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Socio-Affective Technologies

Workshop (Sat 2019)

**Nadja Bernardina De Carolis, Francesca D'Errico and
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In Conjunction with IEEE SMC 2019 IEEE International Conference on Systems, Man, and Cybernetics
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Preface

The main purpose of the present workshop is to advance emotion and social behavior recognition in order to understand their psychological features but also implement multimodal interaction with applications. The idea is to set the state of the scientific research on socio-affective technologies by integrating both the computational and psychological approaches in understanding, recognizing and shaping affective processes in the real and new social environments (social media, virtual reality) even in educational contexts. The two main focuses of the workshop will rely on linguistic, visual and multimodal aspects of the mediated communication and we include papers coming from psychology, computer science and computational linguistics, but also collaborative works, both from a theoretical and methodological point of view. Thanks to the psychological and computer science lenses our workshop has faced two main sessions: 1) Understanding Socio-Affective Technologies' dynamics and 2) Technologies for detecting Socio-Affective processes in real contexts. The first session has been focused on the understanding of socio-psychological processes and behaviors like humor, emotions, aggression and helping put in action within both social media and virtual reality. The works of Papapicco and Mininni, together with Boccia Altieri and La Rocca, have stressed the importance of integrating quantitative and qualitative methods, by advantaging themselves from reciprocal points of strength. The automatic processing of 'big data' from one side can be refined by 'human' interpretation theoretically based, as in the case of online 'humor. Paciello, D'Errico and Saleri showed online rhetorical strategies of moral disengagement in case of sexist aggression by stressing how also people animated by prosocial intentions can be express hostile emotions and comments. The mediated context of virtual reality can also contribute to the understanding of intergroup helping behaviors by integrating real time emotions detection. The study presented by D'Errico, Martinez, D'Anna, Schmidt, Mastrobattista and Parlono pointed out how in intergroup helping behaviors people are distracted and not engaged mainly in usual situation (black people in high state of need and white people in low state of need), thus the engagement extracted by means of EEG can be a measure of coping unexpected social situations. The second session, devoted to Technologies for detecting Socio-Affective processes in real contexts, has presented innovative solution of emotions detection by means of touch on smartphones (Balducci, De Carolis, Impedovo and Pirlo), by means of structured measures reflected in EEG, electrodermal activity and heart rate (Brouwer, Stuldreher and Thammasan) and from spectrogram using Convolutional Neural Networks (Franzoni, Milani and Biondi). A particular attention during this second session was given to the clinical contexts. Gaspari and Donnici presented a design of a novel cognitive rehabilitation exercise for

the rehabilitation of executive functions to integrate into the MS-Rehabilitation system thus aiming at increasing by means of a technological device the patients' life quality. Finally, De Carolis, Palestra and Pino presented a refined Emotions detection from Facial Expressions of Individuals with Mild Cognitive Impairment who interact with NAO Robot.

We would like to take this opportunity to sincerely thank the authors for their inspiring contributions to the workshops. We sincerely thank the program committee members for reviewing the papers and thereby assuring the high quality of the workshop program. We are also very grateful to the organisers of the SMC 2019 conference and in particular to the Chairs for their support in the workshop organisation. Finally, we would like to thank dott. Manuel Martinez for the technical support given during the publication phase.

October 2019

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Impact memes: phds humor(e)

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Abstract— The era of User Generated Content (USG) on Social Networks has invested different areas of human experience, including one of the highest levels of education, i.e. the PhD grade. As regards the opportunity to "imitate" a virtual content, the phenomenon of Memes (Shifman, 2014) is spreading. The research has two goals: to demonstrate how the practices of signification of humor on the doctorate are modified with the "memes factory" and how artificial intelligence is able to detect a complex rhetorical strategy such as humor. To satisfy these purposes, 39 memes about the PhD were collected and, then, analyzed in two levels: the quanti-qualitative, aiming to detect the semi-automatic emotional involvement, expression of humor in "meme discourses"; the semiotic analysis of meme images to understand if it is possible to classify PhD humor. The analysis show a further function of humor mediated by communication through memes, that is the complaint against a complex and precarious career path.

Keywords—PhD Memes, Mediated Humor, Emotional Analysis, Diatextual Analysis Semiotic, Analysis of Imagines

I. INTRODUCTION

The era of User Generated Content (USG) on Social Networks has invested different areas of human experience, including one of the highest levels of education, i.e. the PhD grade. In fact, Social Networks, like Facebook, amplify the possibility of creating content and making sure that they reach a wide audience. Indeed, every user, even a non-expert, can put content online, share it or imitate it. As regards the opportunity to "imitate" a virtual content, the phenomenon of Memes is spreading. Conceptually the Meme is "the minimum cultural unit capable of replication" (Shifman, 2014), which declined in the virtual context and, specifically, of the Social Networks, can take different forms. One of the typical functions of Memes, especially on Facebook, is the replication of semi-serious images accompanied by humorous phrases.

Taking the theoretical boundary between memetics, psychology and computer science, the study aims to assess how, in a context mediated like Facebook, the Memes convey the humorous content regarding a highly qualified educational path, such as the PhD, which is a high level of education, but also delicate because PhD students are neither a teachers/workers nor a students. Furthermore, the research has two goals: to demonstrate how the practices of signification of humor on the doctorate are modified with the "memes factory" and how artificial intelligence is able to detect a complex rhetorical strategy such as humor.

To satisfy these purposes, 39 memes about the PhD were collected from a Facebook page called "High Impact PhD meme" during the first part of 2019. The PhD memes were analyzed in two levels: the quanti-qualitative, aiming to detect the semi-automatic emotional involvement, expression of humor in "meme discourses"; the semiotic analysis of meme images to understand if it is possible to classify PhD humor.

The emotional involvement were detected by means of Tone Analyzer IBM (Byrd, 2016), that gives back as output the prevalence of meme texts emotions. More, starting from these quantitative results and considering the PhD meme texts as "dia-texts" (Manuti & Mininni, 2017), the meme texts about doctorate path were qualitatively analyzed, evaluating the context of enunciation.

Regarding the visual part of a meme, a semiotic analysis of images was carried out, in which the main features were highlighted in terms of structure, colors and principal subjects.

II. HUMOR, SOCIAL NETWORK AND AFFECTIVE INTELLIGENCE

The psychological interest in humor establishes roots in the psychoanalytic theories (Freud, 1905/1950), in which it is underlined the relation to unconscious. Later, Henri Bergson (1950) introduces the theory of laughter affirming that the humor behavior is the result of spontaneity and freedom as human values appearing in a rigid or mechanical expression face. In this way, humor becomes a psycholinguistic subject of study, defined as a cognitive experience that gives rise to feeling of mirth or joy and it is generally mediated by language. Humor is mainly used to reveal suppressed desires and to overcome sociocultural inhibitions, such as aggressive themes. In this way, humor has a primarily emotional function, helping the humorist to build confidence and self-esteem. There are three theories that explain humor: the relief theory (Buijzen, Valkenburg, 2004); the superiority theory (Berger, 1993) and the incongruity theory (Meyer, 2000).

Following these theories, people laugh at things that are unexpected or surprising and it is the violation of an expected pattern that provokes humor in the mind of the receiver. Rather than focusing on the physiological (relief theory) or emotional (superiority theory) function of humor, incongruity theory emphasizes cognition. It assumes that the cognitive capacity to note and understand incongruous events is necessary to experience laughter or mirth. Absurdity, nonsense, and surprise are vital themes in humor covered by this theory (McGhee, 1979; Veatch, 1998). According to Berger (1976, 1993), humor

techniques fall into four general categories: language, logic, identity, and action. Some examples are summarized in Table 1:

Humor Technique	Short Description
Absurdity ^a	Nonsense, a situation that goes against all logical rules
Anthropomorphism	Objects or animals with human features
Bombast ^a	Talking in a high-flown, grandiloquent, or rhetorical manner
Chase ^a	A pursuit or chase of someone or something
Clownish behavior ^a	Making vigorous arm and leg movements or demonstrating exaggerated irregular physical behavior
Clumsiness	Lacking dexterity or grace
Coincidence ^a	A coincidental and unexpected occurrence
Conceptual surprise	Misleading the audience by means of a sudden unexpected change of concept
Disappointment ^a	A situation that leads to (minor) disappointment
Eccentricity ^a	Someone who deviates from the norms, an odd character
Embarrassment ^a	An awkward situation in which someone gets a sense of discomfort, uneasiness, or shame
Exaggeration ^a	Making an exaggeration or overstatement; reacting in an exaggerated way; exaggerating the qualities of a person or product
Grotesque appearance ^a	Someone who has a bizarre or monstrous appearance with striking features
Ignorance ^a	Someone acts or behaves in a foolish, naive, gullible, or childish manner
Imitation ^a	Mimicking or copying someone's appearance or movements while keeping one's own identity at the same time
Impersonation ^a	Taking on the identity of another person, intentionally or unintentionally
Infantilism ^a	Playing with the sound of words
Irony ^a	Saying one thing and meaning something else or exactly the opposite of what you're saying
Irreverent behavior	Lacking proper respect for authority or the prevailing standards

Tab. 1 Humor Techniques (Berger 1976; 1993)

This theoretical framework begins to be challenged following the Digital Revolution and the introduction of new media, in which it has been experienced a humorous situation in a different way. In particular, the spread of social networks, which offer the possibility of producing a quantity of content very easily, modifies the experience of the humorous communication situation, the function and the comprehension itself of this rhetorical strategy. First of all, the main difficulty regarding the mediated humor is the absence of enunciators face to face interaction. In fact, this limit engrave the possibility of a fast understanding, such as in the case of mediated irony (Papapicco & Mininni, 2019). More, regarding the communication act that takes place in virtual space, it is often difficult to re-build the context of enunciation: this is an other factor of engraving the comprehension. In the specific virtual space, as Social Network, the communication act is transmitted in a "broadcasting" way, reaching a wide audience. This means

that users that know the enunciation context may understand easily the meaning of communication act, on the contrary, there was no effect of joy and mirth in the humorous meaning.

Currently, the studies about Artificial Intelligence (AI) and Natural Language Processing (NLP) focused on the creation of sophisticated software, able to detect and recognize the tone and the emotions of all discourse genres. It is the case of IBM tools, in particular the Tone Analyzer, that is more than an Artificial Intelligence, because it may be classified as Affective Intelligence. The mode of operation of these software is that of matching the text in input with their inner vocabularies of words, going back, as output, a data of total emotion on the base of a scale with score lower than 0,50, equal to 0,50 and higher than 0,50: the significant values are those higher than 0.50. The emotions detected are the five basic emotions, which are: joy, fear, sadness, disgust and anger. **Joy** or happiness has shades of enjoyment, satisfaction and pleasure. There is a sense of well-being, inner peace, love, safety and contentment; while **fear** is a response to impending danger. It is a survival mechanism that is a reaction to some negative stimulus. It may be a mild caution or an extreme phobia; **sadness** indicates a feeling of loss and disadvantage. When a person can be observed to be quiet, less energetic and withdrawn, it may be inferred that sadness exists; **disgust** is an emotional response of revulsion to something considered offensive or unpleasant. It is a sensation that refers to something revolting and **anger** evoked due to injustice, conflict, humiliation, negligence or betrayal. If anger is active, the individual attacks the target, verbally or physically. If anger is passive, the person silently sulks and feels tension and hostility. But, even in these cases, the main limit is that it is impossible reduce the complexity of human experience in a matching: in particular the AI is not able to detect all rhetorical strategies and all context.

III. PHD CONTEXT AND SOCIAL NETWORK

PhDs (philosophiæ doctors) are young researchers who invest three or four years in the in-depth study of specific scientific topics. These are graduates with different educational backgrounds, from engineers, doctors to more humanistic disciplines such as social sciences, philosophy and literature. They are, however, people who, after completing their university studies, transform their "thirst for knowledge" into an occupation.

However, it is an occupation that is more "vulnerable" to the labor market flexibility logics, in a context, such as the academic one and, on a larger scale, the scientific one, which is based on rigor and quantity. In addition to this, there is a lack of clarification in the definition of who, in terms of skills and tasks, is a "doctoral student". In most cases, it is a paid "qualified" student, but not all PhDs are eligible for financial support. The common element is that all those who undertake this career clash with an uphill path, not always linear and characterized by deadlines, pressures, measurements of their work through purely quantitative indices, all surrounded by the uncertainty of the future.

This landscape has aroused the interest of sociologists, psychologists and economists, who, starting from statistics,

Identify applicable funding agency here. If none, delete this text box.

have begun to study doctoral students, with "research in research". In particular, a Belgian research of 2017, published in Research Policy, studied the relationship between the academic career and the mental health of the doctoral students (Levecquea et al., 2017). Specifically, 3600 Belgian doctoral students of all disciplines were involved and it emerged that, independently of training, one third of the sample had a high risk of developing, above all, depression. Despite this, there are no other studies to confirm the data, as most of the results show a correlation with stress and states of anxiety, mainly identified as a concern for the future, due to the lack of prospects. There is also the absence, in the universities themselves, of professionals who deal with supporting Human Resources in future employment or simply accepting individual and collective difficulties and needs. Some strategies, already present within the Social Networks, useful to defuse the common practices of meaning related to the doctorate, are the international humorous pages, in which every PhD student is recognized. These pages, like many virtual communities, have almost a "mutual help" function, because, thanks to sharing, it is possible to feel less alone. This is the case of a specific communication tool, which is becoming a rapidly spreading cultural artifact, i.e. the "Meme". The meme is composed of two communicative elements: one visual and the other textual.

IV. IMPACT PhD MEME: A CASE STUDY

The research has two goals: to demonstrate how the practices of signification of humor on the doctorate are modified with the "memes factory" and how artificial intelligence is able to detect a complex rhetorical strategy such as humor. To satisfy these purposes, in the study, 39 memes about the PhD were collected from a Facebook page called "High Impact PhD meme" during the first part of 2019. In fact, more recent PhD memes have been chosen. The PhD memes were analyzed in two levels: the quanti-qualitative, aiming to detect the semi-automatic emotional involvement, expression of humor in "meme discourses"; the semiotic analysis of meme images to understand if it is possible to classify PhD humor.

A. IBM EMOTIONAL ANALYSIS

From the Emotional Analysis of the PhD memes, a significant prevalence of neutrality and negative emotions such as anger, sadness or fear emerges, as can be seen in chart 1:

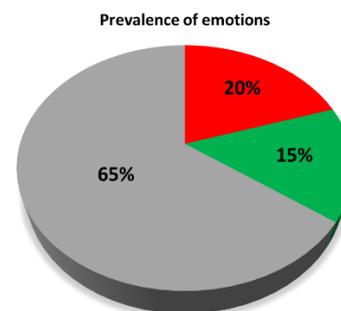


Chart 1: Quantitative results of Emotional Analysis

By convention, following the model of Barrett and Russell (2009) which disfigures positive emotions from negative emotions, the results of positive emotions (joy) have been given a value of 1; for negative emotions (anger, sadness, disgust and fear) a value equal to -1 and for neutrality a value equal to zero.

The results show the prevalence of neutrality, represented in gray in the graph. The negative emotions in red are also significant, where, however, the absence of disgust is highlighted. The positive emotions represented in green are quantitatively less significant. This is an important indicator because, from the psycholinguistic scientific literature on "humor", the connection of this rhetorical strategy to a positive emotion emerges. Starting from this limit and considering the memes discourses as "diatexts", whose meaning derives from the interweaving of text and context, it can be noted that the emotionality detected by the Artificial Intelligence is not entirely incorrect, as in the following example:

Eg. 1 "When your manuscript comes back with major revisions. (0,51)
Ah shit, here we go again (0,73)"

In this case, the real fear emerges of those who submit a scientific work in the form of an article to a journal and receive it with many corrections to be made, perhaps, in a limited period. Fear is immediately replaced by the anger that emerges in having to work again on the same research, further modifying what could have been the initial idea.

At the textual level, in the memes on the doctorate it can be noted the constant presence of bad words, such as "shit", "bastards" which then load the emotions in a negative sense. On the contrary, in the case of joy detection, this is due to the use of intensifiers, as in the following example:

Eg. 2 "When your manuscript is finally revised gets backfrom review" (0,74)

Also in this case, the basic theme is the review of scientific articles by journals. The use of the "finally" intensifier loads the sentence of joy.

From these initial results it can be deduced that the PhD practices of significance are the subject of the memes concern the relationship with the supervisors, the difficulties in publishing the papers and the post-doc uncertainty, as shown in these examples:

Eg. 3 “Phd supervisor: is your manuscript finished yet?
PhD: Well, yes, but actually no”

Eg. 4 “Pimples? Zero
Blackheads? Zero
Probability of your manuscript acceptance on first submission? Zero

Eg. 5 “Me: I’m doing a PhD
People: and then what?
Me: Good question.”

In these examples, there is a prevalence of neutrality, linked to a lack of emotions or to the presence of contrasting emotions, i.e. anger and joy in the same phrase. In PhD meme discourses, neutrality is also due to the presence of imagines, that sometimes is the real element of joy. If the image is bigger or more significant than the text, neutrality is justify. Therefore, it is necessary analyze PhD meme images that, in most cases, replace the non verbal communication act.

B. SEMIOTIC ANALYSIS OF PhD MEME IMAGES

Sight is one of the most attractive senses of the human being, as it communicates messages immediately with respect to the written text. An image is the privileged and mediated way to pass quickly from the level of the signifier (plan of the expression) to that of the meaning (plan of the content). The semiotic analysis of images (Van Leeuwen, 2001) is a methodology that allows to trace meanings within visual objects and it is based on the plastic analysis of the image that includes three levels:

1. **topological organization**, where the constitutional elements of the image are identified;
2. **eidetic organization**, where the lines of the visual object analyzed are highlighted;
3. **chromatic organization**.

After having identified these three characteristics, it can be found the plastic formats that allow to reach the content, that is the transition from the signifier to the meaning, which are divided into two aspects:

1. **the symbolic correlation**, that is the set of conventions and cultural aspects connected to the expression plan (for example if the gold color indicates sacredness, the subject / object depicted that dresses gold, will be a sacred subject / object);

2. **the semisymbolic correlation**, which provides a relationship between a category of the expression and one of the content (for example the topology / topology category, can correspond to one of the content where “high” corresponds to “sacred” and “low” to “profane”.

The application of this methodology aims to understand the presence or absence of regularity on the creation of visual aspect in PhD memes.

First of all, the image becomes the imitation element in the "meme" phenomenon. The images used are actually known. These are images that represent clear and identifiable subjects, placed in the foreground. In some cases, the presence of dialogues is recorded and therefore the image is a vignette, where all the characters have an equal portion of space. Even the colors are clear in most cases, so they can be easily recognized. As for the subjects and the situations portrayed, the protagonists of the photos are famous movie characters with expressions consistent respect to the text of the image. In the case of PhD memes, the recurring expressions in the characters is doubt and sadness, as shown in the following examples:



Fig. 1 example of doubt

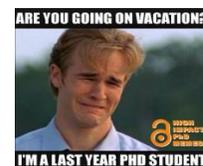


Fig. 2 example of sadness

As can be seen from the images, the visual aspect helps the comprehension of the text and completes it. Furthermore, they are well-known TV personalities: in the first case the expression of doubt and the sentence of the protagonist are not original, that is to say that the context in which they are inserted changes, which makes it possible to consider it an imitation and detect the basic humor. In the second case, the expression of original sadness of a well-known protagonist of a TV series for teenagers, is set in a different context, where, however, the image is coherent.

Other characters typical of the meme images on the PhD are the protagonists of cartoons, as in the following examples:



Fig. 3 Meme of Shrek



Fig. 4 Meme of Spongebob

The images, however, are not chosen randomly. In example 3 there is an "ogre" in the foreground, which in traditional culture is considered a monstrous figure, here instead replaced by an ogre of modern cinematography used to overturn many of the

fairy tales elements. The humor of the PhD meme fits into this reversal.

V. CONCLUSION

The era of User Generated Content (USG) on Social Networks has invested different areas of human experience, including one of the highest levels of education, i.e. the PhD grade. As regards the opportunity to "imitate" a virtual content, the phenomenon of Memes is spreading. The research has two goals: to demonstrate how the practices of signification of humor on the doctorate are modified with the "memes factory" and how artificial intelligence is able to detect a complex rhetorical strategy such as humor. To satisfy these purposes, 39 memes about the PhD, analyzed in two levels: the quantitative, aiming to detect the semi-automatic emotional involvement, expression of humor in "meme discourses"; the semiotic analysis of meme images to understand if it is possible to classify PhD humor. The virtual context, but in particular the image, conveys a representation of the academic career and, specifically of the doctoral course, which is often obscured in the offline environment. The virtual context also changes the way we express humorous techniques. Most rhetorical techniques such as absurdity or imitation, with memes precisely, take on a visual form rather than an oral one. In fact, the analysis show a further function of humor mediated by communication through memes: the complaint against a complex and precarious career path.

This reporting function of PhD meme communication act emerges above all from the Emotional Analysis and the prevalence of neutrality and the anger. The visual part is a means to mitigate the discourse meanings. Humor and imitation strategies arise in the contrast between expected/unexpected or known/unknown: generally it is expected that a famous character behave in a certain way, instead it is integrate in a contextual unexpected framework known. The main features of the PhD memes can be summarized in the following taxonomy:

TABLE II.

Topics	Relationship with supervisors	Difficulty of publication	Uncertainty for the future of work
Subject of images	Main character of Tv series or Films	Cartoons Characters	Animals
Emotions	No Emotions	Anger/Fear	Anger/Sadness
Rethorical Strategies	Intensifiers Vs Attenuators	Bad words (Intensifiers)	Dialogues

Taxonomy of PhD memes

The research shows that humor in the context of PhD memes is based on two levels: a cognitive first linked to the perception of something unexpected and a second emotional level, which explains the presence of negative emotions such as fear. One of the limitations of the research concerns the prevalence of output

neutrality. The software does not allow, in case of neutrality, a sentence level analysis able to understand if neutrality is given by the absence of sentiment or as a juxtaposition of positive and negative emotions, an aspect that will be evaluated as a future perspective. In addition, among the future perspectives, a comparison of the current results of the study with other sources and with a larger sample will be provided. An inter-judges agreement will also be possible, in order to avoid the excessive simplification to five emotions carried out by the IBM software.

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