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DETECTION OF ALTERED STATES OF CONSCIOUSNESS ON FACEBOOK USERS

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ABSTRACT

Technologic advance in the last decades has permitted the development of many applications that avoid the interaction of people with social networks and other smart phones features while they have an altered state of consciousness caused by alcohol consumption. However, none application identifies altered state of consciousness in real time on Facebook users when they share content. Given the lack of research on posting controversial content on Facebook while users have an altered state of consciousness caused by alcohol consumption, this work proposes a solution to prevent users from posting of controversial content on Facebook. Additionally, this work makes an evaluation of the proposed solution through an experiment focused on detecting altered states of consciousness on Facebook users.

Keywords: *Altered States of Consciousness, Facebook, Social Network, Consciousness*

1. INTRODUCTION

In the last years, technology evolution has brought with it the innovation of means of communication, such as emails, text messages and specially the social networks. According to a report of Online Business School (OBS), 82 percent of Internet users worldwide have an account on Facebook and overcoming 90 percent in most countries, becoming the most popular social network [1]. On Facebook, people share every kind of content, and because of this, it has become the biggest field of study in the world for different kind of researches [2]. For instance, there is Facebook content that is called as controversial content by experts (e.g., pictures/texts related to parties, drugs, sex, and nudity). Such posts are often viewed out of context and snap judgments could be made, generating adverse consequences for the involved people. The problem is that posts are often towards a few people, but these can be read for hundreds since it depends on the number of people friends and the kind of privacy that is managed. This situation can lead people to have serious personal, social and professional consequences.

With the plethora of studies concerning Facebook, we cannot deny its importance as social network now and in the future. In this aspect, several researchers have focused on studying the relationship between people's personality when they are on Facebook and when they are in the real life. In this sense, studies have shown that a Facebook profile can reflect real owner personality instead of an idealized personality with desirable features [3].

There are also several studies about controversial content on Facebook and the relationship that has been evidenced between subjects' personality on Facebook and subjects' personality on the real life. These situations lead us to suppose that when people post content they are in a determinate state of consciousness. However, the users can also change to an altered state of consciousness (ASC) by consumption of drugs and alcohol.

Technologic advance in the last decades has permitted the development of many applications that avoid the interaction of people with social networks and other smart phones features while they have an ASC caused by alcohol consumption. For instance, Drunk Text Savior and Drunk Mode are a big step to prevent that people go through shameful moments in their virtual and real lives. However, none application identifies ASC in real time on Facebook users when they share content.

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Given the lack of research on posting controversial content on Facebook while users have an ASC caused by alcohol consumption, this work proposes a solution to prevent users from posting of controversial content on Facebook. Additionally, this work makes an evaluation of the proposed solution through an experiment focused on detecting altered states of consciousness ASC on Facebook users.

Based on the aforementioned statements, we propose the following research questions:

RQ1: Is there a solution to detect ASC in the content that people post on Facebook?

RQ2: Is there a solution to prevent Facebook users from posting controversial content while maintaining an ASC caused by alcohol consumption?

This paper is organized as follows. First, section 2 reviews the state of the art regarding controversial content in ASC and its negative effects when it is connected to digital mediums, such as smart phones, emails, and social networks. Then, section 3 explains the proposed hypotheses and the research scheme. Later, sections 4 and 5 detail the execution of the proposed research and its evaluation. After, section 6 discusses the obtained results. Finally, the conclusions of the research are presented in section 7.

2. STATE OF THE ART

Many critics assumes that most of Facebook users are irresponsible, reckless and out of control "kids", since there are a lot of controversial content in such social network, especially in the student population [4].

Although, posting this kind of content may appear to be harmless fun, many of users are unaware that their profiles are being scrutinized by faculty members, potential employers, relatives, and even by public safety officers [5].

Shelton and Skalski explain that revealing posts and exceedingly risqué pictures online can not only lead to embarrassment, but often bring much more detrimental consequences [4]. For instance, we can mention the case of a recent graduate of Illinois University who was denied a job in Chicago once his potential employer discovered on Facebook that he was interested on drugs, weapons and sex [6].

According to Sticca y Perren [7], posting controversial content is the easiest way to intimidate a person (an action also known as "cyberbullying" in the virtual world). This form of harassment is considered to be crueler and more damaging than traditional bullying. Cyberbullying is causing much trepidation in schools and concern for parents due to kids and adolescents are exposed to offensive posts, malicious rumors, bigotry and hate, exclusion from online groups, intimidation and harassment, and the disclosure of one's own personal intimate information by other peers online [8]. Kwan and Skoric found that posting controversial content could endanger people's safety [9]; they also noted that 59.4% of users experienced at least one form of bullying on Facebook in the last year (e.g., receiving offensive messages, insults or threats, and exclusion from groups).

Furthermore, Fefter explains that campus police and traditional police departments are using Facebook, as a tool to look into illegal student activities [10]. An example is the one that took place in Northern Kentucky University; four students received an order to take an Alcohol Awareness class focusing on the dangers of underage drinking after authorities of the school discovered an incriminating photograph published by themselves surrounding a beer barrel in their dorm room [11]. Another example is the case where two swimming team students from Louisiana State University lost their scholarships and were removed from the team to be part of a Facebook group that ridiculed their swim team coaches [12]. Lastly, one of the most serious case is the one that happened in February 2013, a 19 years old man was arrested because of a Facebook post. The sarcastic post could land him years in prison was: ''I'm fucked in the head alright. I think I'ma shoot up a kindergarten and watch the blood of the innocent rain down and eat the beating heart of one of them''. As of July 2013, the man committed suicide before the end of his trial [13].

On the other hand, scientific studies have also focused on analyzing the relationship between Facebook users' personality when they are online and offline i.e. in the real life. In this sense, a study has shown that it is possible to make quite accurate predictions regarding people's personality through different features taken from their Facebook profiles [3]. Another study proves that subjects who refer to stress in their Facebook profiles may be predisposed to show distress in offline life [14]. Another study taken place in Croatia evidenced that the time that students use Facebook correlates positively with depression [15], while another research concluded that people with low self-esteem use Facebook as the conducive mean for self-disclosure, however, their pessimistic and

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depressing messages provoke negative responses among their friends [16]. All of these researches imply that people do not deliberately misrepresent their personalities in their Facebook profiles, or at least do not distort them much in relation to the results reflected in psychological tests.

The studies mentioned above make us assume that Facebook users have a particular state of consciousness when they post content since people are in a normal state of consciousness in much of their life. But, they can spontaneously enter into an altered states of consciousness (ASC) [17]. Farthing specifies a long list of ASCs such as: sleep, pre-sleep state, hypnosis, meditation, and states produced by drugs like marijuana, Lysergic Acid Diethylamide (LSD) and alcohol [18]. According a report of World Health Organization (WHO), alcohol is considered the most widely used psychoactive drug worldwide [19]; Europe is the continent where it is most ingested, followed by America.

As mentioned Knuston in one of his articles in The Wall Street Journal, human beings make drunken phone calls frequently i.e. when they are in ASC caused by alcohol consumption [20]. Nowadays, Smartphones and Internet access make greater the effects of people's actions in ASC induced by alcohol ingestion. People not only can make calls, but also, use social networks like Facebook and Twitter.

There are several works related to ASC effects induced by alcohol ingestion associated with technology interaction. One of them is a research of Amber Ferris and Erin Hollenbaugh conducted in 2007. They surveyed 489 undergraduates where 79% said they had either placed or received a drunk phone call. The results, published in 2011, showed that the most repetitive reason why people make calls while having an alcohol-induced ASC is confession of emotions, particularly of love [21]. Another work conducted in Washington University showed that a behavior defined as “open sharing” is considered the most dangerous because the involved people loss their privacy control when they upload their information to social networks while having an ASC [22].

Once known the negative effects of alcohol on Internet users, several applications or software modules have been developed in order to decrease such effects. For instance, a 23 years old man living in San Antonio, Texas, developed an iPhone application called Drunk Text Savior that prevent people to send text messages and posting on Twitter while they are in an ASC. This software analyzes the message and advises the author not to press the send button if it contains too many misspellings or explicit language. Google also developed an experimental feature called Mail Goggles to prevent drunk users to send emails. This feature requested users to solve math problems before sending an email [20]. Furthermore, there is Drunk Mode, a software developed by Joshua Anton for iPhone and Android that prevents users to send text messages and making calls to specific contacts for 12 hours from the first drink; before executing the previously mentioned functionalities users must solve mathematical problems. There is another software called iDrunk; this connects to a smartphone through Bluetooth and blocks social media posts if the user's blood alcohol content exceeds a preset limit [20]. This software did not have success due to lack of budget and other problems.

The aforementioned researches lead to suppose that the content that people post on Facebook is influenced by the states of consciousness that users maintain when sharing information in their profiles; and such state of consciousness, many times, tend to be temporarily altered by influences of drugs and alcohol consumption.

On the other hand, studies and research show that it is possible to make relatively accurate predictions regarding the personality of an individual by combining several features of his/her Facebook profile. However, these predictions may become inaccurate when the user publishes content while having episodes of altered consciousness.

Additionally, as mentioned above, there are several software tools to prevent people to access digital means when they are in ASC caused by alcohol consumption. However, there are not effective mechanisms that prevent users to post content on social networks like Facebook and Twitter [20] [23]. Furthermore, existing applications require configuration made a priori by the user indicating execution and stop schedules; this feature becomes a problem since users cannot be aware of such configuration when they are in ASC.

Despite the fact that social networks like Facebook have privacy settings and other security features, there are still people who have shameful moments, and even, they have gone through legal problems because of the content published in their accounts in ASC caused by the effects of alcohol.

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3. HYPOTHESIS AND RESEARCH SCHEME

The present work has set the following hypotheses.

H1: It is possible to detect altered states of consciousness caused by alcohol consumption on Facebook users in an automatic way when they publish posts.

H2: It is possible to prevent users to publish posts when they are in an altered state of consciousness caused by alcohol consumption while H1 is true.

This work pretends to design a solution to detect altered states of consciousness caused by the ingestion of alcohol on Facebook users and blocking them to publish posts. This will be done with a prediction machine, which will have three main modules:

1) Data collection and storage: This will be created to store the general information of the user and collect/store user's posts from their Facebook profiles.

2) Data analysis: This module will allow to differentiate altered states of consciousness from normal states.

3) Data blocking: This module will block user's posts and send them to a data buffer if data analysis module detects an altered state of consciousness. After a period of time, the user will decide to publish or not the temporarily blocked posts.

The objective of this work is to use the proposed solution to control controversial posts published on Facebook while users are in an altered state of consciousness caused by alcohol consumption. For this, it is necessary to define a user model that involves users' behaviors when they are online (i.e on Facebook) and offline (i.e on real life). Features which define the user model will be collected by using different techniques and tools. Proposed solution evaluation will be carried out by applying an experiment.

4. DEVELOPMENT OF THE PREDICTION ENGINE

As mentioned before, this work proposes a solution to detect altered states of consciousness on Facebook users, particularly caused by alcohol consumption, and prevents people to post content that could affect negatively in their lives.

One of the functional requirements of the proposed solution is to define a user model that identifies altered states of consciousness caused by alcohol consumption. We have been taken account a user model proposed by researches of Florida International University in 2012 [24]. Such user model is composed of features grouped under two categories, target-behavior specific features (explicit features) and target-behavior related features (implicit features). Specific features are obtained by assessment instruments which can capture specifically the user's alcohol consumption behavior features, and related features are obtained using demographic features (e.g., name, gender, race, age, place of birth) and affective features (e.g., facial expressions, mood) and contextual features (e.g., location, social interactions, relationships). This user model is oriented to be used in medical recommendation systems to reduce the alcohol consumption in people and make their lives better. We have excluded features such as motivation to change and risk factors due to they are out of context, and because they depend on the mental and physical conditions. Based on the previously detailed criteria, we propose the following user model (see Figure 1).

The proposed user model has the following groups of features:

1) The first group is determined by the consequences of drinking focused on intra-personal features. These features are gotten by asking a collection of questions that reflect the subjective perceptions of the user about his/her drinking issue. The answer of such questions represents the subjective perception of the user in terms of his/her behavior (e.g. aggressive or depressive attitude) and feelings (e.g. happy, unhappy, or guilty). This process is part of the initial configuration of the proposed solution.

2) The second group is related to the frequency of drinking focused and drinking patterns. A drinker may have one of the two drinking patterns: steady or periodic. A person with steady drinking pattern is the one that drinks at least once a week. On the other hand, a person with periodic drinking pattern is the one that drinks less often than once a week or who is abstinent. This process is also part of the initial configuration of the proposed solution.

3) The third group is composed of demographic features such as place of birth, gender, name, and age, which are very important to represent the proposed user model. Such features are obtained in the initial configuration of system.

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4) The fourth group is related to the affective features, such as the moods that a user manifests on Facebook. These features can be inferred from user activity. These features were obtained using a sentiments analysis model created in Google Prediction API [25].

5) The fifth group is related to the contextual characteristics (metadata) of user's posts, such as publication time, location, shared content (e.g. links or videos). This information has been extracted using Facebook Graph API Explorer [26].

6) Finally, the sixth group called other characteristics includes information of user's lifestyle (e.g. if the user practices any sports, do exercises, use drugs, among others). This information helps to contribute to the representation of the proposed model.

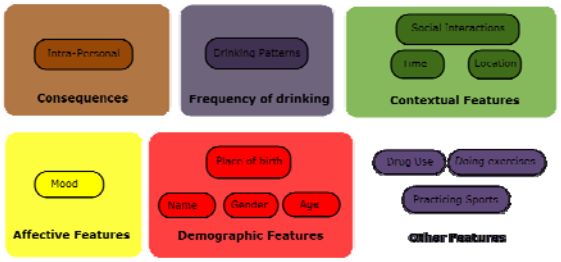

Figure 1: Proposed User Model

Additionally, we have included other functional requirements that the proposed solution must satisfy:

- ✓ Execution without user assistance: The system must automatically detect altered state of consciousness caused by alcohol consumption in user's posts on Facebook. It means that the user does not need to do any special settings or answering questions to infer their status when publishing posts.
- ✓ System Installation: The system must run on a smartphone that uses iOS or Android. The user has to do an initial configuration where they will input demographic information, related to their lifestyle, and the period of time that their posts will be stored before being published.
- ✓ Data collection and storage: The system will have a module to connect to Facebook through Facebook API to collect and storing user's posts on a database. Additionally, another database will store data obtained from the system initial configuration process.
- ✓ Data analysis: The system will have a module for analyzing features of the user model. Therefore, it will be able to differentiate altered states from normal states of consciousness.
- ✓ Data blocking: The system will have a module that blocks user's posts detected as posts created in altered state of consciousness. The module will store such posts on a data buffer to allow user to decide to publish them or not after a period of time.

We also defined several non-functional requirements such as ease of use, scalability and availability.

After analyzing the aforementioned requirements, the following design of proposed solution was created (see Figure 2).

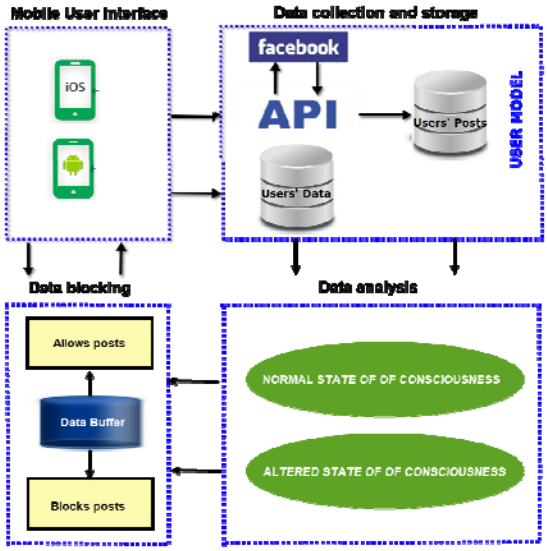

Figure 2: Architecture of the Proposed Solution

According to Figure 2, the user makes use of a mobile interface to do the initial settings of the system by answering a survey that includes questions related to the first, second and sixth features group of the proposed user model. Users also have the possibility of modifying their information when they want and they also will be able to access to the blocking module to configure their post publication conditions. On the other hand, data collection and storage module are in charge of collecting the third, fourth and fifth features group of proposed user model (i.e. demographic, affective and contextual information). The system will use Facebook Graph API to make data requests. Data collection and storage module will use the database management system (DBMS) called MySQL. Such tool will allow the storage of general information of the user and his/her posts. We have chosen MySQL because of its variety of libraries and tools which permit to connect with mobile apps and Facebook API. MySQL Storage Engines are designed to obtain the highest performance when processing

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large amounts of data such as user's posts on Facebook [26].

Data analysis module will use a prediction mechanism based on a supervised machine learning technique. We will utilize Google Prediction API that permits an easy integration with other apps. It is important to mention that it is possible use the "Categorization" algorithm to predict categories or "Regression" algorithm to predict numerical values [27]. Three steps are required to use the Prediction API.

1) Upload: A comma-separated values (CSV) file with the data has to be uploaded to Google Storage.

2) Training: Google's Prediction API uses the uploaded data to train the chosen algorithms and it decides which the best model is.

3) Prediction: Google Prediction API does queries on the trained model to obtain new predictions.

Data blocking module obtains a posts content label from the data analysis module. It permits to publish the post on Facebook if the label is "normal state of consciousness" and it sends the post to the data buffer if its label is "state altered of consciousness". After a period of time, the user decides to publish the posts stored in data buffer.

5. EVALUATION

To demonstrate the hypotheses presented in section 3, we have developed an initial prototype based the solution detailed in Section 4 and we have conducted an experiment using such system. As shown in Figure 3, first, we have selected a group of participants for the experiment and then we have gathered contents published in their Facebook profiles. Then, through a web application, the posts were presented to the participants and each of them labeled their own posts, separating those that were published while they were under the effects of the alcohol from which they were published while they were sober. Afterwards, the labeled posts were adequate according to Google Prediction API requirements and loaded to Google Storage to execute the training process and then the same Google Prediction API tool was used to make the predictions. Finally, the results presented in this work were obtained.

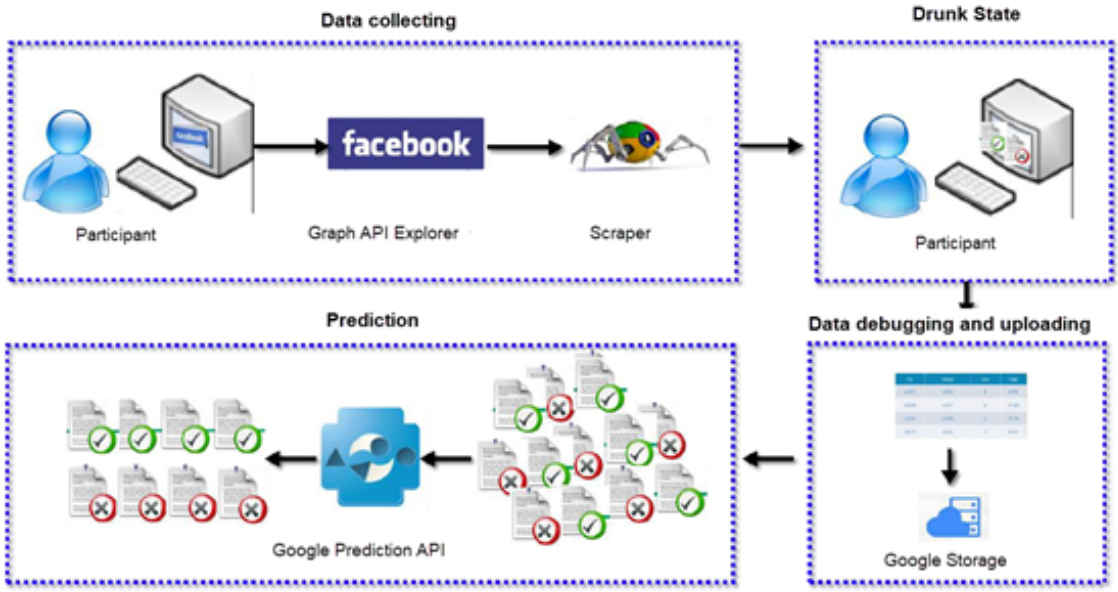

Figure 3: Architecture of the Proposed Prototype

5.1. Participants

Detecting altered states of consciousness caused by the consumption of alcohol present in Facebook users when publishing content suggests the participation of subjects to whom it is possible to track their activities on such social network platform. To do this, a group of students of a University was followed up for five months, focusing mainly on the content of the publications considered controversial. Then, using the observation method [4], it was perceived that ten of the subjects of the whole population make frequent

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controversial publications which means that they were good candidates to participate in the experiment.

The recruitment process was done using a group message on Facebook requesting collaboration to participate in the present experiment. People who accepted participating in this process authorized the access to all publications in their profiles, allowing us the extraction and labeling of posts through a web application. Among the whole population, five subjects were selected for the experiment. The demographic information of these people is shown in Table 1.

Table 1: Participants' Demographic Information (N=5)

No.	Gender	Age	Place of birth
1	male	28	Quito, Ecuador
2	male	28	Quito, Ecuador
3	male	31	Quito, Ecuador
4	female	33	Quito, Ecuador
5	male	30	Quito, Ecuador

Table 1 shows that participants were five people (4 men, 1 woman) ranging in age from 28 to 33 years, being the mean 30 years old and standard deviation 2.12 years old.

5.2. Design

The architecture of the proposed prototype to be used in the experiment shown in Figure 3.

According to the architecture design, the experiment consisted of the following steps.

- ✓ Collecting posts and metadata from participants' Facebook profiles by utilizing Graph API Explorer that permits to do queries to Facebook Graph API directly from user account [28].
- ✓ Extracting posts' content from queries conducted through a Google Chrome extension called Scraper that allows us to extract content from any web page.
- ✓ Storing collected posts in a database which is connected to a web application called Drunk State that was developed exclusively for this work. Utilizing Drunk State, participants ticked off their own posts which were published when they were drunk.
- ✓ Creating CSV files from posts which were ticked off by participants, one file for each participant.
- ✓ Debugging each CSV file according to suggestions of Google Prediction API documentation. A CSV training file must follow these conventions:
  - o Maximum file size is 2.5GB
  - o It must have a minimum of six examples in your training file
  - o No header row is allowed
  - o Columns are separated by commas. Commas inside a quoted string are not column delimiters.
  - o As a best practice, remove characters such as: periods (; .. ...), quotes (" '), question and admiration marks (¿,?,!,¡), accents (Á, é í, Ú) and other characters (/ @ * - _).
- ✓ Uploading debugged CSV files to Google Storage.
- ✓ Choosing a process to train data sets of CSV files.
- ✓ Training data sets by using Prediction API following the selected process which was "crossvalidation method" [29].
- ✓ Finally, doing queries with new data sets to predict the state of consciousness of the user.

5.3. Tools

As shown in Figure 3, the architecture of the implemented prototype is made up of several objects that are part of the materials used for the elaboration of the experiment. Below is a brief description of each of them.

- ✓ Graph API Explorer: it was used to collect the contextual characteristics of the proposed user model. The data was gathered by using queries to posts of Facebook.
- ✓ Scraper: it was used to extract the specific data from the raw data delivered by queries made in Graph API Explorer.
- ✓ Web application: it was developed exclusively for this experiment. The participants used it to tag their own posts.
- ✓ Google Storage: it was used to load training data sets in the cloud.
- ✓ Google Prediction API: training and prediction was performed using this tool.

6. DISCUSSION AND RESULTS

Table 2 shows the results of the real labels i.e. labels which were obtained from Drunk State. Table 2 and Figure 4 represent the number of posts which were labeled by participants: those which were ticked off as altered states and those which were labeled as normal states of consciousness.

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Table 2: Posts and Real Labels

Participant	Labels		
	Altered states	Normal states	Total
1	88	312	400
2	48	352	400
3	55	157	212
4	43	234	277
5	31	77	108
Total Posts			1397

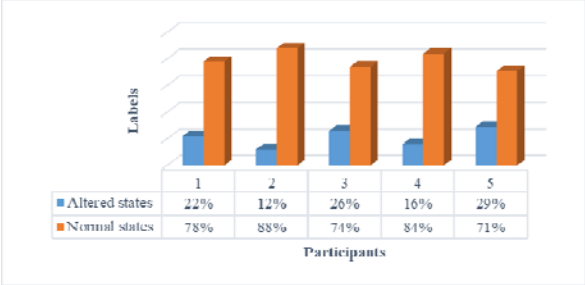

Figure 4: Posts Labeled by Participants

If we analyze the percentages shown in Figure 4, we can say that participant 5 has fewer posts but has the highest percentage of altered state of consciousness labels. On the other hand, participant 1 and 2 have more posts but participant 2 is who has the less percentage of altered state of consciousness labels.

As we mentioned above, we selected the crossvalidation method to train data sets. Training was done in each data set, but to be clearer, we are going to describe the process using the participant 1 data.

We divided data set into 3 parts k=3. *X* represents the first data subset, *Y* represents the second data subset, and *Z* represents the third data subset. The first iteration for training and prediction was $X+Y=Z$, where $X+Y$ is the data set for training and *Z* is the data set to conduct tests. Percentage of accuracy in training of $X+Y$ was 95% while percentage of success in prediction of *Z* was 71.32%. The second iteration for training and prediction was X+Z=Y, where $X+Z$ is the data set for training and *Y* is the data set to conduct tests. Percentage of accuracy in training of $X+Z$ was 89% while percentage of success in prediction of *Y* was 98.49%. The third interaction for training and prediction was $Z+Y=X$, where $Z+Y$ is the data set for training and X is the data set to conduct tests. Percentage of accuracy in training of $Z+Y$ was 92% while the percentage of success in prediction of *X* was 99.25%. Finally, we calculated the mean of percentage in successful predictions: $T=(T_1+T_2+T_3)/3$, where T_1 represents success percentage obtained from data set *Z*, T_2 is the success percentage obtained from data set *Y*, and T_3 represents success percentage obtained from data set *X*. We obtained T=89.67% which is the mean of percentage of successful predictions of problematic posts of participant 1.

Following the process described above, we obtained the accuracy of training and predictions for each participant data sets. Results are shown in Figure 5 and Figure 6.

Figure 5 and Table 2 shows how the data sets of participant 1 and 2 were trained with more accuracy (92% and 91% respectively) and how those users had more posts (400 posts each one). This means that Google Prediction API obtains best accuracy when it is trained more data records. In other words, there is a correlation between accuracy percentage in training and number of data records used for such training. However, it is necessary to conduct several trainings with more data records to conclude that the mentioned correlation really exists.

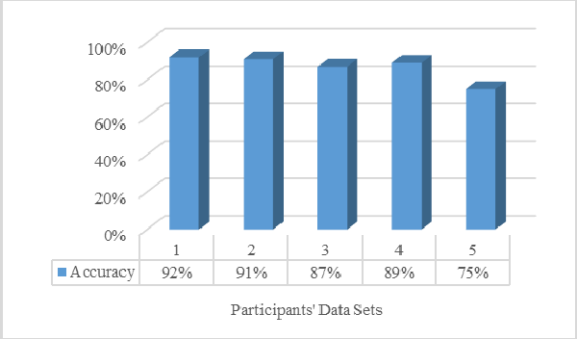

Figure 5: Accuracy in Training of Participants' Posts

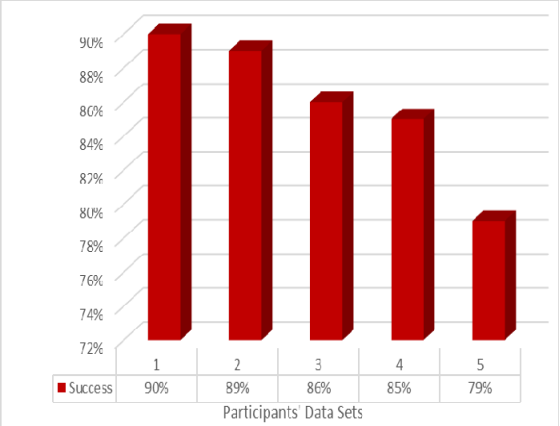

Figure 6: Successful Predictions on Participants' Posts

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In Figure 4 and Figure 6, we can see that participant 3 has 26% of altered states of consciousness labels and 74% of normal states of consciousness labels. Furthermore, such participant has 86% of successful predictions, knowing that the mean of success in prediction is 85.8% and standard deviation is 4.3%. There is a similar situation for participant 1 but the distribution of labels for participant 3 is better. Participant 1 has 90% of successful predictions, despite it is the highest percentage, it is further from the mean in relation with percentage obtained for participant 3. Therefore, we obtained a better prediction on data sets of participant 3. On the other hand, participant 5 has 70% of successful predictions, 75% of accuracy in training and less data records (108 data records). Therefore, we can conclude that on data sets of participant 5 there was not a good prediction.

Additionally, it is important to mention that the proposed solution provides several advantages from previous applications. Table 3 shows the summary of features of existing applications and the solution proposed in the present work.

Table 3: Comparison of Solutions

Feature	Existing applications	Proposed Solution
Execution without user assistance	No	Yes
User must solve math problems or answer questions to infer their state of consciousness	Yes	No
Detects automatically ASC induced by alcohol in published Facebook content	No	Yes
Prevents automatically posting controversial content on Facebook	No	Yes

7. CONCLUSIONS & FUTURE WORK

In this paper, we proposed and applied a user model to detect altered states of consciousness on Facebook users using a prediction engine. Results show high percentages of success in prediction; for example, the participants with higher number of training data sets had percentages of successful predictions between 90% and 95% where the general average was the 86%. Through the proposed model and experiment, we could demonstrate that it is possible to identify altered states of consciousness on Facebook users.

It is important to take account that the number of posts of each participant (i.e. size of training data set) and labeling of such posts in altered and normal states of consciousness are very important to increase the success of predictions. In other words, it was observed that there is an important relation between the number of publications per user and the percentage of success in the prediction; apparently, the greater the amount of trained data the higher the percentage of success of prediction. This work is an important beginning for future lines of research to focus on the development of a kind of virtual assistant for Facebook that not only identifies or detects altered states of consciousness between normal states of consciousness in text based publications, but also that allows to detect such states through photographs.

Finally, we believe that it is possible to improve the elaborated prototype through the following improvements to give a more complete solution (future works).

- ✓ Development of an automated data collection and storage module, using both the Facebook API and the Google API.
- ✓ Development of a blocking module, which will allow the user to have control over their Facebook posts.
- ✓ Development of a mobile interface of the system to detect altered states of consciousness caused by the user's alcohol consumption in Facebook.

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