Emotions and Irony per Gender in Facebook

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Abstract

This paper describes a Spanish dataset collected from Facebook that has been labelled with emotions, irony and author's gender. The inter-annotator agreement shows the difficulty and high level of subjectivity of the annotation task, especially with respect to irony. Statistics of the corpus show the relationship among topics, emotions, irony and author's gender. For instance, females used more emotions than males (mainly positive emotions), males were more ironic than females (at least in this dataset), and politics is the topic addressed more ironically and with more *negative* emotions. A social analysis of the results goes beyond the scope of this paper but being the comments mainly about (some of) the Spanish politicians, we are not surprised of the results. The dataset is publicly available for research and social analysis purposes with the name EmIroGeFB at http://ow.ly/uQWEs

Keywords: emotions, irony, gender, Facebook

1. Introduction

Our habits are changing, we are no longer customers searching for products but users looking for new experiences. Social Media even accentuate such changes. The emotional aspect of the life is acquiring a growing importance. Thus, the need of affective processing acquires a new dimension nowadays in order to know what users want and need.

We are interested in social media since we are interested in everyday language and how it reflects basic social, emotional and personal processes. Furthermore, in social media users reflect what they want and need without restrictions and liberty of expression. But there is a lack of annotated resources on affectivity when we talk about social media texts. Even more if we focus on Spanish language, no matter its good penetration in Internet[1].

We focused on Facebook as representative of social media because it is massively used by people, where they express their thoughts freely and without editorial guidelines unlike traditional media like newsletters and with spontaneity unlike blogs. Thus the expected affectivity in such media is very high. Facebook also allows us to obtain demographics such as gender, unlike similar media like Twitter.

The paper describes a dataset collected from Facebook, in Spanish and labelled with emotions, irony and gender of authors. The structure of the paper is as follows. In Section 2 we describe the corpus, how the data was collected and annotated, and the inter-annotator agreement. In Section 3 we analyse the corpus and we present statistics about emotions and irony per gender. In section 4 the distribution of the labelled corpus is described. Finally we draw some conclusions in Section 5.

[1]http://eldiae.es/wp-content/uploads/2012/07/2012 el espanol en el mundo.pdf

2. Corpus description

In this section we describe the corpus, how it was collected, the labelling process and the inter-annotator agreement.

2.1. Dataset collection

Facebook is composed of a hierarchy of objects. Pages are one of the first level objects, as Profiles, Events or Groups. Each Page has an owner who publishes Posts. Posts are second level objects. Posts are written by the owner of the Page and follow the owner's guidelines and thematics. Posts allow other users to participate in the conversation by answering to them with Comments. Comments are third level objects. In Comments people can express what they think about the topic of the Posts but without the guidelines of Pages' owners. For building the dataset, we focused on Comments.

We selected three thematics, with high volume of participation[2], and susceptible of emotional comments, and as representative for each thematic, we selected four of the most well-known pages in such thematics in Spain, as it is shown in Table 1.

We retrieved at least 1,000 posts for each page, and all the comments written in each post. We collected comments with the gender information of their author. We randomly selected 200 comments for each thematic and each gender, balancing the data as shown in Table 2.

Neither selection nor cleaning has been done except for language filtering and for ensuring that comments have some text (e.g. they are not only shared links).

[2]http://www.pewglobal.org/files/2012/12/Pew-Global-Attitudes-Project-Technology-Report-FINAL-December-12-2012.pdf

POLITICS: Four official pages of Spanish political parties

Partido Popular
https://www.facebook.com/pp
Partido Socialista Obrero Español
https://www.facebook.com/psoe
Izquierda Unida
https://www.facebook.com/izquierda.unida
Union por el Progreso y la Democracia
https://www.facebook.com/Union.Progreso.y.Democracia

FOOTBALL: Four official pages of Spanish football clubs

Real Madrid CF
https://www.facebook.com/RealMadrid
FC Barcelona
http://www.facebook.com/fcbarcelona
Valencia Club de Futbol
http://www.facebook.com/vcf1919
Atletico Bilbao
http://www.facebook.com/pages/ATLETICO-BILBAO/103997686354572

CELEBRITIES: Four official pages of Spanish celebrities

Belen Esteban
http://www.facebook.com/BelenEstebanM
Kiko Hernandez
http://www.facebook.com/ElConfesionariodeKiko
David Bisbal
http://www.facebook.com/davidbisbal
Santiago Segura
http://www.facebook.com/pages/Santiago-Segura-Silva/12459228767

Table 1: Official pages selected for collecting data for each thematic

Theme	Gender	Comments
Politics	Male/Female	200/200
Football	Male/Female	200/200
Celebrities	Male/Female	200/200

Table 2: Dataset collected from Spanish Facebook comments

2.2. Labelling emotions, irony and gender

Three independent annotators[3] labelled 1,200 documents with the six basic emotions of the Ekmans theory (Ekman, 1972) (joy, surprise, fear, anger, disgust, sadness), irony and gender.
There are many ways of annotating emotions in texts:

- The emotion profiled by the speaker;
- The emotion produced in the hearer;
- The emotion that is described or expressed.

[3]Two females and one male

We asked the annotators to use the last approach trying to involve as little as possible issues that are purely personal. Annotators were provided with the information of Figure 1 that was obtained by Greenberg (Greenberg, 2000) on the basis of psychological relationships of emotional states with the six basic emotions of Ekman. It is remarkable that some secondary emotions are shared by more than one primary emotion; for example, *indignation (indignación)* is shared by *anger* and *disgust*, and *fascination (fascinación)* is shared by *joy* and *surprise*. This issue hinders the unique identification of such basic emotions, as it was evidenced in (Ortony and Turner, 1990). Besides, the identification of multiple emotions and the absence of any has been allowed.

ALEGRÍA	ENFADO	MIEDO	REPULSIÓN	SORPRESA	TRISTEZA
Agradecido	Agresivo	Acomplejado	Aborrecimiento	Extrañeza	Abatido
Alegre	Colérico	Alarmado	Desagrado	Sobresalto	Agobiado
Animado	Crispado	Angustiado	Grima	Susto	Apenado
Calmado	Descontento	Ansioso	Repulsión	Consternación	Confuso
Confiado	Enfadado	Atemorizado	Antipatía	Pasmo	Decepcionado
Contento	Enojado	Aterrado	Aversión	Desconcierto	Deprimido
Dichoso	Excitado	Avergonzado	Repugnancia	Estupor	Desalentado
Encantado	Fastidiado	Confuso	Disgusto	Asombro	Desanimado
Entusiasmado	Furioso	Desesperado	Repudia	Fascinación	Desdichado
Eufórica	Insatisfecho	Desorientado	Repulsa	Admiración	Desmoralizado
Esperanzado	irascible	Horrorizado	Odio	Confusión	Frustrado
Feliz	Malhumorado	Inquieto	Manía	Chasco	Nostálgico
Gozoso	Molesto	inseguro	Rabia	Impresión	Soledad
Satisfecho	Nervioso	Intranquilo	Animadversión	Exclamación	Triste
Tranquilo	Rabioso	Pánico	Nauseabundo	Conmoción	Infeliz
Complacido	Tenso	Preocupado	Indignación	Estupefacción	Desconsolado
Libre	Violento	Temeroso	Enfado		Afligido
Fascinado	Irritado	Tenso	Desprecio		Amargado
Seguro	Indignado	Indeciso	Distanciamiento		Impotente
		Impotencia			

Figure 1: Secondary emotions related to the six basic emotions

Due to the increasing use of irony in social media[4] (Reyes et al., 2013)(Reyes and Rosso, 2012)(Bosco et al., 2013) we labelled each comment also as ironic/not ironic. Irony is a uniquely human mode of communication by which the speaker says something other than what he or she intends (Wallace, 2013). (Grice, 1975) and (Attardo, 2000) consider irony as an *intentional* violation of conversational maxims. We ask annotators for tagging each comment as ironic/not ironic based only on their own concept of irony. No further information or definition was provided.
Texts were also labelled with gender information in order to link this resource to tasks such as Author Profiling at PAN 2013(Rangel et al., 2013). Gender annotation was provided by Facebook, but we ensured the right annotation by manually checking first names and photos of the users.

2.3. Inter-annotator agreement

For emotions annotation we calculated the inter-annotator agreement with the Kappa DS method (Diaz-Rangel, 2013). This metric is based on Fleiss's Kappa but it allows to calculate concordance for more than two annotators (in our case three: A1, A2 and A3) with multiple not

[4]A pilot task on sentiment analysis and irony (in Italian) will be organised at Evalita-2014: http://www.di.unito.it/?tutreeb/sentipolc-evalita14/index.html Another task (in English) should be organised at SemEval-2015.

mutually exclusive categories (in our case six not mutually exclusive: the six basic emotions). Kappa DS is calculated for each couple of annotators and then the average of all of them is calculated to obtain the overall assessment. We show results in Table 3.

	A1	A2	A3	Rest
A1	-	0.0587	0.2738	0.1662
A2	0.0587	-	0.1042	0.0814
A3	0.2738	0.1042	-	0.1890
Total		0.1455		

Table 3: Kappa DS: Inter-annotators agreement for emotions annotation

The average value for Kappa, equal to **0.1455**, shows a low index of agreement according to (Landis and Koch, 1977). But, as it is shown in (Diaz-Rangel, 2013), we have to bear in mind the amount of variables intervening in the evaluation for the right interpretation of such index. We also grouped the nearest emotions, that is, those which share secondary emotions, as we highlighted in Figure 1: *joy / surprise* and *anger / disgust*. Results in terms of inter-annotator agreement are shown in Table 4. In this case, Kappa shows a higher value for the agreement (**0.6016**), what stresses out the need of considering such discordance among annotators when using the dataset for machine learning purposes, especially with respect to *joy/surprise* and *anger/disgust*.

	A1	A2	A3	Rest
A1	-	0.6618	0.5656	0.6137
A2	0.6618	-	0.5773	0.6196
A3	0.5656	0.5773	-	0.5715
Total		0.6016		

Table 4: Kappa DS: Inter-annotators agreement with grouped emotions: joy/surprise and anger/disgust

Respect to irony annotations, we calculate the Fleiss's Kappa to measure the inter-annotator agreement. This method allows multiple annotators (three in our case) and binary variables (ironic or non-ironic). We obtained a Fleiss's Kappa value equal to **0.0989**; i.e. a very low index of agreement. We think this low index is due to the task itself: irony is quite subjective and depends on people, their moods, linguistic and cultural context, etc. to be correctly understood; as well as contextual information that, in our case, was not provided. For instance, we did not provide general definition of irony to set up a common framework of characteristics; or the fact that annotators carried out the task on text which means that information such as facial expressions or tone of voice could not help identifying a text as ironic.

In order to know the agreement rate among annotators in relation to emotions labelled also on ironic comments, we calculated the Kappa DS taking into account only the subset of comments identified as ironic. Results are shown in Table 5

	A1	A2	A3	Rest
A1	-	-0.0854	0.0001	-0.0426
A2	-0.0854	-	-0.1128	-0.0991
A3	0.0001	-0.1128	-	-0.0563
Total		-0.0660		

Table 5: Kappa DS: Inter-annotators agreement of emotional comments labelled with irony

We obtained a negative value of **-0.0660** which means there is no agreement when taking into account emotions and irony. In this respect, no further analysis was performed, only the agreement index among annotators. However, we think there is a close relation between irony and emotions, especially, the kind of emotion triggered by an ironic utterance. This kind of analysis is projected as future work.

3. Corpus analysis

In this section we present basic statistics about the corpus and the annotations for emotions and irony.

3.1. Emotions

As it was shown by the low inter-annotator agreement, emotion labelling is a difficult task. Below some examples are shown in their original language to preserve the meaning. We explain them in English in order to show the difficulty of labelling the basic emotion expressed.

e.g. "guuapaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa ers la mejorrr"

The previous is clearly an encouraging comment to a celebrity. But which is the basic emotion? Using the Figure 1, which word better describe the mood: *euphoria*, *fascination*, *admiration*? Depending on the selection, annotators would doubt between *joy* and *surprise*: Annotator 1 selected *joy* and *surprise*, Annotator 2 selected *joy* and Annotator 3 selected *surprise*.

e.g. "Es una vergüenza, que se financien ellos, que para algo son privadas"

Something similar happens with disgusting comments. In the previous one, the author criticizes some entities for being financed by the government although they are private. Comments like the previous one, may be labelled differently depending on annotators' mood or their own world vision. For instance, Annotator 1 and Anotator 2 labelled it focusing on *disgust* and *anger* while Annotator 3 labelled it focusing only on *anger*.

e.g. "guarda semejante alhaja en una camara acorazada por si os la roban"

In the previous comment, the author is recommending to a celebrity to save something in a safe room to preserve it from thieves. This comment is so ambiguous that the basic emotion labelled by each annotator is different. Annotator 1 reported *no-emotion*, Annotator 2 reported *fear* and Annotator 3 reported *surprise*.

In Table 6 the number of comments annotated for each emotion by annotator is shown. As it was previously mentioned, the difference among annotators is greater in emotions like *joy*, *anger*, *disgust* and *surprise*. It seems that

some annotators (A1 and A3) perceived as *surprise* what others (A2) perceived as *joy*, and similar with *anger* (A2) and *disgust* (A1).

	A1	A2	A3
Joy	255	756	215
Anger	96	265	148
Fear	19	6	7
Disgust	255	78	166
Surprise	626	140	460
Sadness	165	72	83
None	97	42	160

Table 6: Number of comments per emotion and annotator

We finally selected those annotations in which, at least, two out of three annotators agreed with. In Table 7 the number and percentage of comments per emotion is given. For example *joy* has a higher value (338) than that was obtained by two annotators (A1=255; A3=215). Something similar happens to other emotions. This means that the perception of *joy* or *surprise* is quite subjective.

	Total	%
Joy	338	28.17
Anger	151	12.58
Fear	3	0.25
Disgust	129	10.75
Surprise	390	32.50
Sadness	76	6.33
None	262	21.83

Table 7: Number and percentage of comments per emotion

In Table 8 the distribution of emotions labelled per gender is shown. Results seem to be quite balanced, no matter there are less comments without emotions for females (18 vs. 37), or more positive/neutral emotions like joy (194 vs. 144) or surprise (215 vs. 175).

	Male	Female
Joy	144	194
Anger	79	72
Fear	2	1
Disgust	66	63
Surprise	175	215
Sadness	37	39
None	37	18

Table 8: Emotions per gender

In Table 9 the distribution of emotions per topic is shown. As it was expected, politics is the most negative perceived topic with higher values for anger, disgust and sadness emotions, and also with lower values for non-emotional comments. Football and celebrities have similar values for joy and surprise, but celebrities have higher values for disgust. Maybe this is due to the fact that people write in celebrities' pages for supporting or criticizing them, depending on the affinity to them.

	Politics	Football	Celebrities
Joy	50	153	135
Anger	114	10	27
Fear	2	1	0
Disgust	79	7	43
Surprise	53	180	157
Sadness	52	9	15
None	9	23	23

Table 9: Emotions per topic

3.2. Irony

Some examples of ironic comments are shown below. Comments are shown in their original language in order to preserve their ironic sense. We provide an English explanation based on our own interpretation, in order to show the difficulty of the task.

e.g. "Pitbul es cultura, no ves que te enseña a contar? aunque sea sólo hasta 3"

In the previous comment, the authors criticises the singer for including in his lyrics "one, two, three...". The author says that this is culture because listening such singer, anyone can count. At least, until number three. The author expresses a positive comment using a remark in order to emphasizing his negative opinion about this singer. In this comment, two of three annotators agreed.

e.g. "Que viva, pero muy lejos!"

In this comment, the author expresses his intention of being far from someone, mentioning at first a positive desire and finally showing his real intention. In this comment all the annotators agreed.

e.g. "Pobres, en el fondo producis ternura...que triste tiene que ser haber votado al PP."

In this comment, the author expresses shame towards people. The author uses this remark in order to show his despise about people's judgement for choosing the current politician party. The author expresses a negative comment in order to show his real intention. In this comment two of the three annotators agreed.

e.g. "Eres muy injusto y quiero que sepas que la infanta cuando se fue a vivir a su nueva vivienda recien reformada y a pesar de ser mucho mas pequeña que la zarzuela se mudo convencida de que era una VPO o no?....."

In the previous comment, the author says that the the Spanish King's daughter moves to a new residence. She says that the Spanish King's daughter is convinced that this new house is a kind of state subsidy housing because it is smaller than Zarzuela's Palace, the Residence of the Spanish royal family. The author expresses a positive remark about someone's judgement including comparisons in order to emphasize the utterance's ironic sense. In this comment all the annotators agreed.

e.g. "Yo soy presunta ciudadana española y digo esto porque no estoy segura de si realmente lo soy o si vivo en una realidad paralela donde nuestro presi es más inútil que una neurona de Paris Hilton."

In the last comment, the author alludes the possibility of living in a parallel reality because her country is governed for someone useless than a Paris Hilton's neuron. The author compares two remarks in the same comment, in order to emphasizing her real intention to show disagreement with government of her country. In this comment all the annotators agreed.

In Table 10 the number of ironic comments labelled by each annotator is shown. The percentage of comments labelled with irony is very low, although one annotator labelled a higher number of comments than the rest.

Annotator	Comments	%
A1	52	4.33
A2	189	15.75
A3	48	4.00

Table 10: Number of comments with irony per annotator

We determined as ironic only those comments that were annotated as ironic by at least two annotators. As can be seen in Table 11 only 42 comments fits this criteria.

	Total	%
Ironic	42	3.62
Non-ironic	1158	96.37

Table 11: Number and percentage of ironic and non-ironic comments

In Table 12 is shown the number of ironic comments per gender and topic. We can see that males used irony more than females and politics is the topic with most ironic comments.

	Female	Male	Total
Football	1	3	4
Politics	11	16	27
Celebrities	3	8	12
Total	15	27	42

Table 12: Ironic comments per gender and topic

Finally, in Table 13 we show the number of comments per emotion, in which, at least, two of three annotators agree.

Emotion	Ironic comments
Joy	8
Anger	4
Fear	0
Disgust	6
Surprise	6
Sadness	0
None	3

Table 13: Number of ironic comments per emotion

4. Corpus distribution

In its data use policy[5] Facebook says: "Because Pages are public, information you share with a Page is public information. This means, for example, that if you post a comment on a Page, that comment may be used by the Page owner off Facebook, and anyone can see it.". We collected comments from public pages thus the data collected is public and can be seen by anyone.

For distributing the collection we use a XML file with the structure described in Table 14.

```
<dataset>
    <comments count="1200">
        <comment ID="FACEBOOK_COMMENT_ID"
                 gender="male|female"
                 topic="POLITICS|FOOTBALL|CELEBRITIES">
           <annotator1>
                <joy>true/false</joy>
               <surprise>true/false</surprise>
                <sadness>true/false</sadness>
                <anger>true/false</anger>
                <disgust>true/false</disgust>
                <fear>true/false</fear>
                <no-emotion>true/false</no-emotion>
                <irony>true/false</irony>
            </annotator1>
            <annotator2>
                ...
            </annotator2>
            <annotator3>
                ...
            </annotator3>
        </comment>
        ...
    </comments>
</dataset>
```

Table 14: XML structure of distributed data

Each Facebook comment is identified by an unique ID with the form:

`pageID_postID_commentID`

For example:

`208701145825784_582486558447239_1966964`

For downloading contents a Facebook token is needed. It may be generated at Facebook Developers website [6]. With the Facebook comment ID and the generated Facebook token, content is available through Facebook Graph [7]

Result is provided in JSON format with the structure described in Table 15.

[5] `https://www.facebook.com/full_data_use_policy`

[6] https://developers.facebook.com/tools/explorer/

[7] https://graph.facebook.com/COMMENTID?access_token=TOKEN

```
{
   "id": "208701145825784_582486558447239_1966964",
   "from": {
      "name": "COMMENTER NAME",
      "id": "COMMENTER ID"
   },
   "message": "COMMENT CONTENTS",
   "can_remove": [false|true],
   "created_time": "DATETIME",
   "like_count": NUMERIC,
   "user_likes": [false|true]
}
```

Table 15: JSON format of Facebook response

The described dataset is available at http://ow.ly/uQWEs with the name EmIroGeFB.

5. Conclusions

In this paper we describe a Spanish dataset collected from Facebook that has been labelled with emotions, irony and author's gender. Such dataset was manually labelled considering four layers: the six basic emotions described in Ekman's theory, the absence of emotions, irony, and finally, gender. To our knowledge, this is the first attempt to link the gender of an author with emotions and irony.

In order to evaluate the annotation of the dataset, we carried out a Kappa-DS analysis of concordance for emotions. To this respect, we shown that there is low concordance due to some emotions such as *joy/surprise* and *anger/disgust* that are very close to each others. In the case of irony, we carried out a Fleiss's Kappa analysis, resulting in a very low concordance. This shows how subjective irony is. A Kappa-DS analysis of concordance was carried out with cases of comments labelled both with irony and emotions. No agreement was found among annotators. The main reason is the high level of subjectivity when annotating the texts. This negative result may suggest that people express irony independently of the emotions they feel. This issue will be investigated further in the future.

The statistics show that (at least in this dataset): i) females tend to use more words related to emotions than males, mainly positive emotions; ii) males tend to be more ironic than females; or iii) the category *politics* is the one with more negative emotions and irony than other the rest of categories. Being the comments mainly about (some of) the Spanish politicians, we are not surprised of the results.

Finally, this dataset was used in (Rangel and Rosso, 2013) for automatic identification of emotions in text, and also for gender identification, showing to be a valuable resource for research in social media in Spanish.

6. Acknowledgements

The work of the first author was partially funded by Autoritas Consulting SA and by Ministerio de Economía de España under grant ECOPORTUNITY IPT-2012-1220-430000. The National Council for Science and Technology (CONACyT-Mexico) has funded the research work of the second author (218109/313683 grant). The work of the third author was carried out in the framework of the WIQ-EI IRSES project (Grant No. 269180) within the FP 7 Marie Curie, the DIANA APPLICATIONS Finding Hidden Knowledge in Texts: Applications (TIN2012-38603-C02-01) project and the VLC/CAMPUS Microcluster on Multimodal Interaction in Intelligent Systems.

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