided to deny permission to those in their network. Structural variations around visibility and access are one of the primary ways that SNSs differentiate themselves from each other.

2 What is in SNS?

After joining a social network site, users are prompted to identify others in the system with whom they have a relationship. The label for these relationships differs depending on the site popular terms include "Friends," "Contacts," and "Fans." Most SNSs require bidirectional confirmation for Friendship, but some do not. These one-directional ties are sometimes labeled as "Fans" or "Followers," but many sites call these Friends as well. The term "Friends" can be misleading, because the connection does not necessarily mean friendship in the everyday vernacular sense, and the reasons people connect are varied. [23]

The public display of connections is a crucial component of SNSs. The Friends list contains links to each Friend's profile, enabling viewers to traverse the network graph by clicking through the Friends lists. On most sites, the list of Friends is visible to anyone who is permitted to view the profile, although there are exceptions. For instance, some MySpace users have hacked their profiles to hide the Friends display, and LinkedIn allows users to optional out of displaying their network.

Most SNSs also provide a mechanism for users to leave messages on their Friend's profiles. This feature typically involves leaving "comments" although sites employ various labels for this feature. In addition, SNSs often have a private messaging feature similar to webmail. While both private messages and comments are popular on most of the major SNSs, they are not universally available.

2.1 The Characteristics of Social Networks

- User Based
 - ✓ Users submit and organize information
 - ✓ Direction of content can be determined by any user
 - ✓ Freeform/unstructured
- Interactive
 - ✓ Not just a collection of chat rooms and forums
 - ✓ Users can play games, take fun quizzes, share photos and ideas with friends
 - ✓ A way to connect and have fun with friends
- Community Driven
 - ✓ Members hold common beliefs or interests
 - ✓ Can make new friends with people who say they share your interests or beliefs
 - ✓ Can reconnect with old friends
- Relationships
 - ✓ Social networks are driven by the number of relationships between its members
 - ✓ With no control on your settings, information will be dispersed to your friends, their friends, and so on...
- Emotional Content
 - ✓ In the past, web content was primarily information

- ✓ Social networks allow people to communicate needs within a community of friends and receive immediate responses. [24]

2.2 A History of Social Network Sites

Nowadays, one can no longer imagine how to catch up with friends and contacts without social networking. Social networking helped us become closer to our friends, even when they are a thousand miles away. Through the World Wide Web, we are able to connect with people from around the world, so the **figure 2.1** shows the Timeline of the launch dates of many major SNSs.

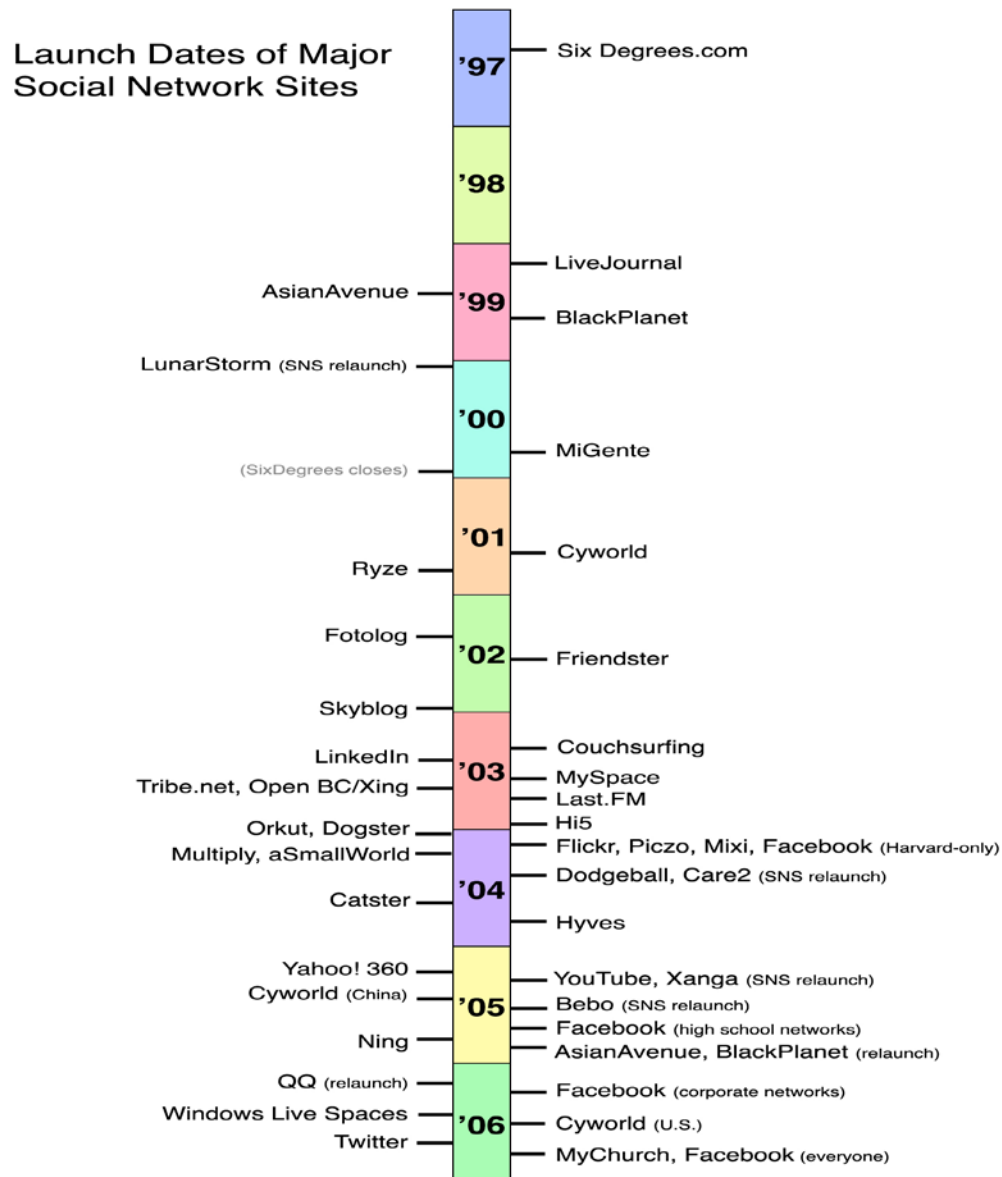


Figure 2.1 Timeline of the launch dates of many major SNSs [25]

2.3 What do people do on SNS?

People use SNS for countless activities. Among the most common uses, however, are:

- Viewing content/finding information
- Creating and customizing profiles

There are many different kinds of profile, although they typically consist of a member owned web page, supported by a range of tools. Profile pages are not just lists of information; they allow members to develop and present an image of themselves to the world, and to establish online identities. Displays of preferences (favorite music, books, films for example) allow members to represent their personality and taste. Most social networking sites also allow members to customize the look and feel of their pages to a greater or lesser extent, through page templates or content, including video, music and images.

- Connecting with existing networks, making and developing friendships/contacts. Young people tend to use SNS to consolidate their existing friend networks – however, in the same way that some children and young people collect trading cards or kinds of toy, some young people use social networks to collect contacts and to display their popularity.
- Authoring and uploading content might be in the form of messages or blog posts – it might also be photos, video or music.
- Adding and sharing content this might be in the form of links or embedded content hosted somewhere else – for example a video hosted at YouTube or another video hosting service.
- Posting messages – public and private many services support public and private messaging – through message boards or in service email. MySpace and Facebook offer members an Instant Messaging system.
- Collaborating with other people service tools vary – but group space, for example, allows users to collectively create profiles, hold discussions, store, share and comment on objects. In service messaging can be a rich source of informal collaboration. [25]

3 Social networks usage

People use social network sites for a variety of reasons among which ease of use, allowing rapid updating, analyzing and sharing the continuously increasing information, reflecting on daily life, establishing and maintaining spontaneous social contacts and relationships, supporting

informal learning practices with interaction and communication and facilitating delivery of education are the leading ones. Thus, these reasons explain why social network sites are adopted rapidly although they first had emerged with the purpose of sharing photos, personal information, videos, profiles and related content. [26]

4 Advantages and Disadvantages of Social Networking

Social Networking has grown to a level where it becomes part of people's everyday living. As with everything on the internet, there are disadvantages and advantages with using social networking.

4.1 Advantages of social networking:

- Low costs

Social networking for personal and business use is free. It is an easy and cost effective way to reach your consumers and people in your network.

- Builds Credibility

For business purposes, connecting with your customers on a personal and professional level will make them loyal to your company and brand.

- Connections

Connecting with people in your friends networks or your work networks will benefit you in the long run. It will help you gain connections which may be useful in the future.

4.2 Disadvantages of Social Networking:

- Lack of anonymity

Social networking usually requires you to input your name, location, age, gender and many other types of personal information.

- Scams and harassment

Being online you are at risk to face cases of harassment, cyber-stalking, online scams and identity theft.

- Time consuming

If you are new to social networking, learning the process can be very time consuming. [27]

5 Biological Impact of Social Networking:

Social networking users face severe health risk because they reduce face-to-face contact and become addicted in a virtual world of relationships. Instant gratification of needs become their

goal. According to the U.S. Internet activity (January 2010) Nielsen Online says, users spent an average of 7 hours a month on Facebook. This makes Facebook Internet's maximum time waster. In U.S. 53 percent of people check their Facebook profile before getting out of bed in the morning and 35 percent check their accounts several times in a day. [28]

Social networking sites have played a significant role in making people become more isolated. Lack of face-to-face contact could alter the way genes work, upset immune responses, hormonal levels, function of arteries and influence mental performance. This could increase the risk of health problems like cancer, strokes, heart disease and dementia. [29]

6 Its affects Work Productivity:

People spent hours chatting with their friends and browsing profiles on social networking sites. It becomes a compulsive habit to visit own profile several times in a day for checking friends' updates, changing status, and commenting on others photos and videos. Finally it diverts employees' attention from the office work. A study conducted by Nucleus Research with 237 corporate employees shows 77 percent of them use Facebook during work hours. And it results in 1.5% drop in employee productivity for those companies allowing full access to Facebook.

Another study by Robert Half Technology, An Information Technology IT staffing firm, says "54% of U.S. companies have banned workers from using social networking sites while on the job". [30]

This was further affirmed by a survey of 3500 UK companies, it says 233 million hours are lost every month as a result of employees wasting time on social networking sites, Mike Huss, director of employment law at Peninsula says "All firms should block access to sites such as Facebook. Why should employers allow their workers to waste two hours a day on Facebook when they are being paid to do a job". Portsmouth City Council blocked access to Facebook after it found its 4,500 staff logged on for 270,000 times a month, and they collectively waste 572 hours (71 working days) in just one month. [31]

7 Facebook Addiction Disorder:

After drugs and alcohol addiction, if the world is facing any new type of addiction disorder, then that is Facebook addiction. This is a kind of Internet addiction, but social networking site influences such that people goes mad behind it. It's like people being immersed in virtual life and forgetting about the physical world around them.

Alexandra V. Tobias, a mother from north Florida, killed her own child because the boy was crying that make her anger while she was playing FarmVille on Facebook. The shocking story was reported by the Florida Times-Union in 2010. Salum Kombo, 18 years old from London, was stabbed by his friend over an argument that started over Facebook. Salum wrote something stupid on his friend's wall and that provoked the boy to kill his best friend on the street. [32]

Table 2.2 shows participants' socio-demographic features and Facebook usage behaviors.

		Frequency	Percent (%)
Gender	Male	367	40.6
	Female	536	59.4
Place of Residence	At home	15	1.7
	At home with friends	278	30.8
	With family	112	12.4
	With relatives	9	1.0
	At dormitory	475	52.7
	Pension/ Hotel	13	1.4
Facebook Connection	Computer	490	54.4
	Mobile Phone	147	16.3
	Both of them	263	29.2
Facebook Usage Experience	Less than 1 year	69	7.7
	1-2 years	224	24.9
	3-4 years	446	49.5
	5 years and more	162	18.0
Facebook Usage Frequency	1 day in a week	124	13.8
	2-3 days in a week	235	26.1
	4-5 days in a week	249	27.6
	Everyday	293	32.5

Table 2.2 show participants' socio-demographic features and Facebook usage [33]

Dr. Joanna Lipari, a clinical psychologist at University of California says there are five clues that show you are addicted to Facebook. [33]

- ✓ You start losing sleep over Facebook and that hampers your daily activity.
- ✓ Spend more than an hour on Facebook.
- ✓ You become obsessed with your old loves and start visiting their profile. And gradually it
- ✓ Starts to affect your current relationship status.
- ✓ You tend to ignore work and use Facebook in office hours.

- ✓ When you think of going a day without Facebook, it causes stress and anxiety to you.

8 How to remain safe in SNS:

Whether to use social networking site or not is an individual decision to many. But you must be aware of certain things when discussing your private life in public. These are some of the tips that can make you and your family safe on the networking sites:

1. Change the profile privacy now.

Keep your information accessible only to people in your friend list.

2. Don't accept friendship request from strangers.

Many often we judge a particular person online, by his/her profile picture and personal information. This is the first mistake that cyber criminals wanted us to do.

3. Don't post very personal information on the profile.

It includes your email id, date of birth, contact number, home address and information about your family members.

4. Be cautious while posting your photo.

Ensure your photo background doesn't show about your actual whereabouts.

5. Don't post your current location when on a tour.

Posting this information on social networking site is just like inviting criminals.

6. Don't post negative things about your life.

This is just like maligning your own image. Your friends are monitoring your activity and one such mistake can cause havoc in future.

7. Make distance from your ex's profile.

This might seem you little cruel, but once you decide to quit a relationship there is no meaning again visiting your ex-partner's profile. If you want to have a good life in the future, then unfriend your ex from friend list.

8. Don't substitute real friends with virtual friends.

Facebook is a great tool to connect new people across world. But they can never be your real friends. You need real friends to enhance your social image and reduce stress and anxiety.

9. Avoid using Social networking sites in work hours.

When you try to use social networking sites during work hour, it not only affects your work performance but also increases chances of getting fired.

9 Conclusion

Today Facebook draws attentions as a biggest social networking site preferred by youth and with its almost one billion members. With its possibilities such as communicating with friends, socialization, getting information about people and events, entertaining and relaxing; it is the most preferred social networking site of the world. However, heavy and unconsciously usage of social networking sites like Facebook cause big problems to users and at the present most important of these problems is addiction. Although addiction was defined as an illness that patients cannot resist some psychical materials or drugs, today it has developed and extended its classical borders.

CHAPTER 3

PREDICTIVE ANALYSIS AND DETECTION OF SUICIDE

1 Introduction

Over the last years Suicidal behavior represents a major public health problem requiring the development and implementation of early detection and treatment strategies.

So in this chapter we are going to talk about risk factors that could lead to early detection of youth suicide, These risk factor domains include psychiatric diagnosis, personality traits, psychosocial factors, life events and chronic medical illness, biological factors, and family history and genetics. The three levels of early detection are detection awareness, major problem awareness, and major psychiatric disorders. Detection awareness requires a strong component of education and public health interventions. Major problem awareness requires a level of active intervention and treatment in dealing with behavior problems, personality issues, or specific life events. The final level deals not exclusively but primarily with the treatment of psychiatric disorders since it is proposed that treatment of specific psychiatric syndromes plays a major role in preventing suicide.

Suicide is the final common pathway for many human problems. Warning signs of suicidal behavior in young people include sudden changes in behavior, impulsivity, change in appetite, change in sleep patterns, a humiliating life experience, persistent feeling of guilt, self reproach and hopelessness, loss of interest in usual activities such as school or sports, decreased concentration, suicide “talk” making a “will” and giving away a prized possessions. When several of these warning signs persist and cluster, the physician or other health care practitioner should be alert to risk of suicidal behavior in a young person.

2 Early Detection

We are going to talk about students who attend school because that’s the place we can detect mostly where a young boy or a girl is thinking of suicide.

School is the environment where youngsters spend most of their time. By providing a safe and healthy environment where mental health is promoted, school can contribute greatly to the prevention of student suicide.

‘There is no health without mental health’. Mental health is ‘a state of emotional and social well-being that enables people to undertake productive activities, experience meaningful interpersonal relationships, adapt to change and cope with adversities.’ Promotion of mental health for all students can enhance their ability to cope and feel positive about people and events in life, increase resilience and reduce the incident of suicidal behavior. In the multi-level ‘Health Promoting Schools Framework’ advocated by The World Health Organization (WHO) (2000), promotion of mental health is the basis of suicide prevention. [34]

3 Warning Signs that could lead to suicide

Research has demonstrated that in over 80% of completed suicide, a warning sign or signs were given. The following is a list of warning signs grouped under seven categories:

❖ Unexpected reduction of academic performance

- Drop in grades and academic performance
- Apathy in class
- Failure to complete assignments
- Inability to concentrate on school work and routine tasks
- Increased absences or truancy
- Increased aggression, frequent trouble-making in school

❖ Expression of ideas and themes about death and suicide

- Written essays, conversation and artwork contains ideation about death/suicide
 - ✓ -Direct statements indicating a wish to die or escape or a final departure
 - ‘I wish I were dead.’
 - ‘I am going to kill myself.’
 - ‘I am going to end it all.’
 - ✓ Indirect or subtle statements indicating feelings of hopelessness and helplessness
 - ‘I am so tired of it all.’
 - ‘You will be better off without me.’
 - ‘What’s the point of living?’
 - ‘Who cares if I’m dead’
 - ‘Very soon you won’t have to worry about me.’
 - ‘I should never have been born.’

- Exploring various lethal means such as sleeping pills, hanging, charcoal burning, etc. from different sources, e.g. peers, the internet, etc.
- Making plans and/or final arrangements e.g. giving away prized possessions, putting affairs in order
- ❖ Change in mood and marked emotional instability
 - Anger at self, increased irritability, moodiness, aggressiveness
 - Pervasive sadness, sudden tearfulness
 - Overwhelming guilt, shame
 - Increased hopelessness, helplessness and worthlessness
- ❖ Significant stress events
 - Grief about a significant loss e.g. death of friend/family member, breakup with boy/girl friends, suicide of a peer, anniversary of someone else's suicide, etc.
 - Situational stress e.g. unwanted pregnancy, trouble with the law/disciplinary crisis, severe family disruption, physical/sexual abuse, etc.
- ❖ Withdrawal from relationships
 - Loss of interests in surroundings, friends, hobbies or activities previously enjoyed
 - Drop out of sports and clubs
 - Isolation
- ❖ Physical symptoms with emotional cause
 - Increased physical complaints such as headache, stomachaches, fatigue, body aches
 - Change in sleep or eating patterns, nightmares, eating disturbances
 - Neglecting personal hygiene/physical appearance
 - Disorientation, frequent accidents
- ❖ High risk behaviors
 - New involvement in high risk activities
 - Increased use of drugs or alcohol
 - Repeated self-injuries behaviors [35]

It is estimated that as many as 90% of individuals who have ended their lives by committing suicide had a mental disorder, 60% of which were depressed at the time. In fact, all types of mood disorders have been clearly linked to suicidal behavior. Depression and its symptoms

(e.g., sadness, lethargy, anxiety, irritability, sleep and eating disturbances) should alert all counselors to the potential risk of suicide.

Elevated risk for suicide also has been associated with schizophrenia, substance abuse disorders, personality disorders, anxiety disorders including Post-traumatic stress disorder (PTSD), and diagnostic comorbidity.

Approximately 10-15% of individuals with schizophrenia complete suicide, which is consistently the most common cause of death among individuals experiencing psychosis. Increased personal insight into the mental disorder, fewer years in treatment and severe depressive symptoms are associated with a heightened risk of suicide among individuals within the psychotic population. The effects of alcohol use in the presence of significant life challenges and stressors can lead to a constricted view of reality and potential self-harm. Alcoholism, particularly in the presence of depression and personality disorder, also can increase the risk of suicide. [36]

4 The five domains that comprise the proposed risk factor matrix

Five domains of risk factors comprise the proposed theoretical model of suicidal behavior. It is suggested that these five domains, organized as a matrix or multiaxial approach, provide a simple model for considering risk factors for education and clinician intervention as well as clinical investigation (see Figure 3.1).

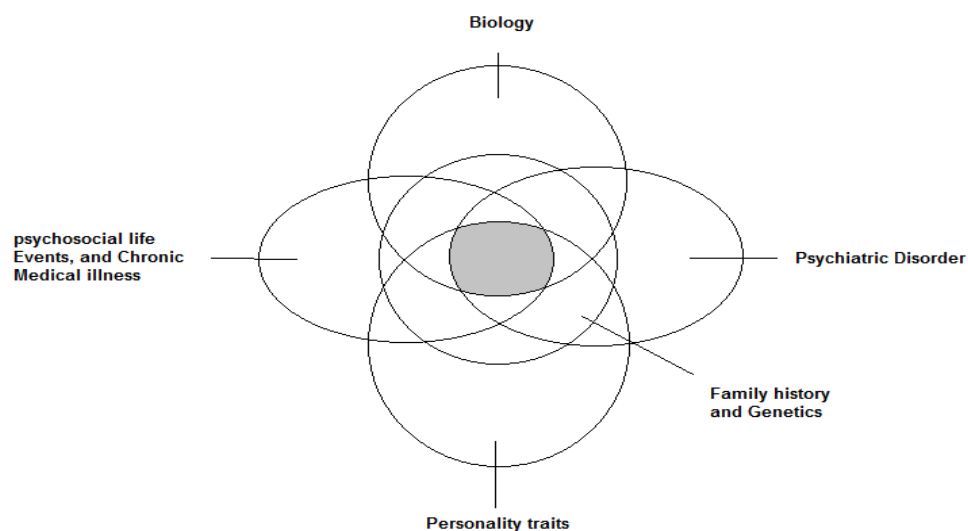


Figure 3.1 Overlap model (five domains). [47]

1. The first is a careful clinical description according to psychiatric diagnosis. Current research shows that affective disorders, conduct disorders, and substance abuse are the most highly associated psychiatric diagnoses with suicide in young people. As found in the adult literature where over 90% of persons who end their lives by suicide have an associated psychiatric illness, the few studies on adolescent suicide suggest high percentages as well. [37]
2. Second, personality traits relating to suicide, such as aggression, impulsivity, and hopelessness, are important in and of themselves in characterizing suicide since they may represent personality styles that cross diagnostic groupings. In addition, this domain includes certain personality disorders, such as borderline personality disorder and antisocial personality disorder, which are more highly correlated with suicidal behavior and represent risk factors.
3. The third domain is concerned with psychosocial factors, social supports, life events, and chronic medical illness. For example, early loss, increased negative life events, the presence of a chronic medical illness, and decreased social supports increase the risk for suicide. In addition, most young people who end their lives have had a recent humiliating life experience. [38]
4. The fourth area is the identification of both genetic and family factors that predispose an individual to suicide. Previous investigators have suggested. That the genetics of suicide may be independent of the genetics in a family history relating to specific psychiatric disorders such as affective disorder or alcoholism.
5. The final factor in this matrix is the neurochemical and biochemical variables currently under active investigation in an attempt to identify either a biologic abnormality or a vulnerability state for suicide.

5 Detection Levels

The three levels of detection require greater elaboration. A brief over-view of each level and several examples are now presented. Individuals who would be placed in **Level I**, which can best be labeled "detection awareness", are not actively suicidal or in immediate danger of suicide completion (**Table 3.1**). However, individuals at this level do have certain risk factors. For example, the offspring of affectively ill or substance-abusing parents, the offspring of a person who has died by suicide, close contacts with suicides and suicidal people, and abused and

neglected children would comprise the Level I group. Level I would also include children who have recently been under extreme stress, such as that relating to the divorce of parents, moves, the presence of a chronic illness either in the children or in the family, or the recent death of a parent or a close relative. It should be pointed out that one can think of the individual as having relatively little control over Level I problems.

- | |
|---|
| <ol style="list-style-type: none">1. Offspring of affectively ill or substance-abusing parents.2. Offspring of suicides and suicide attempters.3. Close contacts of suicides and suicidal people (prevention of contagions).4. Abused and neglected children.5. Children who have recently been under severe stress.<ol style="list-style-type: none">(a) Divorce of parents.(b) Move.(c) Death of parent/relative. |
|---|

Table 3.1 Level I-Detection Awareness. [47]

Level II, shown in (Table 3.2), is characterized by major problems that do not meet criteria for a psychiatric disorder. Young individuals who fit into Level II may require assessment, intervention, and perhaps even treatment, but the treatment is not for a Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R) psychiatric diagnosis. Individuals at this level generally show some amount of distress, presence of symptoms, and/or decrease in function. Examples of problems at this level may include pronounced academic problems, the presence of learning disabilities, increasing interpersonal relationship difficulties, a major loss, or severe self esteem problems. These individuals may be exemplified by youth who run away, adolescents who have an unwanted pregnancy, or children who are undergoing major stresses and become symptomatic. Personality problems including extreme aggressivity or feelings of hopelessness are also characteristic of Level II in young people. Individuals at Level II may indeed become suicidal, and are at risk for suicide attempts and suicide completion.

Level III, represents the detection of suicidal youth who have major psychiatric disorders (Table 3.3). When any individual is identified at this level, assessment and an intervention component are required, with the intervention representing active treatment aimed at a specific psychiatric diagnosis. Such diagnoses in children and youth may include affective disorders, conduct disorders, schizophrenia, eating disorders, substance abuse, and adjustment reactions.

1. Requires assessment and intervention/treatment (not related to psychiatric diagnosis)
2. Anything that is not a major psychiatric disorder.
3. Symptomatic, but does not meet criteria for a DSM-III-R, Axis I disorder
 - (a) Academic problems
 - (b) Learning disability
 - (c) Interpersonal relationship difficulties
 - (d) Self-esteem and sexual identity problems
 - (e) Runaways
 - (f) Having an unwanted pregnancy
 - (g) Children who are undergoing major stress or loss and are symptomatic
 - (h) Aggressivity, hopelessness, personality traits and styles.

Table 3.2 Level II - Major Problem Awareness. [47]

Even though personality disorders are not diagnosed before the age of 18, they can be diagnosed in those youth between the ages of 18-24. In addition, as was previously discussed, certain disorders of childhood and adolescence may be predictive of adult disorders (i.e., conduct disorders - antisocial personality disorders). In fact, there is a stability of these personality characteristics developmentally. Most individuals with antisocial personality disorder have had a conduct disorder in their youth. [39]

1. Necessitates appropriate assessment and evaluation
2. Has a treatment component aimed at a specific psychiatric diagnosis
 - (a) Affective disorder
 - (b) Schizophrenia
 - (c) Conduct disorder
 - (d) Substance abuse and/or alcoholism
 - (e) Adjustment reactions
 - (f) Eating disorder
 - (g) Identity disorder

Table 3.3 Level III--Major Psychiatric Disorder. [47]

6 Protective factors

Researchers and practitioners refer those conditions that may increase a person's risk of attempting or completing a suicide as 'risk factors' and those that protect a person, promote resilience and reduce the potential for suicidal behaviors as 'protective factors'. From a developmental perspective, youth in particular, face different challenges at different ages.

Suicidal behaviors, ranging from suicidal ideation to suicide death, are often triggered by certain very stressful life events (e.g. loss or death of friend, disciplinary crisis, negative

anticipated outcomes/humiliation, etc.) and an unbearable state of mind (e.g. hopelessness, helplessness, shame, etc.).

Suicide usually happens with warning signs. For suicide prevention, we should aim at early detection and intervention so that warning signs can be timely identified risk factors at individual, family and environmental levels mitigated and protective factors effectively enhanced. Our conceptual framework is given below (**Figure 3.2**).

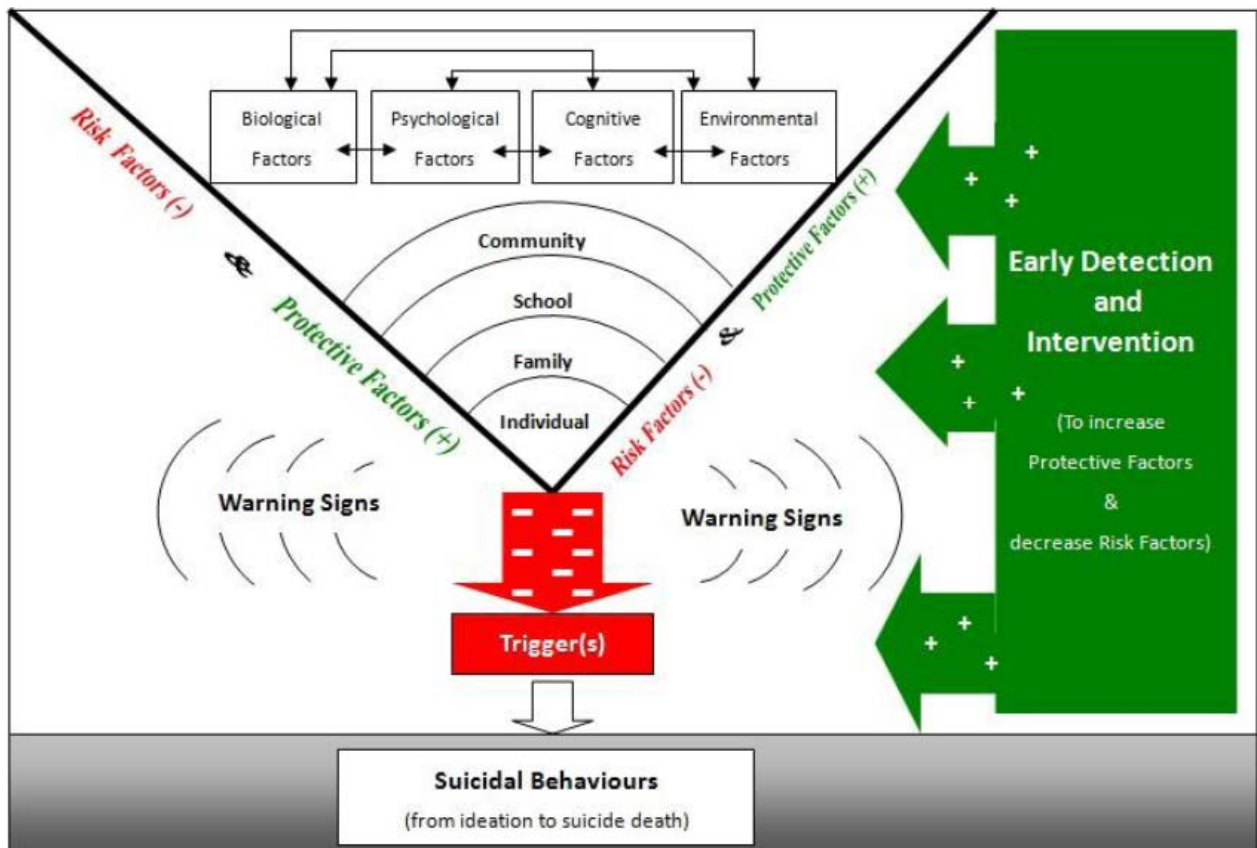


Figure 3.2 A Conceptual Framework for Understanding Suicide. [46]

They are positive conditions that promote resilience. Although such protective factors ‘do not negate the risk of suicide, they can counterbalance the extreme stress of life events. [40] Below are examples of protective factors found in suicide literature:

- Strong sense of self-worth
- Strong sense of personal control
- Positive attitude and life value
- Religious, cultural and ethnic beliefs
- Effective coping skills e.g. problem-solving, conflict resolution, social skills, anger control, communication, etc.
- Good impulse control

- Supportive significant others (e.g. best friends, parents)
- Positive family environment and healthy family relationships
- A satisfying social life (e.g. constructive use of leisure time)
- Community involvement e.g. opportunity to participate and contribute to school/community activities
- Safe and supportive environment (e.g. difficult access to lethal means)
- Access to mental health care, medical compliance
- Pets [35]

7 Assessment of suicidal behaviors

A comprehensive assessment of suicidal behaviors is fundamental to effective counseling intervention and prevention activities. The primary goal of suicide assessment is to provide information for prevention and counseling. Assessment subsequently guides clinical judgment, counseling intervention and prevention. All suicide assessments should include:

- A review of relevant risk factors.
- Any history of suicidal behavior.
- Unchangeable biological, psychosocial, mental, situational, or medical conditions.
- The extent of current suicidal symptoms including the degree of hopelessness.
- Precipitant stressors.
- Level of impulsivity and personal control.
- Other mitigating information.
- Protective factors.

Suicide assessment requires an evaluation of the behavior and risk factors, the underlying diagnosis of mental disorders, and a determination of the risk for death. Once an assessment is completed, it is important to rate the overall suicide risk in terms of severity. [34]

8 Myths and Facts about Suicide

❖ Myth: Suicides happen without warning

Most teens who attempt or die by suicide have communicated their distress or plans to at least one other person. These communications are not always direct, so it is important to know some of the key warning signs of suicide.

❖ **Myth:** Suicide is genetic

There is no gene for suicide. Having a family member die by suicide may increase one's risk, as some believe that exposure may make suicide seem acceptable. But there is no current evidence of a gene that predisposes one to suicide.

❖ **Myth:** Only certain types of people die by suicide

While some factors contribute to higher risk for suicide, it is important to remember that suicide does not discriminate. There are no clear, specific traits that separate suicidal people from non-suicidal people. Individuals from all cultures, upbringings, social economic statuses kill themselves. Pay attention to what the person says and does, not what he/she has or looks like or how you believe that person should think, feel, or act.

❖ **Myth:** Suicide is an act of aggression, anger, or revenge

Most people who kill themselves do so because they feel they do not belong or are a burden on others. They think that their death will free their loved ones of this burden. Many suicides occur in ways and in places that the person hopes will ease the shock and grief of those they left behind.

❖ **Myth:** Talking to teens about suicide makes them likely to kill themselves

Talking about suicide with teens gives them an opportunity to express thoughts and feelings about something they may have been keeping secret. Research clearly demonstrates there are no iatrogenic effects of asking teens about suicide. [41] In fact, discussion brings it into the open and allows an opportunity for intervention. Therefore, youth who come forward to caring adults following a presentation on suicide is most likely the result of providing that youth, who was already suicidal, the freedom to confide their pain to others. Only then, will the healing begin.

❖ **Myth:** People who talk about suicide are not serious about killing themselves

Many teens who are considering suicide tell others about these thoughts. However, mention of suicide often makes people uncomfortable, and as a result they may not take the person seriously.

❖ **Myth:** Suicidal thoughts and behaviors are ways to get attention

It is important to take any mention of suicide or suicidal behavior seriously regardless of your thoughts about their true motives. In the very least, we need to help teens identify more effective ways to seek having their needs met without dismissing the severity of their expressed thoughts, concerns, and/or behaviors.

❖ **Myth:** Suicidal teens overreact to life events

Problems that may not seem like a big deal to one person, particularly adults, may be causing a great deal of distress for the suicidal teen. We have to remember that perceived crises are just as concerning and predictive of suicidal behavior as actual crises.

❖ **Myth:** Teens are at less risk for suicide as soon as they start to feel better

Suicide re-attempts in teens often occur in the first six months following a previous attempt, with data suggesting the window for a re-attempt may actually be within the first month after an attempt. [42] Around this time, the relational routine with family and friends begins to return to normal; however, it may take longer for the teen to return to normal and he/she may feel abandoned by support systems when getting back to old routines. Additionally, this is when the teen may start to face the same problems he/she had prior to the attempt and begin to think that suicide is the only solution. Teens that seem to recover very quickly may be at heightened risk, as it could indicate that they are planning their next attempt.

❖ **Myth:** Suicide cannot be prevented.

Most teens are suicidal between 24-72 hours. During this period it is possible to stop someone from suicide by showing him/her how and where to get help. This intervention also makes it less likely that they will make another attempt again. A caring, concerned individual can help someone in distress. Taking someone's feelings seriously and listening can truly save a life.

9 Conclusion

The magnitude of the suicide in the world makes suicide prevention not exclusively a problem of Mental Health. This is a problem that must be addressed from a multidisciplinary perspective, involving different areas. Internet Technologies and Communication and, more specifically, the Human Language Technologies can help to resolve part of these problems through the early detection of suicidal thoughts and/or behavior expressed through the Social Media. The words and the way people use to communicate in their blogs, social networks, etc. provide information about the psychological state and personality of individuals. The processing and analysis of natural language texts shared via Internet helps record and detect changes in an emotional state of the people. Unfortunately, although there are available resources and tools for sentiment analysis and opinion mining, even in the field of the depression detection and using different approaches and features, there is neither system nor platform that deals with the full process of suicide prevention.

CHAPTER 4

THE SYSTEM IMPLEMENTATION.

1 Introduction

The use of Social Media as a mean of communication is becoming extremely popular, through which their emotional states and impressions are exchanged. Therefore, it is no surprise that more and more people with depression publish their suicide notes in these communication channels. In this context, Information Technologies and Communications, and more specifically Language Technologies. In this chapter we will explain the system that we have implement to detect suicide notes and tweets in tweeters and we choose tweeter because it is a free broadcast social media site that enables registered users to communicate with others in real-time using 140 character statements.

Users create a network by following other accounts; although, the large majority of Twitter accounts are public which allows anyone to view their content. Twitter content can be posted via a web interface, SMS or a mobile device. It is available in almost all countries except China, Iran and North Korea, and has no minimum age requirement. Approximately 23% of online adults use Twitter and over 500 million tweets are sent per day.

Finally will be talking about the methodology in details which is composed of three steps, the first one is the collection of the data that we are going to use to compare the data received from the person who tweets, second we manually annotate the messages into two categories, risky tweets and non risky tweets and we put them in our database which is about two columns and finally we'll create our program which a java program created by the Netbeans IDE version 8.0.2 and the program will be composed of three interfaces and we'll explain every component in each interface after that we'll try to give some example and see the result.

2 Human Language Technologies and Suicide Prevention

In order to resolve this social issue, Language Technologies (LT) could help with the early identification of “suicide warning signs” that will be useful to detect individuals with suicidal ideation, as well as virtual environments where pro-suicide information is being shared or suicidal attempts are being encouraged. In particular, LT can analyze language structures and their meaning [43].

On different textual genres. Tasks such as information retrieval, information extraction, text classification and clustering, or sentiment analysis, are basic pillars of these technologies that allow the construction of more complex automatic processes for discovering knowledge from oral and/or written text. [44]

3 Mining Twitter for Suicide Prevention

We will address three major challenges: 1) Building vocabulary to collect messages from Twitter social network and dealing with various topics related to suicide (e.g. depression, anorexia); 2) Mining messages which are extremely variable from the point of view inter and intra individual in order to propose a classification model to effectively trigger alerts and thus identify people with a high risky behavior; and 3) Presentation of suspect messages in a java interface for health professionals.

The challenges associated with this study are numerous because text analysis is difficult. Most of the NLP (Natural Language Processing) methods used in health domain have been applied to publications and hospitalization reports. Their transposition to tweets is far from trivial (limited to 140 characters with nonconforming grammatical structures, misspelling, abbreviations, slang).

4 Methodology:

Our method is hard in the begging but it gets more and more easy later, so all we need is to collect a lot of suicidal tweets, and more data we collect more we get a good result, and it does not matter if it has been proven that the person who tweeted that tweet has really committed suicide.

We can store the tweets that has been proven by professionals that it is probably could be suicidal tweets but before we add them to the database, we first have to filter some articles, nouns, adverbs and even verbs conjugated or not, then we put the rest that left word by word in the database.

The comparison would be much easier, so when we compare how much there is in our database from the tweet words that has been entered by us, we give the percentage and if the percentage is higher enough (we set it to 80 percent), then we could say that we have a suicidal person if not then we have a normal tweet, and the new thing we are going to add into our program is that, it can learn over every time it proves that the tweet is a suicidal tweet, and by that we mean that, if it detects the suicidal tweet we look in our database, if any of the words of the suicidal tweet is in it, if true the word is in the database we do not add it if not then we list

them in a table, and a professional could look at them and decide which of them could fit and can be added to our database. Finally we could say that our method is divided into 3 steps:

1. Suspects and proven messages (data collection) :

collected a corpus of tweets containing the words of the defined vocabulary through the web site [44] (about 1500 suspicious messages) We also collected messages from accounts identified as those of Persons having committed suicide, and we don't have to collect only those but we could collect tweets that has been proven by professionals that it's probably could be suicidal tweets so we can store them in our database in form of words.

2. Manual annotation of messages into two categories: risky tweets and non risky tweets :

Manually classify messages into the two categories (according to the information collected on proven cases). About 150 messages have then been used for the learning phase of the classification process, so we start to classify all the tweets that we collected in the first step into risky tweets non risky tweets by some defined vocabulary we'll mention them in the collection of tweeter data section so we can use them later to do our comparison of the new tweet to find out if its suicidal tweet or not.

3. Presentation of results via a java program:

Finally our program which will detect for us if the tweet that has been entered is a suicidal tweet or not and the presentation will be in a form of a percentage of how much there is in our database from the tweet words that has been entered by us, and if the percentage is more than 80% then we could say that we have a suicidal person.

5 Collection of Twitter data:

In order to collect and analyze suicidal communication posted to Twitter, we first needed to identify a set of terms that were likely to identify suicidal communication within text. To do this i initially collected text from Web forums via the Websites. [44]

Term Frequency-Inverse Document Frequency (TF IDF) (see Appendix) analysis was applied to each dataset (suicidal/non suicidal). This process identified the most frequent terms in each dataset that are not present in the other, thus providing a ranked list of terms that are more likely to be suicidal than not. In this study, we considered terms as n -grams (contiguous sequence of n items from a given sequence of text or speech. The items can be phonemes, syllables, letters, words or base pairs according to the application) of up to five tokens in length. TF-IDF was applied by considering the posts classified as non-suicidal as distinct documents,

whereas those including suicidal intent were aggregated into a unique document. Examples of the most relevant trigrams and five grams produced by the TF-IDF procedure are given in **Table 4.1**.

“Suicidal; suicide; kill myself; my suicide note; my suicide letter; end
My life; never wake up; can't go on; not worth living; ready to jump;
Sleep forever; want to die; be dead; better off without me; better off
Dead; suicide plan; suicide pact; tired of living; don't want to be
Here; die alone; go to sleep forever”.

Trigrams		Fivegrams	
TF-IDF	3-gram	TF-IDF	5-gram
169.94	Want to die	32.819278	To take my own life
126.36	To kill myself	24.633562	Want to die right now
71.75	To commit suicide	22.590259	Have nothing to live for
68.18	Want to kill	19.691567	It's not worth it anymore
65.64	Can't live	19.691567	Don't want to live anymore
61.18	To end it	19.691567	Me want to kill myself
58.3	I'm tired of	19.691567	My self hate my life hate
54.46	I hate my self	19.43643	Want to be here anymore
53.81	End it all	18.475171	Want it to be over
47.44	End my life	18.475171	Want it all to end
36.95	Take my own	18.475171	Wish could just fall asleep
33.89	Kill my self and	17.612125	Fall asleep and never wake
32.82	My death would	15.933278	Want to end it all
32.79	To live anymore	13.127711	Just really want to die
31.87	About killing myself	13.127711	Rather die its not worth
29.73	Kill my selfi	13.127711	I'm sorry that im leaving
29.73	Never wake up	13.127711	Fuck trying to live normal
28.24	Killing my selfi	13.127711	So why should continue living
26.26	Stop the pain	13.127711	Don't want to live defeated
26.26	Kill my selfright	13.127711	To commit suicide within few
25.89	Thoughts of suicide	13.127711	And pain anymore just can
25.89	Point in living	13.127711	Put an end to this
24.63	Worth it anymore	13.127711	Been self harming for years
24.3	Have nothing to	13.127711	Bad really am worthless what
21.86	Wanted to die	13.127711	Life is this miserable just

Table 4.1 TF-IDF listing of first 25 tri-grams and five-grams. [47]

Because of the significant number of irrelevant terms that would not logically be useful as search key words for the Twitter data collection, the TF-IDF lists were subject to further examination by two experts in the suicide field leading to a list of 62 keywords and phrases used to collect suicidal communication from Twitter, as shown in **Table 4.2**. [47]

Asleep and never wake	Just want to sleep forever	Take my own life
Can't do this anymore	Kill myself	Thoughts of suicide
Could just fall asleep	Killing myself	Tired of being alone
Die in my sleep	Life is so meaningless	Tired of being lonely
Don't want to be here	Life is too hard	To end this nightmare
Don't want to exist	Life is worthless	To hurt myself
Don't want to go on	My death would	To live anymore
Don't want to live	My life consists of nothing	Want it to be over
Don't want to try anymore	My life is pointless	Want to be alive anymore
Don't want to wake up	My life is this miserable	Want to be around anymore
End it all My life	isn't worth	Want to be dead
End my life	Not want to be alive	Want to be gone
End this pain	Nothing to live for	Want to be here anymore
Ending it all	Point in living	Want to die
Hate my life	Put an end to this	Want to disappear
Hate myself	Ready to die	Want to end it
I'm drowning	Really need to die	Wanted to die
I'm leaving now	Stop the pain	Wanting to kill yourself
I'm worthless	Suicidal	What is wrong with me
Isn't worth living	Suicide	Why should I continue Just
want to give up	Take it anymore	

Table 4.2 Keywords and phrases search terms. [47]

6 Implementation and Presentation of results:

Our implementation system is a GUI interface created by Java program (Netbeans version 8.0.2 a free also an open source software). We have implemented three interfaces or three classes, the first one is called Detection and it is the main one, the second is AddTweetsToDB and the last one is EditTweets and we will try to explain also show each interface and what it can do. We will try to see the result of each interface and how we present it.

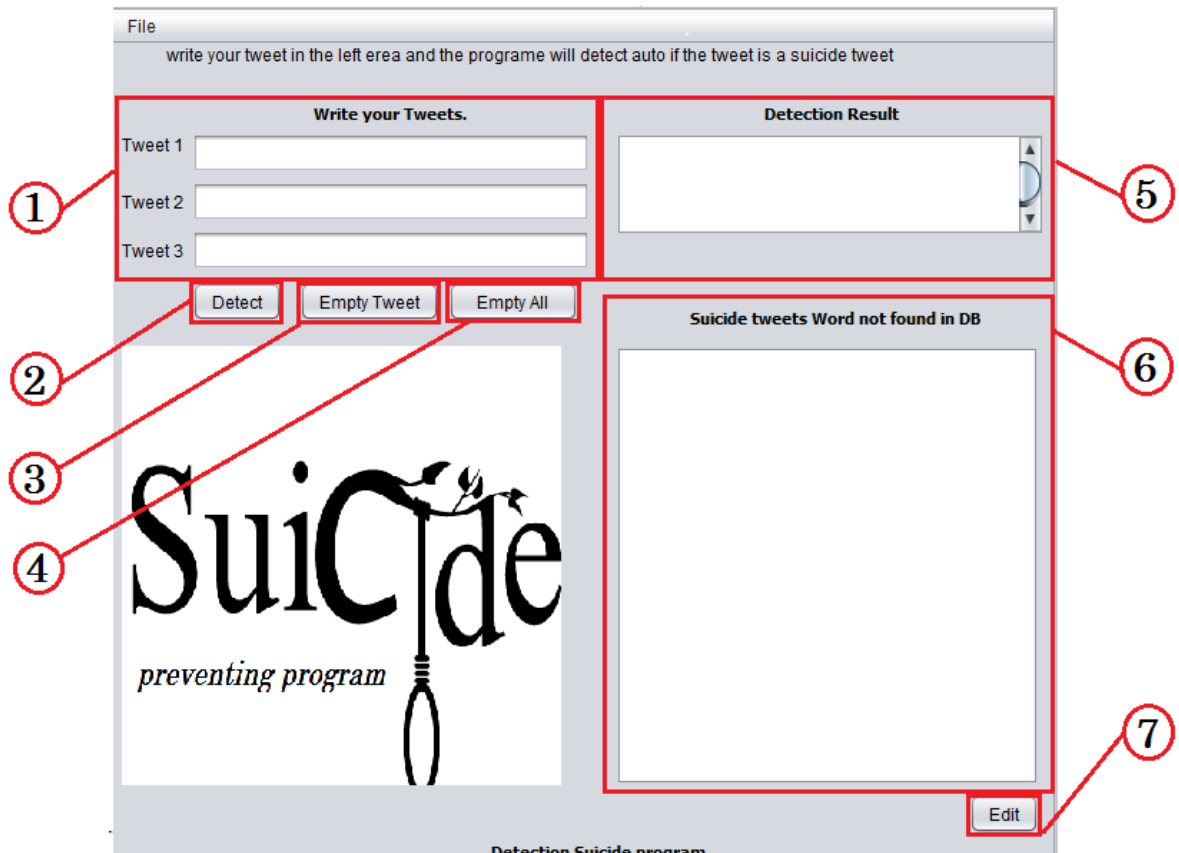


Figure 4.1 the main interface (Detection).

The figure 4.1 shows the main interface of the detection program and we will explain the following elements:

1. This is the area where we can input the tweets that we want to test if they are suicidal, sometimes we can't detect the tweet if it's suicidal or not from the first input that's why we created three inputs so the percentage of having a good results will be high.
2. The second element is a button we press when we've already written the tweets in the element (1).
3. This element we press when we want to empty the first area.
4. And this button we press when we want to empty all the areas in this interface so we can do another around.
5. This text area will print for us the result of the detection and it contains the percentage of the words which was found in our suicidal database.
6. This text area will print for us all the words that has not been found in our database and that is only if the program detect the suicidal tweet or tweets from non suicidal ones.

7. This element when we press it, it will take us to the Edittweets interface so we will talk about it later and it's only for the professionals or the experts of detection suicide to press.

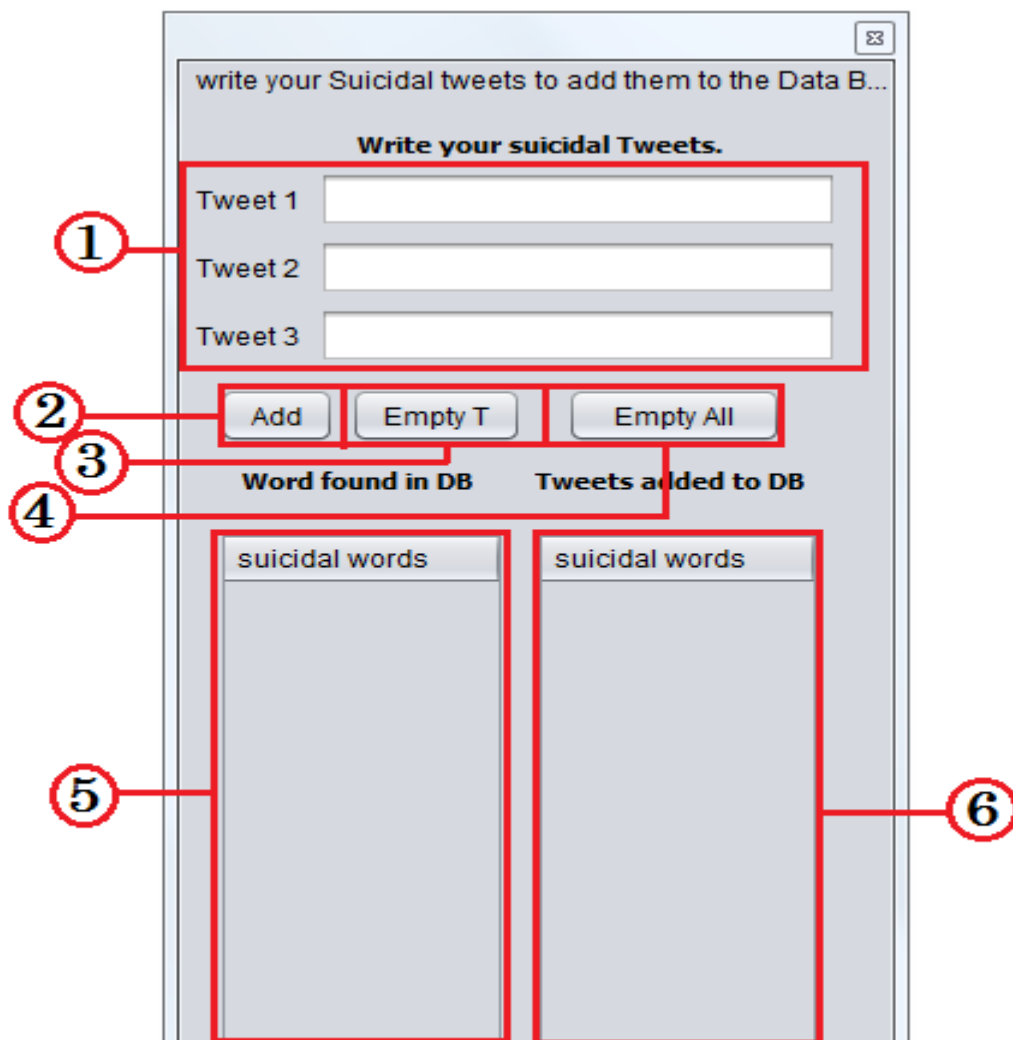


Figure 4.2 adding Tweets to Database interface.

The figure 4.2 shows an interface where a professional can add all the suicidal tweets to the database so later on, you can use them to detect suicidal from non suicidal tweets as we have seen in the previews interface, we will explain what each element represent:

1. This is the area where we can input our tweets, suicidal tweets which will be added to our database and we can only add three tweets maximum each time.
2. The button 'Add' we press when we already inputted the tweets in the first area or the second area or both.
3. The 'Empty T' button we press when we want to erase all the tweets in the first area.

4. The 'Empty All' button we press when we want to areas all the areas in the interface.
5. This table will print to the user all the words that have been found in the database, suicidal words as you see in the table so we won't add them one more time for optimizing the database.
6. This table will print all the words that have been successfully added to the database.

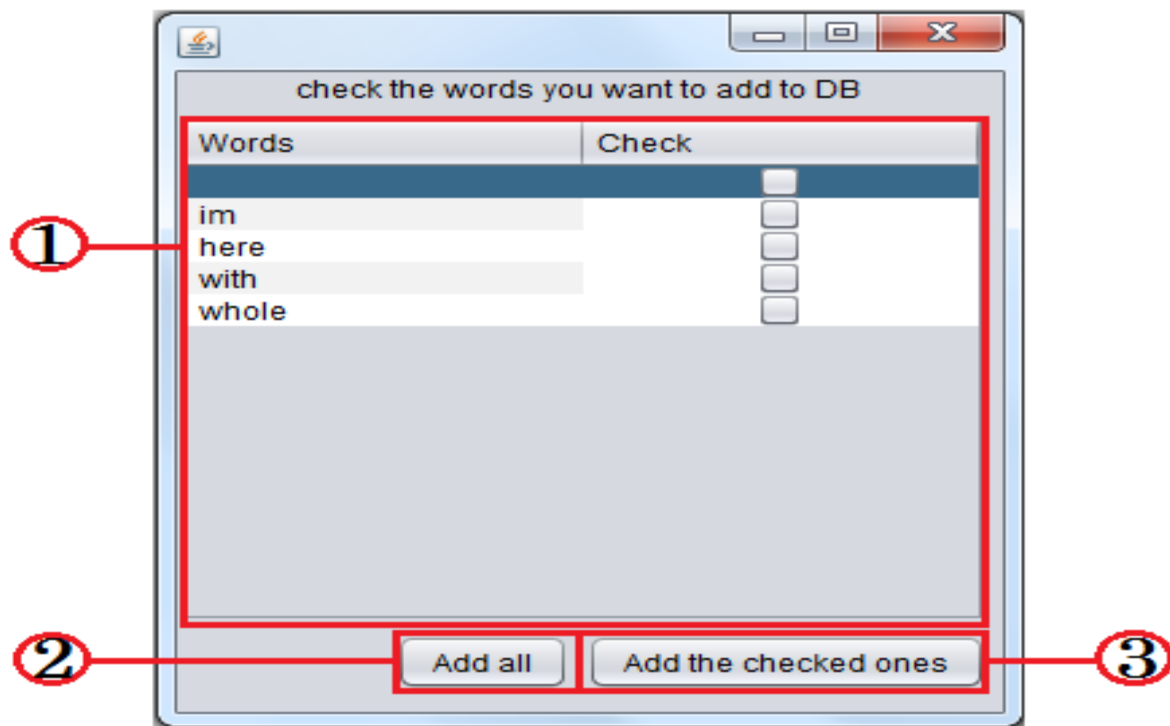


Figure 4.3 adding suicide words to the database.

6.1 Learning machine

Learning machine means that it does evolve over time and over old experiences, which is something new we added to our program in order to become updated all the time.

Our last interface is about the part when we detect that the tweet is a suicide tweet, but the tweet or the tweets contain some words that are not in the database, so we gather them in this table for professionals or experts, who in our case will be psychiatrics, to decide whether the words are really suicidal or not, so he chooses all the suicidal words and add them to the database, now we are going to talk about the components in this interface:

1. This is a table which contains all the suicidal words which we did not find in the database so all the professionals or the experts have to do, is to check if the words could go into our

database or not, and it fits to be a suicidal word or not. After choosing we click the button ‘add the checked ones’.

2. This is a button that when we press it will add all the words in the table to the database. And we hit it if only if that all the words considered as suicidal words.
3. The button “add the checked ones” will add only the words that have been chosen by the professional to the database.

7 Conclusion:

While moving forward, there is a key point to consider, which is that Suicide prevention activities should be implemented simultaneously with data collection .The collection of accurate data on suicide and suicide attempts are important and have been a major challenge in most countries; however, waiting for a perfect surveillance system is not the answer. Improvements to surveillance should be made as the country moves forward in implementing suicide prevention interventions, as we have seen in the last chapter, if you detect that the person is at risk of committing suicide, then you can recommend him or her a special authority that cares about this kind of situation, or you can follow some protocols to deal with it.

as we have seen in the last chapter, that our program detects suicidal tweets, all you have to do is write the tweet or the tweets, and it will give the percentage of been suicidal or not, and we add something to our program, which is that it learn over time, and experiences also will be more effective and more accurate of detecting a suicidal tweet from non suicidal, so we could say it updates itself.

GENERAL CONCLUSION

Due to various reasons, people may not have an appropriate way to alleviate their depressions in real life, which is a symptom that leads to committing suicide, so this kind of people will try to express such feeling with the world, and they begin searching for ways.

In the present most of them use the social network for that, so as you saw in the previous chapters that we gave a better looking to this phenomenon, and how we can detect it in social network also preventing it.

This work aims to create a program, which will be capable of detecting suicide in social networks, so the results obtained from this study or this program were acceptable.

While we have identified some interesting and promising results, future work will be setting a machine classification which means that the classification will be automatic, and perhaps we could integrate data mining in our work.

We could develop a machine classification method, which could automatically distinguish between text containing suicidal ideation, and other forms of suicidal communication, and could be used to derive a much larger dataset from social media streams for further validation and experimentation.

BIBLIOGRAPHY

1. Dr Oleg Chestnov, public health action for the prevention of suicide, Publications of the World Health Organization, 2002.
2. Suicide Prevention Resource Center, www.sprc.org/library_resources/items/understanding-risk-and-protective-factors-suicide-primer-preventing-suicide. Accessed 2016-03-11.
3. Sisask M, Varnik A. Media roles in suicide prevention: a systematic review. *Int J Environ Res Public Health*. 2012.
4. Pompili M, Serafini G, Innamorati M, et al. Suicidal behavior and alcohol abuse. *Int J Environ Res Public Health*. 2010.
5. Swahn MH, Ali B, Bossarte RM, et al. Self-harm and suicide attempts among high-risk, urban youth in the U.S.: shared and unique risk and protective factors. *Int J Environ Res Public Health*. 2012.
6. Survivors of Bereavement by Suicide <http://uk-sobs.org.uk>, Accessed 06/03/2016
7. American Foundation for Suicide Prevention <http://afsp.org/about-suicide/suicide-statistics/>, Accessed 08/03/2016
8. Edwin Shneidman, *The Suicidal Mind*, (a co-founder of the American Association of Suicidology, www.suicidology.org)
9. Substance Abuse and Mental Health Services Administration, Results from the 2013 National Survey on Drug Use and Health: Mental Health Findings, NSDUH Series H-49, HHS Publication No. (SMA) 14-4887. Rockville, MD: Substance Abuse and Mental Health Services, 2014. Available at <http://www.samhsa.gov/data/sites/default/files/NSDUHmhfr2013/NSDUHmhfr2013.pdf>.
10. Centers for Disease Control and Prevention, <http://www.cdc.gov/injury/wisqars/index.html> Accessed 10/03/2016
11. Centers for Disease Control and Prevention. Fatal injury data, 2009. Web-based Injury Statistics Query and Reporting System. www.cdc.gov/injury/wisqars/fatal.html. Accessed 11/03/2016
12. Valtonen H, Suominen K, Mantere O, Leppamak iS, Arvilommi P, Isometsa ET. Suicidal ideation and attempts in bipolar I and II disorders. *J Clin Psychiatry*. 2005.
13. Palmer BA, Pankratz VS, Bostwick JM. The lifetime risk of suicide in schizophrenia: a reexamination. *Arch Gen Psychiatry*. 2005.
14. Lisa Firestone Continuing Education Program (March 2011) American Psychological Association.
15. Recommendations for Reporting on Suicide website (www.reportingonsuicide.org.) Accessed 08/03/2016.
16. World Health Organization and International Association for Suicide Prevention. Preventing suicide in jails and prisons. Geneva, Switzerland: WHO Document Production Services; 2007.

17. Hayes L. Suicide prevention in correctional facilities. In: Scott C, Gerbasi J, eds. Handbook of correctional mental health. Washington, DC: American Psychiatric Publishing; 2005.
18. Joinson, N. A. (2008). Looking at', 'Looking up' or 'Keeping up with' People? Motives and uses of Facebook. 2008.
19. eBizMBA, <http://www.ebizmba.com/articles/social-networking-websites> . Accessed 26/03/16.
20. Cassidy, J. (2006). Me media: how hanging out on the internet became big business. The New Yorker, Retrieved 26/03/16 at http://www.newyorker.com/archive/2006/05/15/060515fa_fact_cassidy.
21. Zywicki, J.& Danowski, J. The faces of Facebookers: Investigating social enhancement and social compensation hypotheses; predicting Facebook and offline popularity from sociability and self-esteem, and mapping the meanings of popularity with semantic networks. *Journal of Computer-Mediated Communication*. 2008.
22. Sundén, J. Material Virtualities. New York: Peter Lang. 2003.
23. boyd, d. (2006a). Friends, Friendsters, and MySpace Top 8: Writing community into being on social network sites. http://www.firstmonday.org/issues/issue11_12/boyd/ Accessed 26/03/2016
24. Lovetoknow, http://socialnetworking.lovetoknow.com/Characteristics_of_Social_Networks Accessed 31/mars/2016.
25. Boyd, d. and Ellison, n. (2007) 'social network sites: definition, history, and scholarship'
26. Ajjan, H., & Hartshorne, R. Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *The Internet and Higher Education*. 2008.
27. Blogspot, <http://profcms2012.blogspot.com/2012/04/advantages-and-disadvantages-of-social.html> Accessed 01/04/2016
28. People's addiction to networking sites on rise: study. (2010, March 25). <http://economictimes.indiatimes.com/infotech/internet/Peoples-addiction-to-networking-sites-on-rise-Study/articleshow/5721998.cms>. accessed . Accessed 03/April/2016
29. Online networking harms health. (2009, February 19). http://news.bbc.co.uk/2/hi/uk_news/7898510.stm. Accessed 03/April/2016
30. Gaudin, Sharon. (2009, October 6). 54% companies ban facebook, twitter at work. Retrieved from http://www.computerworld.com/s/article/9139020/Study_54_of_companies_ban_Facebook_Twitter_at_work. Accessed 03/April/2016
31. Kiesel, Ryan. (2009, September 2). Town hall bans staff from using facebook after they waste 572 hours in one month. <http://www.dailymail.co.uk/news/article-1210361/Town-hall-bans-staff-using-Facebook-waste-572-hours-month.html>. Accessed 03/April/2016
32. France, Anthony. (2009, December 22). Facebook 'disrespect' led to killing in street. <http://www.thesun.co.uk/sol/homepage/news/2781029/Facebook-insult-led-to-killing-in-the-street.html.%20>. Accessed 03/April/2016
33. Şükrü Balci, Abdülkadir Gölcü, Facebook Addiction among University Students in Turkey: "Selcuk University Example". 2013.

34. The World Health Organization Making a difference, the world health report. 1999.
35. Early Detection, Intervention & Postvention (EDIP), October 2015,
<http://www.edb.gov.hk/>, Accessed 11/04/16.
36. Sanchez HGT. Risk factor model for suicide assessment and intervention. Professional Psychology: Research and Practice, 2001.
37. Shaffer, D., Gould, M., and Traubman, P. Paper presented at the Conference on the Psychobiology of Suicidal Behavior, New York. 1985.
38. Hirschfeld, R., and Blumenthal, S. Personality, life events and other psychosocial factors in adolescent depression and suicide: A review. In Klerman, G. (ed.), Suicide among Adolescents and Young Adults, American Psychiatric Press, Washington, D.C. 1986.
39. Frances, A., and Blumenthal, S. J. Personality disorders and characteristics. Paper presented at the National Conference on Risk Factors for Youth Suicide, Bethesda, MD. 1986.
40. The World Health Report. Geneva: World Health Organization, 2006.
41. Gould, M. S., Marrocco, F. A., Kleinman, M., et al. evaluating iatrogenic risk of youth suicide screening programs: A randomized clinical trial. JAMA, 2005
42. Brent, D. A., Greenhill, L. L., Compton, S., et al. The Treatment of Adolescent Suicide Attempters (TASA) study: Predictors of suicidal events in an open treatment trial. Journal of the American Academy of Child and Adolescent Psychiatry, 2009.
43. Navigli. Word Sense Disambiguation: A Survey. ACM Computing Surveys, 2009.
44. <http://info-demo.lirmm.fr:8080/suicide2/> Accessed 27/04/16
45. Dahlberg LL, Krug EG. Violence—a global public health problem. In: Krug E, Dahlberg LL, Mercy JA, Zwi AB, Lozano R, eds. World report on violence and health. Geneva, Switzerland: World Health Organization; 2002.
46. eBook on Student Suicide for Schools: Early Detection, Intervention and Postvention (EDIP).(October 2015). Educational Psychology Service Section Special Education & Kindergarten Education Division Education Bureau web 24/04/2016
47. Susan J. Blumenthal and David J. Kupfer Overview of Early Detection and Treatment Strategies for Suicidal Behavior in Young People Received January 13, 1987; accepted August 7, 1987.

APPENDIX

Term Frequency-Inverse Document Frequency (TF IDF) :

Raw term frequency as above suffers from a critical problem: all terms are considered equally important when it comes to assessing relevancy on a query. In fact certain terms have little or no discriminating power in determining relevance. For instance, a collection of documents on the auto industry is likely to have the term auto in almost every document. To this end, we introduce a mechanism for attenuating the effect of terms that occur too often in the collection to be meaningful for relevance determination. An immediate idea is to scale down the term weights of terms with high *collection frequency*, defined to be the total number of occurrences of a term in the collection. The idea would be to reduce the **tf** weight of a term by a factor that grows with its collection frequency.

Instead, it is more commonplace to use for this purpose the *document frequency* **Df**_t, defined to be the number of documents in the collection that contain a term t. This is because in trying to discriminate between documents for the purpose of scoring it is better to use a document-level statistic (such as the number of documents containing a term) than to use a collection-wide statistic for the term.

Example:

word	Cf	Df
Try	10422	8760
Insurance	10440	3997

Table 1

Table 1: Collection frequency (cf) and document frequency (df) behave differently, as in this example from the Reuters collection.

The reason to prefer df to cf is illustrated in table 1, where a simple example shows that collection frequency (cf) and document frequency (df) can behave rather differently. In particular, the cf values for both try and insurance are roughly equal, but their df values differ significantly. Intuitively, we want the few documents that contain insurance to get a higher boost for a query on insurance than the many documents containing try get from a query on try.

How is the document frequency df of a term used to scale its weight? Denoting as usual the total number of documents in a collection by N , we define the inverse document frequency of a term t as follows:

$$\text{idf}_t = \log \frac{N}{df_t}.$$

Thus the idf of a rare term is high, whereas the idf of a frequent term is likely to be low.

Term	Dft	Idft
Car	18,165	1.65
Auto	6723	2.08
Insurance	13,241	1.62
Best	25,235	1.5

Table 2

Table 2: Example of idf values. Here we give the idf 's of terms with various frequencies in the Reuter collection of 806,791 documents.

الملخص:

الانتحار هو ظاهرة اجتماعية والتي لها تأثير على مجتمعا ؛ أيضا الانتحار هو مشكل يتعلق بالصحة النفسية والذي يتطلب استراتيجيات للكشف المبكر عنه. بالتالي فإن العمل الذي تم في إطار هذه المذكرة المتعلقة بتحقيق نظام مما يجعل الكشف عن انتحار محتمل في الشبكات الاجتماعية، علاوة على ذلك، يستند هذا النظام على بعض التغريدات الانتحارية التي أثبتت أن الأشخاص الذين قاموا بالتغريد فعلا انتحروا.

الكلمات المفتاحية: كشف الانتحار، الشبكة الاجتماعية، تصنيف التغريدات.

Abstract:

Suicide is phenomenon, which has a relevant impact on our society; also it is a major psychological health problem which requires early detection strategies. So the work undertaken within the framework of this research paper related to the realization of a system which makes the detection of suicide possible in social networks, moreover, this system is based on some suicidal tweets that have proved that people who tweeted them has really committed a suicide.

Key words: detection suicide, social network, tweet classification.

Résumé:

Le suicide est un phénomène qui a un impact significatif sur notre société; il est aussi un problème de santé psychologique majeur qui nécessite des stratégies de détection précoce. Ainsi, les travaux entrepris dans le cadre de ce document de recherche liés à la réalisation d'un système qui rend la détection du suicide possible dans les réseaux sociaux, de plus, ce système est basé sur certains tweets suicidaires qui ont prouvé que les personnes qui les tweeté a vraiment commis un suicide.

Mots clés: suicide de détection, réseaux sociaux, classification tweet.