Data Formats for Emotion and Personality

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Abstract: Data formats used in the representation of affective aspects are usually formed by different computational formalisms or terminologies, such as architectures modeled according to user models or profiles. Those conceptual formalisms or terminologies have been used in order to formalize many different affective data from user and/or interface. Those affective data are usually used to express emotional and personality based-data. Data formalization is a fundamental and inherent step to the affective computing research, and it can enable the community of computer scientists to use and share user affective information in a non-proprietary way, aiming to build personalized systems that improve the computational decision-making process, which makes it easy and transparent to users. Based on that, this paper aims to present a systematic mapping as a survey in order to build, classify and analyze the scenario of existing affective data formats on scientific literature. As a result, we did not found any effort from scientists' community towards to standardize this type of data. As a conclusion, we recognized the lack of standardized data format.

1 Introduction

The use of affective data in computer decision-making process is quite new [Elliott, 1994; Picard, 1997; Lisetti, 2002; Zhou and Conati, 2002; Nunes, 2008]. According to Nunes [2008] it has been proved by scientists from other areas, such as Psychology, Anthropology, Neuroscience, how much affective information can be relevant during human cognitive processes [Simon, 1973; Damasio, 1994]. Affective data could include emotions, feelings, personality. In 1979, Rich [1979] described in her book a chapter about user modeling via stereotypes including personality aspects. From that, in 1997, Picard [1997] published the first book about Affective Computing and the use of affective data in order to improve the computer decision-making and interfaces. At that time, Piccard focus was mainly on emotions. However, in 1994, Elliot described about the research problems on representation of emotion along with personality in computer systems, and his main

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issue was about asking for a scientifically based and analytical understanding of how personality and emotion could affect the interaction and motivation of human agents in social situations [Elliot, 1994]. In 2002, Lisetti [2002] formalized personality computationally as influencer of other affective aspects such as emotions. Additionally, Zhou and Conati [2002] proposed the use of human personality influencing computer decision-making focused in Educational Systems. On the other hand, Nunes [2008] modeled personality aspects and applied it in recommender systems in order to improve systems personalization.

These works inspired others scientists and made them aware of these benefits, so they started to give more attention to this subject; mainly on Computer Science field. However, one of the emergent problems concerning the use of affective aspects had arisen. The problem was about what data format or model/profile the scientists should adopt in order to formalize emotion and personality (among other affective aspects) to make it effectively useful for computer decision-making processes.

Data formats are usually represented by different computational formalisms or terminologies, and some examples are data architectures, user models, user profiles, ontologies[3], and/or markup languages based on different psychological theories. Data formalization became a fundamental step for affective computing researches in the sense that they can use or re-use this type of data in a non-proprietary way towards building personalized systems that improve the computational decision-making processes. Based on that, this paper aims to show a systematic mapping [Petersen et al., 2008] in the form of a survey on existing affective data formats, user models and profiles. Our main contribution is to answer the following questions: (i) Is there in the literature standards in the representation of a data format? and (ii) What are the psychological theories the data format are using?.

This paper is organized as follow: Section 2 presents concepts about data format, user model and user profile. Section 3 is focused on the method used to build the systematic mapping. In Section 4 we present the results and discussions; while Section 5 presents the final conclusions.

2 Data Format, User Model or User Profile

The user profile, user model or data format can be seen as a database where user´s information, interests and preferences are stored [Nunes 2008]. It represents the user identity in the virtual world.

Nunes [2008] defined identity as the self-awareness or the presentation of oneself in relation to society. It is dynamic and it can be presented as a "particular

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[3] "An ontology is a specification of a conceptualization" [Gruber, 1993].

narrative going". Identity plays a key role mainly during human communication in a virtual world.

In Computer Science, the technical and persistent way to formalize the identity of a person is using profiles, models or data formats. Ontologies can be used for abstract conceptualization before the formalization in a user profile/user model; while markup language[4] is used for the annotation or standardization of data stored in used profile/model/data format. We might find many types of user profiles with different complexity degrees, since they are developed in many contexts, such as e-commerce, e-learning and e-communities. There is a classical scientific work about user model developed by Kobsa in [Kob01], [Kob07]. He created a Generic User Modeling to be used as a shell to the development of user information applied to web site personalization. It is one of the most relevant user model developed; however it is not focused on affective aspects.

In terms of user model definitions, Heckmann [Hec05] proposes the General User Model (GUMO), which is a conceptual overview of a ubiquitous user model including many basic aspects of users; ranging from contact information, demographics and abilities to psychological and physiological human features like personality, emotional state, mental state, and nutrition. Heckmann's ontology is very rich and it can be implemented following the interest of the designer who implements a user profile. It is a very complete ontology, but it is hard to be effectively used it.

3 Method

Towards building this survey we used the method called Systematic Mapping Study (SMS) [Petersen et al., 2008]. We use this method because it provides issues about a specific topic, which is the main contribution of this paper. .To reach this goal we followed a set of steps: the first one was to select a research scope, considering some questions to be posed about the desired subject. The second step was the creation of the primary studies by presenting the database to be searched, as well as the search parameters and filters. Afterwards, we selected the relevant papers using inclusion and exclusion criteria. Finally, we analysed and discussed about the results. This method allows us to create a scenario of growing area as well as some evidences raised on the research questions.

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[4] "is a modern system for annotating a document in a way that is syntactically distinguishable from the text" [Wikipedia 2015]

4.1 Research scope

In this section we define the research questions, which are presented on Table 1. According to [Petersen et al., 2008], the research questions provide us an overview about the mapped research area by the identification of the quantity and type of research and results available within it.

Table 1. Research questions

Research Question	
RQ1:	What are the investigated and used psychological/affective/emotion/personality theories related to the data format/user model/user profile implemented in software from Computer Science scenario?
RQ2:	Are they a proprietary model?
RQ3:	Did researchers standardize those models?
RQ4:	What is the most common journal/proceeding where the computer scientists publish about affective data formats?
RQ5:	Who are the researchers that have been publishing in this field?
RQ6:	What is the most representative researches affiliation in affective data formats field?
RQ7:	What are the countries that have more researchers who published on affective data format field?
RQ8:	What are the years of publications that scientists have been publishing most part of papers on the affective data format field?

4.2 Primary Studies

Towards providing an overview about the researched area, we defined a set of strings aiming to select and filter the papers for the primary studies. According to Petersen et al. [2008], "The primary studies are identified by using search strings on scientific databases or browsing manually through relevant conference proceedings or journal publications". Towards conducting our search for primary studies we used:

(i)   The SCOPUS [2015] database, which is "…the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings." SCOPUS has more than 55 million records and more than 21.915 titles. It covers the most important databases in Computer Science, such as Elsevier, Springer, and IEEE.

(ii)   In order to complement the search on SCOPUS database, we did a research in the ACM-DL (Association for Computing Machinery - Digital Library), which is specific on Computer Science.

All searches of primary studies considered a slightly different strategy of searching and string definition because of the particularity of the search engine of each database.

4.2.1 SCOPUS database

The strings used in SCOPUS towards selecting the primary studies were:

"ABS (emotion* AND "data format*") OR ABS (emotion* AND "user model*") OR ABS (emotion* AND "user profile") OR ABS (affecti* AND "data format*") OR ABS (affecti* AND "user model*") OR ABS (affecti* AND "user profile") OR ABS (personalit* AND "data format*") OR ABS (personalit* AND "user model*") OR ABS (personalit* AND "user profile") AND (LIMIT-TO (SUBJAREA , "COMP")) AND (LIMIT-TO (LANGUAGE , "English"))"

4.2.2 ACM Digital Library database

The strings used in ACM-DL towards selecting the primary studies were:

(i)   (Abstract:affect*) and (Abstract:"data format" or Abstract:"user model*" or Abstract:"user profile")
(ii)   (Abstract:emotion*) and (Abstract:"data format" or Abstract:"user model*" or Abstract:"user profile")
(iii)   (Abstract:personalit*) and (Abstract:"data format" or Abstract:"user model*" or Abstract:"user profile")

4.3 Relevant Papers

In this step of the methodology, we defined the inclusion and exclusion criteria in order to exclude not relevant papers already selected in our primary studies. These papers do not concern to our research questions.

4.3.1 Relevant papers of SCOPUS database

In Table 2 we present the inclusion and exclusion criteria for SCOPUS database.

Table 2. Inclusion and exclusion criteria for SCOPUS database

Inclusion Criteria of Primary Search of SCOPUS	Exclusion Criteria 1 (Entire book of conference reviews)

We included all papers available at SCOPUS filtered by the strings matched on the paper abstract as presented in Section 2.2.1 The papers was also filtered by Computer Science area, and English language.	We exclude explicitly from SCOPUS database only the documents from Conference Reviews, because we are not interested in entire Conference Review books (as an example, we are interested in a paper from UMAP 2012 instead of the entire proceedings from UMAP).

The search was done on 1st February 2015 at SCOPUS-Elsevier redirected by PeriodicosCapes [2015].

Table 3 presents the results of SCOPUS primary search. We show the amount of papers selected considering the inclusion criteria; as well as the amount of papers selected at exclusion criteria and, consequently, the final amount of papers showed as relevant papers.

Table 3. Number of papers from SCOPUS based on Primary search, Inclusion and Exclusion criteria (relevant papers)

Number of papers	Inclusion Criteria of Primary Search based on strings from Table 1	Exclusion Criteria 1 (Entire book of conference reviews)	Relevant papers
Based on the string presented at Section 2.2.1	196 papers	28 papers	168 papers
TOTAL	**196 papers**	28 papers	**168 papers**

4.3.2 ACM Digital Library database

Table 4 presents the Inclusion and Exclusion criteria for ACM-DL database.

Table 4. Inclusion and exclusion criteria for ACM-DL database

Inclusion Criteria of Primary Search of ACM-DL	Exclusion Criteria 1	Exclusion Criteria 2
We included all papers from ACM-DL database that the strings presented at Section	We excluded duplicated papers (papers that appear in more than 1 time during the 3 searches).	We excluded papers that the abstract do not appear representative in order to present

2.2.2 matched on the paper abstract. Because we did the search separately considering each psychological term, some papers were duplicated.

details of data format, profiles or models considering our searchable strings. We also excluded papers presented only in 2 pages abstract because of the lack of completeness.

In Table 5, we present the results of ACM-DL primary search. We show the amount of paper selected considering the inclusion criteria; as well as the amount of paper selected at exclusion criteria 1 and 2, followed by the final amount of papers to be analyzed showed at relevant papers.

Table 5. Number of papers from ACM DL Primary search; Inclusion and exclusion criteria (relevant papers)

Affective feature / Number of papers	Inclusion Criteria of Primary Search based on strings from Table 1	Exclusion Criteria 1 (Duplicated papers)	Exclusion Criteria 2 (Not representative)	Relevant papers to be analyzed
Affect*	22 papers	2 papers	15 papers	5 papers
Emotion*	5 papers	1 paper	1 papers	3 papers
Personality*	9 papers	3 papers	1 paper	5 papers
TOTAL	**36 papers**	30 papers	17 papers	**13 papers**

The search was done in 22 January 2015 at ACM-DL redirected by Periódicos Capes [2015].

5 Results and Discussions

In this section we present the discussions about the selected papers, creating an overview about the affective computing data format using both the SCOPUS and ACM-DL database.

5.1 SCOPUS database

After reading and analyzing the complete content of each one of the 168 papers selected as relevant papers from SCOPUS database, we created Table A.1 pre-

sented at Appendix 1. This table enables us to provide an overview about the perspectives towards answering the research questions proposed in Table 1 presented in Section 2.1.

Towards creating an overview about the scenario, we answer the following research questions proposed on last sections: RQ1- What are the investigated and used psychological/affective/emotion/personality theory related to the data format/user model/user profile implemented in software from Computer Science scenario?, RQ2 - Are they a proprietary model?, and RQ3- Did researchers standardize those models? (we present a subset of Table A.1). This summary is presented in Table 6[5], which shows the papers selected and answers to RQ1. It presents at least one psychological theory related to the affective data format, user model or user profile used in each paper which this information was available.

From the whole 168 relevant papers, only 62 are presented in Table 6, since they present some information about the psychological theory they have used in order to define, model or use some affective aspect presented in the paper. That means that only 36% of the analyzed relevant papers can be taken seriously about their affective data, i.e., we consider the papers that did not present any theory about affective as superficial papers. Sometimes, scientists write about the importance of affective data representation and use, but not deeply implement such concepts, being questioned about their effectiveness by psychologists.

In addition, in Table 6 we can observe that only 3 papers from the whole 36 papers are presented as a non-proprietary model (grey lines). We mean by non-proprietary when authors use other already existing data format. Only 8,3% from those 36 papers are non-proprietary. However, from that non-proprietary they are also non-standard models. Often, when data format is proprietary it could be hardly standardized and free for other scientists to use that format. We find some declaration about standardization in 3 papers from our search (green lines). They represent also 8,3% from those 36 papers that are related to psychological theories.

Therefore, from the whole 168 papers, only 1,7% presented a non-proprietary model. In addition, only 1,7% presented some type of standardization. The papers that presented some standardization were: (i) paper 118: PAM (Personality Affective Modeling), (ii) paper 125: "comprehensive user profiling", and (iii) paper 147: "Smart User Model (SUM)".

From Table 6, we also extract the psychological theories more referenced by affective computing scientists on those 36 papers. They are: Personality→ (i) Big Five: presented in 12 papers; (ii) FFM: 6 papers; (iii) FFM/BigFive[6]: 1 paper; (iv) 16PF: 3 papers; MBTI: 2 papers; Emotion → (v) OCC: 8 papers; (vi) Ekman: 7

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[5] Each number presented on the line of Table 6, is the same number of the paper referenced at Appendix 2-SCOPUS, and it is also analyzed and described at Appendix 1 Table A.1.

[6] As described in Nunes [2008] "The term *Big Five* was coined by Lew Goldberg and was originally associated with studies of Personality Traits used in natural language derived from lexical data and based on empirical phenomenon. The term *Five-Factor Model*, which has been more commonly associated with studies of traits using Personality questionnaires".

papers; (vii) Thayer: 4 papers; (vii) Goleman: 3 papers; (viii) Saw: 3 papers. Other theories used and cited at Table 6 are not in this list because they were used only once. The references about all those theories can be found in each paper numbered at Table 6 and referenced at Appendix 2.

Table 6. Papers that presented at least one psychological theory, information about proprietary model and model standardization from SCOPUS

Paper	RQ1.What psychological theory the model presented was based on?	RQ2.Was it a proprietary model?	RQ3.Was it a standard model? What's name?
1.	It is a proprietary version of many theories on affect	Yes	No
3.	FFM/Big Five	Yes	No. He finds a correlation to the affective model. His user model is not an affective one.
4.	Big five	Yes	No. mFingerprint
5.	SAM (Smiley Affect Measurement technology) AMSS (affective metacognitive scaffolding service)	Yes	-
7.	FFM	Yes	No
9.	Big Five	Yes	No
15.	Big Five	Yes	No
27.	lens model analysis	Yes	No
30.	Big Five	Yes	No
34.	Big Five	Yes	No. HIT
39.	LIWC	Yes	No
41.	Personality types	Yes	No. use ECA interface
45.	Thayer's Activation-DeactivationAdjective Check List	Yes	-
48.	Big Five, LOC	Yes	No. Part of Personal Equation of Interaction
49.	Thayer	Yes	No. AMP
54.	Personality	Yes	No
55.	Alternative Five model	Yes	No. TP2010
56.	Ekman	Yes	No
58.	OCC model/ BDI	No	No. Cognitive-Based Affective User Modeling (CB-AUM) using X-BDI
63.	Big Five	Yes	No
68.	Eysenck's PEN model (personality)	Yes	-
69.	Thayer model	Yes	-
71.	reactivity to reward and punishment, sensation seeking, Big Five personality traits, MBTI	Yes	no
72.	Velten mood induction technique	Yes	No
73.	Secondary emotions (47 POMS)	Yes	No
75.	SAW	Yes	No. NEU-FACES

80.	Clynes (emotion)Five- Factor-Model (personality)	Yes	no
81.	BIGFIVE	Yes	No
83.	SAW	Yes	No. NEU-FACES
84.	Thayer	Yes	no
86.	Izard	-	-
88.	Global Workspace Theory (GWT)	Yes	CERA-CRANIUM
91.	Describe many theories applied by npc	No	No
92.	16PF	Yes	No
96.	Big Five	Yes	No
97.	Big Five	Yes	No
102.	Goleman	Yes	No
107.	Goleman	Yes	No
111.	Spontaneous trait inferences (Uleman)	Yes	No
112.	Dimensional Affective Model	Yes	No
118.	FFM, Ekman , OCC	Yes	Yes. Personality affective Modeling (PAM); Emotional Prediction System
119.	Physiological state (Picard)	Yes	No
123.	OCC	Yes	No
125.	Goleman	Yes	Yes. The comprehensive user profiling
127.	Big Five	Yes	No
128.	Many	No	No
131.	Five-Factor-Model, Ekman	Yes	No. Affective user Modeling
132.	Simple Additive Weighting (SAW)	Yes	No
133.	Ekman	Yes	No
134.	16PF, Ekman	Yes	No
135.	Cassady	Yes	No. User Perceptual Preferences
140.	Ekman and Friesen	Yes	No
141.	OCC model	Yes	No
147.	Human Values Scale (HVS)	Yes	Yes. Smart User Model (SUM)
150.	Ekman and Friesen	Yes	no
152.	OCC model (emotion); Five Factor personality	Yes	no
153.	MBTI e 16PF	Yes	no
155.	OCC model, Five Factor personality	Yes	No
156.	Many	Yes	No. MAUI
159.	FMBT model	Yes	No. REA
160.	Ekman; Zajonc and Markus; Frijda; Ortony (OCC); Levenson	Yes	No. MOUE
165.	OCC model, Elliot	-	-

The answer to the research question 4 (RQ4 - What is the most common journal/proceeding where the computer scientists publish about affective data formats?) is presented in Figure 1, which shows the most usual journal/proceeding where the computer scientists have been publishing their papers about affective data format. The first place is the "Lecture Notes in Computer Science" from Springer (including the Subseries "Lecture Notes in "Artificial Intelligence and "Lecture Notes in Bioinformatics"), and it presents 43 papers from the whole 168 relevant papers of our research. The second place is based on two types of publications: the "Studies in Computational Intelligence" from Springer, which presents 4 papers, and the "Frontiers in Artificial Intelligence and Applications" from IOS Press, with both 4 papers. The third place is the "Communication in Computer and Information Science" from Springer with 3 papers, and the "Computers in Human Behavior" from Elsevier presenting 3 papers too. Some others proceedings and editors have also 3 papers or less (see Appendix 2 to the complete list).

We suppose we found much more papers in Lecture Notes because it is included in all subseries of "Lecture Notes". In contrast, in ACM or IEEE it is categorized by Conference title.
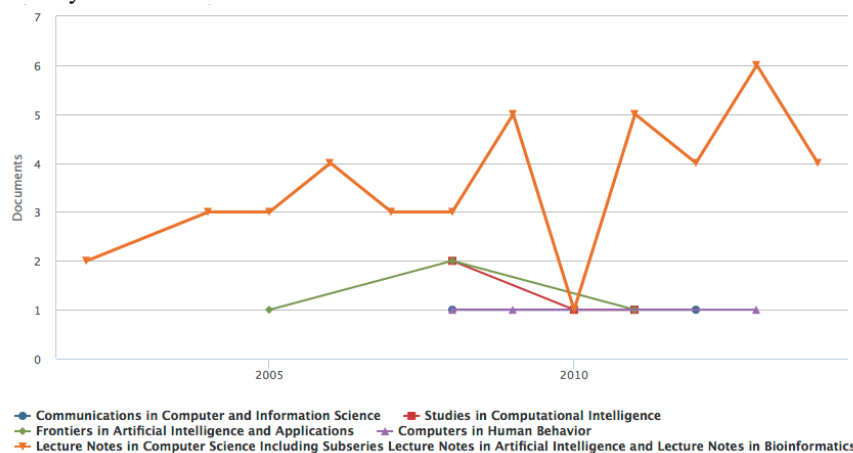

Fig. 1. Journal/proceeding where the computer scientists have been publishing their papers about affective data formats (RQ4) (extracted from SCOPUS based on our search)

The answer to the research question 5 (RQ5 - Who are the researchers that have been publishing in this area?) is presented in Figure 2. We present the authors who appeared in 5 papers or more and they are: Virvou, M. (15 papers), Alepis, E. (9 papers), Germanakos, P. (6 papers), Mourias, C. (6 papers), Lisetti, C. (6 papers), Lekkas, Z. (5 papers), Nasoz, F.(5 papers), Tsianos, N. (5 papers), Samaras, G. (5 papers), and Stathopoulou, I.O. (5 papers).

The authors usually participate also as co-authors of published papers, then the most ranked could be, hypothetically, chief of some lab or research group interested in affective data.
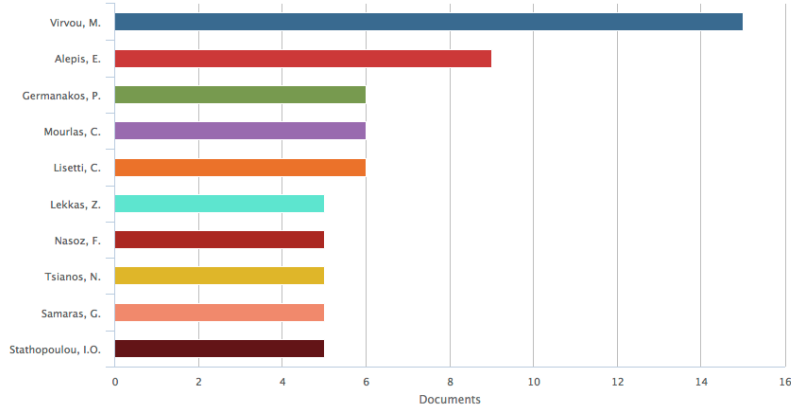
Fig. 2. Researchers that have been publishing in affective computing data formats (RQ5) (extracted from SCOPUS based on our search)

The answer to the research question 6 (RQ6 - How about the affiliation more representative in affective data format area?) is presented in Figure 3. The universities more representatives that published at least 3 papers in affective data formats are presented in Figure 3. They are: (i) Panepistimion Pireus (16 papers), (ii) University of Athens (7 papers), (iii) University of Cyprus (5 papers), (iv) Arizona State University (4 papers), University of Aberdeen (4 papers), Tchnische Universiteit Eindhoven (4 papers), Universidad Carlos III de Madrid (3 papers), University of Haifa (3 papers), Trinity College Dublin (3 papers), Taiyuan Li Gong Daxue (3 papers), Phillips Research (3 papers), Universidad Autonoma de Madrid (3 papers); Ecole Politechnique Federale de Lausanne (3 papers); EURECOM (3 papers), University of Las Vegas (3 papers). Other universities presented 2 papers or less (it can be visualized on Table A.1)
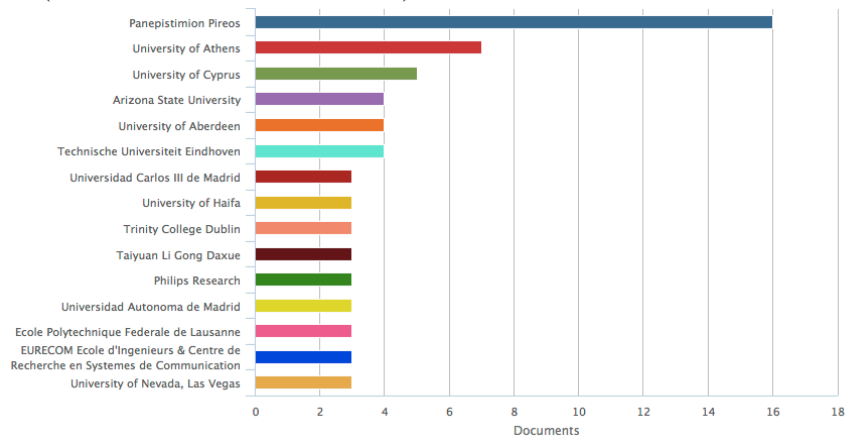

Fig. 3. Affiliation more representative in affective data format (RQ6) (extracted from SCOPUS based on our search)

The answer about the research question 7 (RQ7 - What are the countries that have more researchers who published on affective data format field?) is presented in Figure 4, in which we present the countries that have more publications in affective data formats. They are: (i) United States have 34 papers published (as author or co-author), (ii) Greece has 25 papers published, (iii) China has 16 paper published, (iv) United Kingdom has 16 papers published, (v) Spain has 11 papers published, (vi) France has 9 paper published, (vii) Nederlands have 8 papers published, (viii) Japan has 8 papers published; (ix) South Korea has 6 papers published; (x) Cyprus has 5 papers published; (xi) Finland has 5 papers published and (xii) Germany has Also 5 papers published, as presented at Figure 4. Other countries with 4 papers or less, such as Italy (4 papers), Brazil (3 papers), Slovenia (1 paper) can be found on Table A.1.
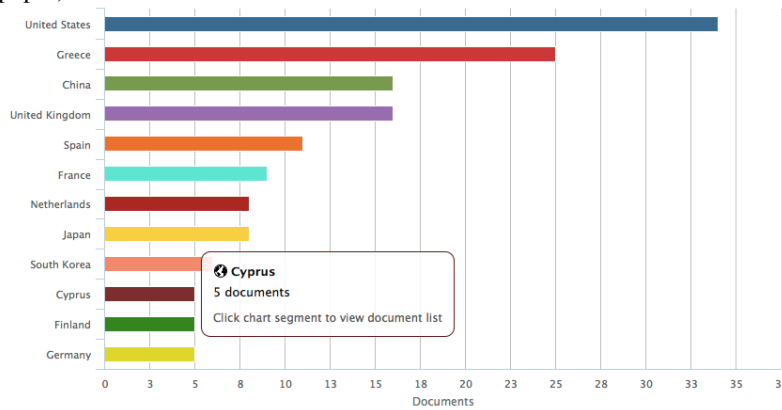
Fig. 4. Countries that have more researchers who published in affective data format (RQ7) (extracted from SCOPUS based on our search)

The answer to the research question 8 (RQ8 - What are the year of publications that scientists have been publishing most part of papers on the affective data format field?) is presented in Figure 5. The year which scientists published most papers was 2008, being published 24 papers (first place on ranking). According to Figure 5, the amount of papers published in 2014 was 11 papers; 2013, 23 paper (second place on ranking); 2012, 19 papers; 2011, 18 papers; 2010, 14 papers; 2009, 19 papers; 2007, 10 papers, 2006, 7 papers; 2005, 6 papers; 2004, 5 papers; 2003, 4 papers; 2002, 2 papers; 2001, one paper; 1997, one paper; 1991, 2 papers; 1979 one paper.

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Year			
○ 2014	(11)	○ 2004	(5)
○ 2013	(23)	○ 2003	(4)
○ 2012	(19)	○ 2002	(2)
○ 2011	(18)	○ 2001	(1)
○ 2010	(14)	○ 1997	(1)
○ 2009	(19)	○ 1994	(1)
○ 2008	(24)	○ 1991	(2)
○ 2007	(10)	○ 1979	(1)
○ 2006	(7)		
○ 2005	(6)		

Fig. 5. Years and amount of published papers in affective data format (RQ8) (extracted from SCOPUS based on our search)

We can observe in Figure 5 how much the interest on affective computing issues is growing, such as data formats. In 1979 there was only one paper published by Rich [1979] about user modeling via stereotypes including personality aspects. However, after 2001 the publications became more often and i we observe that in 2008 there was a growth in contrast to 2007. The number of papers published in 2014 is not yet complete, since many journals and reviews take some time to be published officially by the editors.

5.2 ACM database

From 13 papers selected as relevant papers from ACM database, only 3 of them did not appear on SCOPUS search. The total amount of relevant papers is presented on Table 5 and the complete list can be found on Table A.2 at Appendix 1.

Towards creating an overview of research papers selected in ACM database, we answer the research question 1 (RQ1- What are the investigated and used psychological/affective/emotion/personality theory related to the data format/user model/user profile implemented in software from Computer Science scenario?), research question 2 and 3: research question 2 (RQ2 - Are they a proprietary model?), and research question 3 (RQ3- Did researchers standardize those models?), we present a subset of Table A.2. This Table is presented as Table 7[7]. Table 7 shows the papers selected which answer RQ1, since they presented at least one psychological theory related to the affective data format, user model or user profile.

Thus, 5 papers from the 13 relevant papers from ACM-DL are presented in Table 7. They present some information about the psychological theory they have used in order to define, model or use some affective aspect presented in the paper.

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[7] Each number presented on Table 7 is the same number of the paper referenced at Appendix 2, and it is also described at Appendix 1 Table A.1.

That means that 38,43% of the analyzed relevant papers present any theory about their affective data.

Additionally, Table 6 presents all 5 papers as a proprietary model. From that, 2 papers labeled their model, they are: (i) paper 7: titled as Personality Recognizer; and (ii) paper 8: titled as User Psychological Profile (UPP). All 5 papers are also non-standard models.

From Table 7, we also extract the psychological theories referenced by affective computing scientists on those 5 papers. They are: Personality→ (i) Big Five: presented in 2 papers; (ii) FFM/BigFive: 1 paper; (iv) 16PF: 1 paper; MBTI: 1 paper. The references about all those theories might be found in each paper numbered at Table 7 and referenced at Appendix 2-ACM-DL.

Table 7. Papers that presented at least one psychological theory, information about proprietary model and model standardization from ACM-DL database.

Paper	Did it have been analyzed for this systematic mapping?	RQ1.What psychological theory the model presented was based on?	RQ2.Was it a proprietary model?	RQ3.Was it a standard model? What's name?
1.	Analyzed in SCOPUS mapping N°3	FFM/Big Five	Yes	No. He finds a correlation to the affective model. His user model is not an affective one.
7.	**Yes. Only from ACM**	Big Five	Yes	No. Personality Recognizer
8.	**Yes. Only from ACM**	Big Five	Yes	No. User Psychological Profile (UPP)
11.	Analyzed in SCOPUS mapping N° 134	16PF, Ekman	Yes	No
13	**Yes. Only from ACM**	MBTI, MIR, Brain.exe.	Yes	No

With respect to research question 4 (RQ4 - What is the most common journal/proceeding where the computer scientists publish about affective data formats?), we can see in Table A.2: (i) 6 papers from ACM conference proceedings; (ii) 3 papers from Proceeding of conferences ACM partners (iii) 1 paper from conferences both IEEE/ACM, and (iv) 3 papers from Lecture Notes – Springer.

Regarding the answer to research question 5 (RQ5 - Who are the researchers that have been publishing in this area?), we notice that all researchers from 13 papers publish only once at ACM-DL in this subject.

The answer to research question 6 (RQ6 - How about the affiliation more representative in affective data format area?) is presented in Table A.2. The universities are: (i) Slovak University of Technology in Bratislava/Slovakia, (ii) Instituto Politécnico de Setúbal/Portugal, (iii) Universidad Autónoma de Madrid/Spain, (iv) Trinity College/Ireland, (v) ITT/Ireland, (vi) University of Montpellier/France, (vii) Chinese Academy of Sciences/China, (viii) Tampere University of Technolo-

gy/Finland, (ix) Taiyuan Univ. of Tech/China, (x) University of Toronto/Canada, (xi) Columbia University/USA, (xii) University of Liverpool/UK.

The answer to research question 7 (RQ7 - What are the countries that have more researchers who published on affective data format field?) is composed by: (i) Spain: 2 papers; (ii) Ireland: 2 papers; and (iii) China: 2 papers.

With respect to the answer to research question 8 (RQ8 - What are the year of publications that scientists have been publishing most part of papers on the affective data format field?), the amount of papers published in 2014 is 1 ; in 2013 is 1 paper; in 2012 are 4 papers; in 2011 is 1 paper; in 2008 is 3 papers; in 2007 is 1 paper, in 2005 is 1 paper.

The first paper about the subject at ACM-DL was published in 2005. Different from SCOPUS the year more relevant at ACM-DL was 2012 at first place, and 2008 as a second place (at SCOPUS 2008 was in first place).

6 Conclusions

This paper presented a wide literature review by using a systematic mapping method. We show how data formats towards to represent affective aspects are being explored in papers. As we could observe, the first paper was published in 1979, and from 2008 to nowadays this field has been growing. This fact is observed by the increase of publications on last years, otherwise, it seems that this field does not yet present standardized data formats among the community. This fact is sustained by our analysis, which did not identify much details about each data format, which creates a barrier if a developer needs to use them to develop computer applications/systems or neither scientific researches. Our hypothesis for this is that researches do not want to provide more details due to marketing strategies or privacy of this type of information.

As a future research we could extend or change the string of search including words such as "ontology" and "markup language", for instance. During our analysis only one paper mentioned about Heckmann's ontology [2009] that describes affective data. However it is quite few considering the amount searched at SCOPUS and ACM. We also know about markup languages to annotate affective data such as EmotionML [2015] and PersonalityML [2015]. However, they are not even mentioned at papers from our search considering the stringer we selected. Other future research could be towards trying to understand why many papers analyzed in our mapping do not present any psychological theory connected to paper description (106 from 168)? Did they use the word "affective", "emotion", "personality", because they consider this keyword as a trend? Or did they recognize the importance of the subject in order to treat as future research?

We could also propose as a future work the creation of a list of existing research groups interested in this subject based on the top ranking publisher, for instance.

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Appendix 1

Table A.1 Map of 168 relevant papers extracted for the systematic mapping from SCOPUS database.

Paper/ criteria	Did it have been analyzed for this systematic mapping?	Did the author said that he is using/creating some data format / profile/ model in some implementation presented at paper?	Did the author present a detailed data format / profile/ model used in some implementation presented at paper? General? Affective?	What psychological theory the model presented was based on?	Was it about emotion?	Was it about personality?	Was it about other affective aspect? What was the aspect?	Was it a proprietary model?	Was it a standard model? What's name?	Where was the first author from?
1.	Yes	Yes	Yes/yes/no	It is a proprietary version of many theories on affect	Emotional state/ emotional proximity	Extraversion	Deceit	Yes	No	University of Dundee/UK
2.	No (A)									
3.	Yes	Yes	Yes/yes/no	FFM/Big Five	No	Predicting from NEO FFI personality questionnaire	No	Yes	No. He finds a correlation to the affective model. His user model is not an affective one.	Slovak University of Technology in Bratislava/Slovakia

4.	Yes	Yes	Yes/yes/no	Big five	Inferring from audio (he did not give details)	Predicting from phone usage (he did not give details)	Mood (detected from communication history, he did not give details)	Yes	mFingerprint	School of Informatics & Computing/USA
5.	Yes	Yes	Yes/yes/yes	SAM (Smiley Affect Measurement technology) AMSS (affective metacognitive scaffolding service)	Mood as Emotional state	-	Smile (mood)	Yes	-	University of Technology/ Austria
6.	no									
7.	yes	Yes	No/no/no	FFM	-	FFM questionnaire	-	Yes	No	Swiss Federal Institute of Technology/ Switzerland
8.	No (B)									
9.	yes	Yes	No/no/no	Big Five	-	OCEAN	-	Yes	No	Mackenzie Presbyterian University/Brazil
10.	No (C)									
11.	No (A)									
12.	No (B)									
13.	No (B)									
14.	Yes	Yes	No/no/no	-	No	No	Mood	Yes	No	Instituto Politécnico de Setúbal/Portugal
15.	Yes	Yes	No/no/no	Big Five	No	44-item Big-Five Inventory	No	Yes	No	University of Chinese Academy of

No.										
										Sciences/China
16.	No (A)									
17.	Yes	Yes	No/no/no	-	Emotional state	-	-	Yes	No	Lanzhou University/China
18.	No (A)									
19.	No (A)									
20.	Yes	Yes	No/no/no	-	Emotion	-	-	Yes	No	University of Avignon-France
21.	Yes	Yes	No/no/no	-	Emotion	-	-	Yes	No	Yunnan Normal University/China
22.	Yes	Yes	No/no/no	-	-	Use Fleming (Neil Fleming) "VARK", classification method to try to map personality.	-	Yes	no	Jiangxi Normal University/China
23.	No (A)									
24.	No (A)									
25.	Yes	Yes	Yes.	EEG data mapped for emotions	Emotional state	-	-	Yes	BIO_EMOTION ontology	Lanzhou University/China
26.	Yes	Yes	No/no/no	-	-	-	Mood	Yes	No	Philips Research/ Nederlands
27.	Yes	Yes	No/no/no	Lens model analysis		Big Five Factor inventory	-	Yes	No	University of Kansas/USA
28.	No (A)									
29.	No (A)									
30.	Yes	Yes	Yes/yes/no	Big Five	-	Personality	-	Yes	No	Mackenzie Presby-

										terian University/ Brazil
31.	No (B)									
32.	No (A)									
33.	Yes	Yes	No/yes/no	-	-	Personality	-	Yes	No	Ecole Polytechnique Fédérale de Lausanne /Switzerland
34.	Yes	Yes	Yes/yes/yes	Big Five		Personality extracted from TIPI test	-	Yes	HIT	Ecole Polytechnique Fédérale de Lausanne /Switzerland
35.	No (A)									
36.	Yes	Yes	No/no/no	-	-	-	-	No	No	Chinese Academy of Science/China
37.	Yes	Yes	No/no/no	-	Emotion	-	Social signals	Yes	No	University of Leeds/UK
38.	Yes	Yes	No/no/no	-	Emotional state	Personality	-	Yes	No	National Technical University of Athens/Greece
39.	Yes	Yes	No/no/no	LIWC	Emotional state	-	Sentiment	Yes	No	Universidad autonoma de Madrid/Spain
40.	Yes	Yes	No/no/no	No	-	-	-	Yes	No	Politecnico di Milano/Italy
41.	Yes	Yes	Yes/yes/yes	Personality types	Emotion/facial expression	-	Mood	Yes	use ECA interface	Florida International University/USA

#										
42.	Yes	Yes	No/no/no	-	Emotional state/emotion	-	-	Yes	No	National ICT of Australia/Australia
43.	Yes	Yes	yes/no/no	-	Emotion	-	-	Yes	-	Kyung Hee University/Korea
44.	Yes	Yes	Yes/no/yes	-	Emotion	-	-	Yes	Emotional profile identification.	Universidad Autónoma de Madrid/Spain
45.	Yes	Yes	Yes/no/no	Thayer's Activation-Deactivation Adjective Check List	-	Personality	-	Yes	-	University of California/USA
45.	Yes	Yes	Yes/yes/no	-	Emotional statue	-	-	No	-	Yunnan Normal University/China
47.	No (A)									
48.	Yes	Yes	Yes/no/yes	Big Five, LOC	-	Personality inferring by using 20-item Mini-IPI	-	Yes	Part of Personal Equation of Interaction	Simon Fraser University/Canada
49.	Yes	Yes	Yes/yes/yes	Thayer	-	-	Mood measured by skin temperature and UWIST Mood Adjective Checklist	Yes	AMP	Eindhoven University of Technology/Netherlands
50.	No (A)									
51.	Yes	No	No/no/no	-	Emotion models	Personality models	Affective models	No	No	Trinity College/Ireland
52.	No (C)									
53.	No (A)									

No.										
54.	Yes	Yes	Yes/yes/no	Personality	-	Personality inferring by using TKI personality test	Social trust	Yes	No	Complutense University of Madrid/Spain
55.	yes	Yes	Yes/no/yes	Alternative Five model	-	Personality inferring by using ZKPQ questionnaire	-	Yes	TP2010	Universidad Autónoma de Madrid/Spain
56.	Yes	Yes	Yes/no/yes	Ekman	Emotion/emotional state	-	Mood	Yes	No	University of Ljubljana/ Slovenia
57.	Yes	Yes	Yes/yes/no	-	Emotion	-	User psychology	Yes	Based on UX	Agora Center/Finland
58.	Yes	Yes	Yes/no/yes	OCC model/ BDI	Emotion	-	-	No	No. Cognitive-Based Affective User Modeling (CB-AUM) using X-BDI	PIPCA/UNISINOS /Brazil
59.	Yes	Yes	Yes/yes/no	-	-	-	-	No	No	Universiti Kebangsaan/Malaysia
60.	Yes	No	No	-	Emotion	Personality	-	No	No	University of Konstanz/ Denmark
61.	Yes	Yes	No/no/no	-	Emotional state	-	-	Yes	No	University of Girona/Spain
62.	Yes	No	Non/no/no	-	-	-	Affective support	No	No	University of Massachusetts/USA
63.	Yes	Yes	Yes/no/yes	Big Five	-	Personality inferring by using Japanese version of the Big Five	-	Yes	No	Matsuyama University/Japan

					Inventory (BFI)					
64.	No (A)									
65.	Yes	Yes	Yes/yes/no	-	-	-	-	Yes	No	University of Piraeus/Greece
66.	Yes	Yes	Yes/no/yes	-	Emotion	-	Affective	Yes	No	Wuhan University/China
67.	Yes	Yes	Yes/yes/no	-	-	-	-	Yes	Yes. UPS framework	Zhejiang University/China
68.	Yes	Yes	Yes/no/yes	Eysenck's PEN model (personality)	Emotional styles	Personality type inferring by using EPQR-S	Affect inferring by using (DMSI) and (PSSQ)	Yes	-	National & Kapodistrian University of Athens/Greece
69.	Yes	Yes	Yes/no/no	Thayer model	Emotion detection	Personality	-	Yes	-	Bialystok University of Technology/Poland
70.	Yes	Yes	No/no/no	-	-	-	-	No	SLR user model	Boeing Research and Technology/USA
71.	Yes	No	Yes/no/no	Reactivity to reward and punishment, sensation seeking	Emotion	Personality	-	Yes	No	University of Haifa/Israel
				Big Five personality traits						
				Myers-Briggs Type Indicator						
72.	Yes	Yes	Yes/no/yes	Velten mood induction technique	Emotional state	-	Mood	Yes	No	National Technical University of Athens/Greece
73.	Yes	Yes	Yes/no/yes	Secondary emotions	Emotion	In future	Affective state	Yes	No	Technical Universi-

#										
				(47 POMS)	state		(emotion)			ty of Cluj-Napoca/Romenia
74.	No (B)									
75.	Yes	Yes	No/no/no	SAW	Emotional state	-	-	Yes	NEU-FACES	University of Piraeus/Greece
76.	No (A)									
77.	No (same paper as 83 item)									
78.	No (A)									
79.	No (A)									
80.	Yes	Yes	Yes/no/yes	Clynes (emotion) Five- Factor-Model (personality)	Emotion	Personality	-	Yes	No	University of Nevada/USA
81.	Yes	Yes	Yes/no/yes	BIGFIVE	-	Personality inferring by using TIPI	-	Yes	No	Swiss Federal Institute of Technology in Lausanne/Switzerland
82.	No (A)									
83.	Yes	Yes	No/no/no	SAW	Emotional state	-	-	Yes	NEU-FACES	University of Piraeus/Greece
84.	Yes	Yes	Yes/yes/yes	Thayer	Music emotion	Personality of user	Mood	Yes	No	Bialystok Technical University/Poland
85.	No (A)									
86.	Yes	Yes	No/no/no	Izard	Emotion	-	-	-	-	University of Glasgow/UK
87.	Yes	Yes	Yes/yes/yes	-	Music emotion	-	Music emotion	-	No	National Taiwan University/Taiwan

88.	Yes	Yes	Yes/yes/yes	Global Workspace Theory (GWT)	Emotion	Consciousness	-	Yes	CERA-CRANIUM	Carlos III University of Madrid/Spain
89.	Yes	Yes	Yes/yes/yes	-	-	Personality inferring by using Minnesota Multiphase Personality Inventory version 2	-	Yes	No	Instituto Politécnico Nacional/Mexico
90.	No (A)									
91.	Yes	Yes	No/no/no	Describe many theories applied by npc	Emotions	-	-	No	No	Psychometrix Associates/USA
92.	Yes	Yes	Yes/yes/yes	16PF	-	Personality inferring by using --- the Sixteen Personality Factor Questionnaire by Cattell (16PF),	-	Yes	No	Taiyuan Univ. of Tech./China
93.	No (A)									
94.	Yes	Yes	Yes/yes/no	-	Emotion	Personality	Mood	Yes	No	Telecom Bretagne/France
95.	No (B)									
96.	Yes	Yes	Yes/no/yes	BigFive	-	Personality	Presence (used the (PQ));(empathy used (IRI)); imagination(used the (QMI)); immersive	Yes	No	University of Haifa/Israel

							tendencies (used the (ITQ)), dissociation tendencies (used the (DES) and locus of control(used the (LoCQ))			
97.	Yes	Yes	Yes/no/yes	Big Five	-	Personality inferring by using Big 5 Personality Questionnaire	-	Yes	No	North Carolina State University/USA
98.	Yes	Yes	Yes/yes/no	-	-	Personality	-	Yes	No	University of Piraeus/Greece
99.	Yes	Yes	Yes/no/no	-	Emotional states inferring by using BodyMedia SenseWear armband or ProComp Infiniti 8	Personality	Affective model	Yes	No	University of Nevada/USA
100.	Yes	Yes	Yes/no/yes	-	Emotional state inferring by using physiological signs	-	-	Yes	User Model framework	University of Massachusetts/USA
101.	Yes	Yes	Yes/yes/yes	-	-	-	Affect	Yes	No	Arizona State University/USA
102.	Yes	Yes	Yes/yes/yes	Goleman	Emotion,	-	-	Yes	No	National & Ka-

					emotional intelligence using EQ					podistrian University of Athens/Greece
103.	No (B)									
104.	Yes	Yes	Yes/no/yes	-	Emotion	-	-	Yes	No	City University/UK
105.	Yes	Yes	Yes/yes/no	-	-	-	Affective states	Yes	No	Microsoft Research/USA
106.	No (B)									
107.	Yes	Yes	Yes/yes/yes	Goleman	Emotion, emotional intelligence using EQ	-	-	Yes	No	*National & Kapodistrian University of Athens/Greece*
108.	Yes	Yes	Yes/yes/no	-	Emotional state	-	-	Yes	No	National & Kapodistrian University of Athens /Greece
109.	Yes	Yes	Yes/yes/no	-	Emotions	-	Affective state	Yes	No.iMTV	Chinese Academy of Sciences/China
110.	Yes	Yes	Yes/yes/yes	-	Emotions inferring by using Simple Additive Weighting (SAW)	-	-	Yes	no	University of Piraeus/Greece
111.	Yes	Yes	Yes/no/no	Spontaneous trait inferences (Uleman)	-	Personality profile	-	Yes	No	University of Washington/USA
112.	Yes	Yes	Yes/no/yes	Dimensional Affective Model	-	-	Affective model	Yes	No	Chinese Academy of Sciences/China

No.										
113.	No (A)									
114.	Yes	No	No	-	Emotion	-	-	No	No	University of Bath/UK
115.	Yes	Yes	Yes/no/no	-	-	Personality	-	Yes	Personality METADATA	Tampere University of Technology/Finland
116.	No (B)									
117.	No (A)									
118.	Yes	Yes	Yes/no/yes	FFM, Ekman, OCC	Emotion	Personality inferring by using Online Implementation of the Five Factor Personality Inventory (proprietary inventory)	-	Yes	Yes. Personality affective Modeling (PAM); Emotional Prediction System	Taiyuan University of Technology/China
119.	Yes	Yes	Yes/Yes/yes	Physiological state (Picard)	Emotion	-	Entertainment	Yes	No	IT-University of Copenhagen/Denmark
120.	Yes	Yes	Yes/Yes/yes	-	-	Personality	-	Yes	No. AUTOCOLLEAGUE (UserModeller)	University of Piraeus/Greece
121.	No (B)									
122.	Yes	Yes	Yes/no/no	-	-	Personality	-	Yes	Yes. Generic XML Personality Metadata	Tampere University of Technology/Finland
123.	Yes	Yes	Yes/yes/yes	OCC	Emotional state	-	Affective state	Yes	No	University of Piraeus/Greece

124.	Yes	No (theoric paper)	No/no/no	-	Emotional contagion	Personality	Affective state	No	No	University of Aberdeen/UK
125.	Yes	Yes	Yes/yes/yes	Goleman	Emotional state inferring by using EQ	-	-	Yes	Yes. The comprehensive user profiling	National and Kapodistrian University of Athens/Greece
126.	Yes	Yes	No/no/no	-	-	Personality	-	Yes	No. User Modeller	University of Piraeus/Greece
127.	Yes	Yes	Yes/yes/yes	Big Five	-	Personality inferring by using Ten Item Personality Measure (TIPI).	-	Yes	No	Eindhoven University of Technology/Netherlands
128.	Yes	No (theoric paper)	No	Many	Emotion effects	Personality	Affective user modeling	No	No	Psychometrix Associates/USA
129.	Yes	Yes	Yes/no/yes	-	Emotion mapped from :(SC), (SCL), and (SCRs),(HR)	-	-	Yes	No. UM (Psycho Physiological Emotional Map –PPEM)	Institut Eurecom/France
130.	Yes	Yes	Yes/no/yes	-	-	-	Mood classification	Yes	No.SVM based Mood Classifier (SVMMC) and the Mood Flow Analyzer (MFA)	Information and Communications University/South Korea
131.	Yes	Yes	Yes/no/yes	Five-Factor-Model Ekman	Emotion recognition	Personality inferring by using the NEO PI-R	Affective states	Yes	No. Affective user Modeling	University of Nevada Las Vegas/USA
132.	Yes	Yes	Yes/no/yes	Simple Additive	Emotional	-	-	Yes	No	University of Pi-

				Weighting (SAW)	state					raeus/Greece
133.	Yes	Yes	Yes/no/no	Ekman	Emotion recognition	-	-	Yes	No	University of Piraeus/Greece
134.	Yes	Yes	Yes/no/yes	16PF, Ekman	Emotion expression	Personality inferring by using Sixteen Personality Factor Questionnaire	-	Yes	No	Taiyuan Univ. of Tech/China
135.	Yes	Yes	Yes/no/yes	Cassady	Emotional parameters (emotional arousal)	-	Anxiety inferring by using Cognitive Test Anxiety and State-trait anxiety inventory	Yes	No. User Perceptual Preferences	*National & Kapodistrian University of Athens/Greece*
136.	No (A)									
137.	Yes	No	No/no/no	-	-	Personality	-	No	No	University of California/USA
138.	No (A)									
139.	Yes	Yes	Yes/yes/yes	-	Emotion	-	-	Yes	No	Yonsei University/South Korea
140.	Yes	Yes	Yes/no/yes	Ekman and Friesen	Emotion postures	-	Affective postures	Yes	No	University of Aizu/Japan
141.	Yes	Yes	No	OCC model	Emotion	Personality	-	Yes	No	University of Edinburgh/Scotland
142.	Yes	Yes	Yes/yes/no	-	Emotion	Personality	Feelings	Yes	No	University of Piraeus/Greece
143.	Yes	No (theoric paper about models)	No/no/no	-	Emotion	Personality	-	Yes	No. MAMID	Psychometrix Associates/USA

No.										
144.	Yes	No	No/no/no	-	Emotional state	Personality	-	Yes	No	University of Piraeus/Greece
145.	Yes	Yes	Yes/yes/no	-	-	Personality	Affect	Yes	No	University of Toronto/Canada
146.	Yes	Yes	Yes/yes/no	-	Emotion	Personality	-	Yes	No	Kyoto University/Japan
147.	Yes	Yes	Yes/no/yes	Human Values Scale (HVS)	Emotion	-	-	Yes	Yes. Smart User Model (SUM)	University of Girona/Spain
148.	Yes	No	No/no/no	-	Emotion	-	-	No	No	University of Science and Technology of China/China
149.	Yes	Yes	No/no/no	-	Emotion	-	-	Yes	No	Massey University/NewZealand
150.	Yes	Yes	Yes/no/yes	Ekman and Friesen	Emotion	-	Affective posture collected by using motion capture system	Yes	No	University of Aizu/Japan
151.	Yes	Yes	Yes/yes/no	-	-	-	-	Yes	No	Fraunhofer Institute for Applied Information Technology/Germany
152.	Yes	Yes	Yes/no/yes	OCC model (emotion); Five Factor personality Theory	Emotion	Personality	-	Yes	No	University of British Columbia/Canada
153.	Yes	Yes	No/no/no	MBTI e 16PF	-	Personality inferring by using MBTI and 16PF	-	Yes	No	Middlesex University/UK

154.	Yes	Yes	Yes/yes/no	-	-	-	-	Yes	No	Dresden University of Technology/Denmark
155.	Yes	Yes	Yes/no/yes	OCC model (emotion), Five Factor personality theory	Emotional states	Personality	-	Yes	No	University of British Columbia/Canada
156.	Yes	Yes	Yes/no/yes	Many	Emotion inferring by using BodyMedia SenseWear Armband	-	Affect inferring by using BodyMedia SenseWear Armband	Yes	No.MAUI	Institut Eurecom/France
157.	No (A)									
158.	No (A)									
159.	Yes	yes	Yes/yes/no	FMBT model	-	Personality	Affective	Yes	No. REA	MIT Media Lab/USA
160.	Yes	Yes	Yes/no/yes	Ekman ; Zajonc and Markus; Frijda; Ortony (OCC); Levenson	Emotional state inferring by using BodyMedia SenseWear	-	Affective state inferring by using Body-Media SenseWear	Yes	No.MOUE	University of Central Florida/USA
161.	No(B)									
162.	Yes	Yes	Yes/yes/no	-	-	-	-	Yes	No	Università degli Studi di Bari/Italy
163.	No (A)									
164.	No (A)									
165.	Yes	No (research problems of	No/no/no	OCC model, Elliot	Emotion	Personality	-	-	-	DePaul University/USA

					model emotion and personality				
166.	Yes	Yes	Yes/yes/no	-	-	-	-	Yes	-	University of Maryland/USA
167.	Yes	Yes	Yes/yes/no	-	-	-	-	Yes	No. SERUM	MIT Laboratory for Computer Science/USA
168.	Yes	Yes	Yes/yes/no	-	-	Personality	-	Yes	No	Thr University of Texas/USA

Legend: A= (without access to the document); B=(it is not relevant; from other area) C=(it is a preface, without explicit information or model)

Table A.2 Map of 13 relevant papers extracted for the systematic mapping from ACM database.

Paper/ criteria	1.Did it have been analyzed for this systematic mapping?	2.Did the author said that he is using/creating some data format / profile/ model in some implementation presented at paper?	3.Did the author present a detailed data format / profile/ model used in some implementation presented at paper? General? Affective?	4.What psychological theory the model presented was based on?	5.Was it about emotion?	6.Was it about personality?	7.Was it about other affective aspect? What was the aspect?	8.Was it a proprietary model?	9.Was it a standard model? What's name?	10.Where was the first author from?
1.	Analyzed in SCOPUS mapping N°3	Yes	Yes/yes/no	FFM/Big Five	No	Predicting from NEO FFI personality questionnaire	No	Yes	No. He finds a correlation to the affective model. His us-	Slovak University of Technology in Bratislava/Slovakia

#										
									er model is not an affective one.	
2.	Analyzed in SCOPUS mapping N°14	Yes	No/no/no	-	No	No	Mood	Yes	No	Instituto Politécnico de Setúbal/Portugal
3.	Analyzed in SCOPUS mapping N°44	Yes	Yes/no/yes	-	Emotion	-	-	Yes	Emotional profile identification.	Universidad Autónoma de Madrid/Spain
4.	Analyzed in SCOPUS mapping N°47	it is not relevant; from other area								
5.	Analyzed in SCOPUS mapping N°51	No	No/no/no	-	Emotion models	Personality models	Affective models	No	No	Trinity College/Ireland
6.	Analyzed in SCOPUS mapping N°52	it is a preface, without explicit information or model								
7.	**Yes. Original ACM**	Yes	Yes/no/yes	Big five	-	Personality (based on GUMO and use personality recognizer)	-	Yes	No. Personality Recognizer	ITT/Ireland
8.	**Yes. Original ACM**	Yes	Yes/no/yes	Big Five	-	Personality inferring by using NEO-IPIP inventory	-	Yes	No. User Psychological Profile (UPP)	University of Montpellier/France
9.	Analyzed in SCOPUS	Yes	Yes/yes/no	-	Emotions	-	Affective state	Yes	No.iMTV	Chinese Academy

	mapping N°109									of Sciences/China
10.	Analyzed in SCOPUS mapping N°115	Yes	Yes/no/no	-	-	Personality	-	Yes	Personality METADATA	Tampere University of Technology/Finland
11.	Analyzed in SCOPUS mapping N° 134	Yes	Yes/no/yes	16PF, Ekman	Emotion expression	Personality inferring by using Sixteen Personality Factor Questionnaire	-	Yes	No	Taiyuan Univ. of Tech/China
12.	Analyzed in SCOPUS mapping N°145	Yes	Yes/yes/no	-	-	Personality	Affect	Yes	No	University of Toronto/Canada
13	**Yes. Original ACM**	Yes	Yes/yes/yes	MBTI, MIR and Brain.exe.	Emotion	Personality inferring by using MBTI, MIR and Brain.exe.	-	Yes	No	Columbia University/USA

Appendix 2

We present the references of the168 papers extracted from SCOPUS database and ACM used on the systematic mapping (organized by year of publication).

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