A Taxonomy of Mood Research and Its Applications in Computer Science

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***Abstract*—A growing number of studies in the computer science and engineering communities are addressing mood, an affective phenomenon related but not equivalent to emotion. While emotion has been investigated intensely in the affective computing domain, the characteristics and applications of mood are relatively unexplored. Through a bottom-up approach, this paper aims to identify in which areas and for what purposes computer scientists and other researchers in the ACM and IEEE communities are studying mood. Based on a literature review of 1,264 peer-reviewed publications, this paper proposes a taxonomy of mood research in affective computing. Despite a wide range of applications and domains, core themes of mood research relate to identifying users' mood, influencing it, or helping users to communicate their mood to others. The conceptualization and definition of mood, however, vary between the studies surveyed and sometimes can fall considerably far from the psychological concept of mood in affect research. In several instances, researchers use the terms mood and emotion interchangeably and do not sufficiently discuss the implications both for their measurements and for the design of affective-computing systems as well. With our study, we aim to contribute a clearer conceptualization of mood research and to provide researchers with a broad overview of the research as well as areas of applications in which mood is addressed.**

1. Introduction

Mood is an affective phenomenon that influences an individual's behavior, cognition, and health. Scientists have been studying mood as a single phenomenon as well as in relation to individuals' behaviors and environments. Mood-related studies spread through various fields of research, including psychology, health, sport, marketing, and several others. The computer science and engineering community has also been increasingly conducting mood-related research, as is indicated by the use of the term *mood* in their papers (figure 1). While the number of papers that use *emotion* in their titles, abstracts, or authors' keywords is considerably higher (roughly six times greater), mood is still addressed in a substantial part of scientific research in the community, and should therefore not be overlooked.

As the leading area for interdisciplinary affect research for the ACM and IEEE communities, affective computing

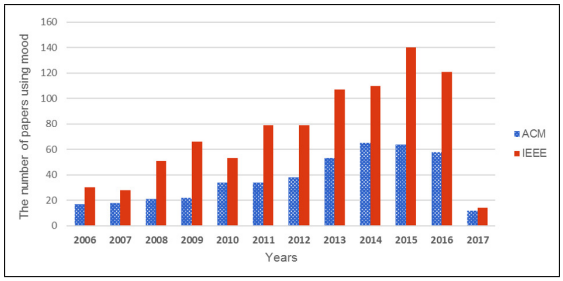

Figure 1. The increasing number of papers published in each year that used *mood* in their titles, abstracts, or in the authors' keywords. Obtained from search queries from IEEE and ACM databases on April 21st, 2017

seems to discuss *emotion* more than *mood*. For example, the first handbook of affective computing [1] shows a significant difference between using the term *emotion* (5635 times) versus *mood* (184 times). Compared to *emotion*, affect - which, in our view, is an overarching term for mood and emotion - has been mentioned only $3,741$ times. Although the scientific community has been studying mood frequently, to the best of our knowledge there is no concise overview of how computer scientists, particularly the ACM and IEEE communities, study mood, what their aims are, and whether mood is considered similar or dissimilar to emotion.

Many scientists argue that mood and emotion are similar but distinct concepts in a psychological context, and there has been an ongoing discussion about their differences. For example, Beedie et al. [2] investigated how the scientific community discusses differences between mood and emotion based on such factors as duration, intentionality, cause or origin, and the consequences. The exact duration of mood and emotion is still a matter of dispute, however there is a general view (e.g. [3], [4], [5], [6], [7]) that mood is a longer lasting phenomenon while emotion is typically of short duration. Further differences have been investigated as well. For instance, emotion may consume a person's direct attention, whereas mood may run in the background of the mind [8]. Since it lasts longer, an individual may experience a mood state more than an emotional state. Some researchers also maintained that emotion is associated with observable signals [3], [7], but mood may not have an observable physiological or expressive signal. Mood and emotion are both constructs of a user's affect, and a substan-

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tial and diverse body of literature discusses their definitions, constructs, measurements, properties, and differences.

While several reviews, classifications, and surveys of affective computing exist, they rarely mention *mood*. For example, Schwarks [9] presents a taxonomy of affective computing focusing on affect generation, understanding, and applications. In a survey, Calvo and D'Mello [10] review the progress of affective computing, and in discussing different emotion theories, they provide an overview of affect detection methods. In another study, Poria [11] presents a review of affecting computing, focusing on approaches that utilize more than one communicative channel, namely audio, textual, or visual channels. Although these reviews provide overviews of the affective computing field, they present no specific information about mood, and we found no mood-specific review in the targeted communities.

In this paper, we present the results of a literature analysis of mood-related papers in the ACM and IEEE libraries. Using a bottom-up approach, we establish a taxonomy of mood research in computer science and its related communities. In particular, we identify the different purposes and domains for which mood has been studied, and then we categorize the papers based on their application domain. Analyzing the various meanings and usages of the term *mood* in our findings, we look at how these usages may influence research on affective computing.

2. Method

In a bottom-up approach to deriving a taxonomy, we searched the ACM and IEEE digital libraries for mood-related studies. In March 2017, we ran a query that searched for papers that use *mood* in their abstracts, titles, or in the authors' keywords. After removing duplicates, we obtained a total of $1,482$ results. The next step was to remove irrelevant results, such as papers that were not peer reviewed. In addition, when reading the abstracts, we generously labeled the papers for clustering, and subsequently removed the papers whose abstracts had no relation to the common concept of mood in affect research, such as those that used the term *mood* only in an idiomatic sense or as a technical term (e.g. *"authors are in the mood to", "the shopping mood", or "MOOD as the Metrics for Object Oriented Design", etc.*). In the end, $1,264$ papers remained for grouping into clusters.

We formed the clusters and sub-clusters by reading the abstracts and grouping them according to similarities in their application domain, and, alternatively, their publication venue. Since the IEEE publication guidelines states that the main purpose, domain, methods, and the procedures of the studies should be reflected in the abstracts, for grouping we considered each abstract to be representative of the whole paper. To find a top-level cluster, we therefore relied mainly on reading and analyzing the papers' titles, keywords, abstracts, publication venues, and other bibliographic information.

The procedure of grouping involved several iterations followed by refinements at the end of each one. In each iteration, the aim was to determine the focus of a paper, which explains how and in which context the paper uses or addresses *mood*, and then to group the paper into a cluster with others sharing the same focus. We assigned each paper to only one cluster that best represents the paper's contributions. After each iteration and papers' assignment, we then went through every paper in the clusters again, and evaluated their similarities with other papers in the designated cluster and refined their assignments if needed.

We started the grouping procedure with the first 200 papers, formed an initial clustering according to the application domain, and then assigned the rest of the papers to these clusters according to where they fit, forming new clusters as needed. Using a divide and conquer approach, we went through each cluster in more detail, and with another iteration of clustering and refinement, we then formed the sub-clusters. We found some of the clusters to be similar both in structure as well as in their sub-clusters, thus we merged these similar clusters into one where possible. At the end, the final structure for mood-related studies was formed. We do not claim that this clustering is absolute, though it is merely one possible representation of the overall diverse research pathway on mood. Therefore, it only manifests a broad conceptual structure of mood-related research in the community.

3. Results

Our grouping approach resulted in a taxonomy of mood-related research in the community. Figure 2 depicts this taxonomy, which has seven high-level clusters or application domains: I. Multimedia, II. Health, III. Sentiment analysis, IV. Human-computer interaction (HCI), V. Virtual or machine agents, VI. Methods, and VII. Business. Table 1 gives a brief overview of the clusters, their descriptions, and the type of papers present in each.[1]

In the multimedia cluster, we identified music, movie, image, and game sub-clusters, each with several sub-clusters. In this application domain, mood has been mentioned as a genre and an attribute of multimedia content, i.e. music, image, and movie. Alternatively, it has been mentioned as the users' internal mood state for which one can identify, influence, or customize the contents. Researchers develop or use techniques for multimedia content analysis, generation, and personalization. Classification of music content in particular comprises the majority of studies (53.5%) in the music cluster (equal to 9.02% of all reviewed papers)[2].

The health cluster covers a considerable portion of mood-related research, and it studies the users' mood in specific medical conditions as well as for health promotion. Broadly speaking, health-related papers can be categorized into studies that focus on diagnosis and studies that concentrate more on treatment and monitoring. Specific mental disorders such as bipolar disorder which is directly related

1. For the full list of the papers included in the review and their categorizations, see https://github.com/torkamaan/Mood

2. Several papers have focused on the song lyrics in combination with the music. Considering their direct relation to the music, despite using minor sentiment analysis methods, they are grouped into the music cluster.

TABLE 1. SUMMARY OF THE TYPE OF THE PAPERS IN EACH CLUSTER

Cluster	**Sub-cluster**	**Description** (papers in this cluster include but are not restricted to the papers that (have/study)...)	**Count**
Music	Genre-classification	Mood as a genre/attribute of the music itself, e.g. song mood, a property for searching, music (search/retrieval/datasets); (predict/classify/analyze/build) music (content/attributes), improve (annotation/tagging/labeling), study audio features...	114 (9.02%)
	Influencing users	Affective music and the users' reaction, mood (enhancement/regulation), emotion aware applications, music therapy; invoke (positive reactions/a physiological state), influence the users with music e.g. while driving; improve creativity...	24 (1.9%)
	Customization/ interactive systems	Customization according to the user's mood, (mood/context/environment/situation) aware music systems, interactive systems, (music/group) performance & experience transfer; (detect/identify) users' state & react to it, music recommendation...	51 (4.03%)
	Music-graphics	The (expression/presentation/relationship/classification/visualization) of (music/sound) together with (graphic/image)...	24 (1.9%)
Movie / video	Content-methods	Movie Content Classification, extraction, annotation, methods & techniques, etc.	27 (2.14%)
	Identify mood	Application of users' mood identification, social videos; identify (audiences' reaction/facial expression in movies), etc.	25 (1.98%)
	Customize /influence	Customization of the videos for a user, recommendation; influencing the users' mood with a specific video, etc.	25 (1.98%)
	Presentation	Presentation of the affective video, (generation/improvement/expression) of (movies/a mood state), e.g. light, color, movie mood(an attribute), applications of video mood identification, affective content & users' mood	29 (2.3%)
Image	Methods & techniques	Methods & techniques for color correction, color&texture (combination/transfer), lighting, scene lighting, image (mood manipulation/color enhancement), photography, commercial design application; transfer mood between images...	23 (1.82%)
	Mood identification	The application of mood detection, extraction from art & facial expression, as genre, classifications; clustering art...	12 (0.95%)
	Facial expression	Human facial expression identification and mood detection methods, etc.	11 (0.87%)
Game	Game solutions	(Imitating/simulating) humans'(affective state/reactions), help users, influence users, specific game applications, genre.	18 (1.42%)
Health	Bipolar disorder	Health improvement, diagnosis, monitoring, etc.	50 (3.96%)
	Depression	Detection (classification/identification/diagnosis) methods, etc.	37 (2.93%)
		Improvement of life & monitoring, treatment & prediction of relapse, etc.	18 (1.42%)
	Other Disorders	Treatment, monitoring, & prediction of a disorder, treatment relapses, improvement of life & patient performance (disorders: medical conditions, disabilities e.g. sleep disorder, epilepsy, schizophrenia, autism, addiction, ADHD, etc.)	55 (4.35%)
		Diagnosis, identification, detection of (mood or the conditions) for specific disorders	28 (2.21%)
	Health Promotion	(Tracking/detection/monitoring) for health purposes & awareness; (diary/auto detection/self-reports), mood & behavior	25 (1.98%)
		Positive influence on user to be healthier, mood with other activities e.g. social media use, stress, sleep, data collection...	20 (1.59%)
		Physical activities	8 (0.63%)
		Elderly support and quality of life improvements	8 (0.63%)
Senti--ment Analy--sis	Opinion mining & crowds	Public (opinion/mood/behavior) (mining/tracking/modeling), (identifying/predicting) events (e.g. social/economical/political/weather) or their influences on (crowds/citizens/customers)' (mood/opinion/health/behavior), e.g. (stocks/political) forecasting, policy making, smart cities, traffic congestion, etc.	72 (5.7%)
	Methods & techniques	Methods for (classification/opinion mining), large scale sentiment analysis techniques, mood classification methods, discussion of speech recognition techniques, methods in speech & text classification based on mood...	57 (4.51%)
	Mood of an individual	Identify & capture a user's mood, (track/visualize) mood (fluctuation) based on (social media/microblogging) activities, truth discovery, personalize services & recommendations, (predict/model)(personality/behavior/emotion/contagion)...	32 (2.53%)
	Speech	Application of speech recognition, identification & extraction of mood and its variation in speech & dialogue...	32 (2.53%)
Virtual / physical agents,	Interpret humans	Agents try to interpret, understand, or identify human behavior or affective states, etc.	29 (2.3%)
	Improve or help humans	Agents try to help & improve humans' performance or quality of life, adapt to their environment, reduce stress, induce an emotion, improve a user's mood, react to a human's emotion, invoke change in humans, e.g. robot assist activities...	46 (3.64%)
	Natural interactions	Agents try to imitate human behavior, interact with users emotionally and naturally, show and communicate emotional states, users' perception of the machines' emotions, study human behavior, improving human-robot interaction, etc.	83 (6.56%)
HCI, UX, & design	Communicate affect	Help users reflect their affective states, user-user (direct/remote/implicit) interaction & communication, self-reflection, audiences' responses, interactive or tangible tools, mood mapping, awareness support, collaboration, social relations...	79 (6.25%)
	Mood aware design	Mood-aware design, help users in daily life, customize & adapt (& determine one's mood for), assess satisfaction, give affective feedback, give awareness of surroundings, design methods, mood-aware ecosystem, user's intention...	41 (3.24%)
	Detect mood	Directly and interactively capture, predict, or determine a user's mood, mood quantification, etc.	17 (1.34%)
	Influence users	Influencing the users' mood, e.g. encouraging, giving emotional incentive, effect of design element effect of emotion, e.g. color, light, images, positively influence the users, etc.	39 (3.08%)
Methods	Physiology	Methods, techniques, & study of the physiological signals, its analysis & extraction with regards to affect, detection of humans' activity recognition, physiological signals and behavioral consequences, e.g. memory, stress, cognition...	42 (3.32%)
	Behavior	Modeling & predicting user behaviors, patterns of behavior, understand the relationship of users' mood to a specific behavior e.g. grading, survey answering, and other cognitive, creative, learning, & searching processes, etc.	25 (1.98%)
Business	Corporation	Stock, supply chain, marketing, etc. advertisement for the customers or businesses, look into affect with this regard.	18 (1.42%)
	Management	Mood in management, tasks, performance, human resources, decision-making, etc.	20 (1.58%)

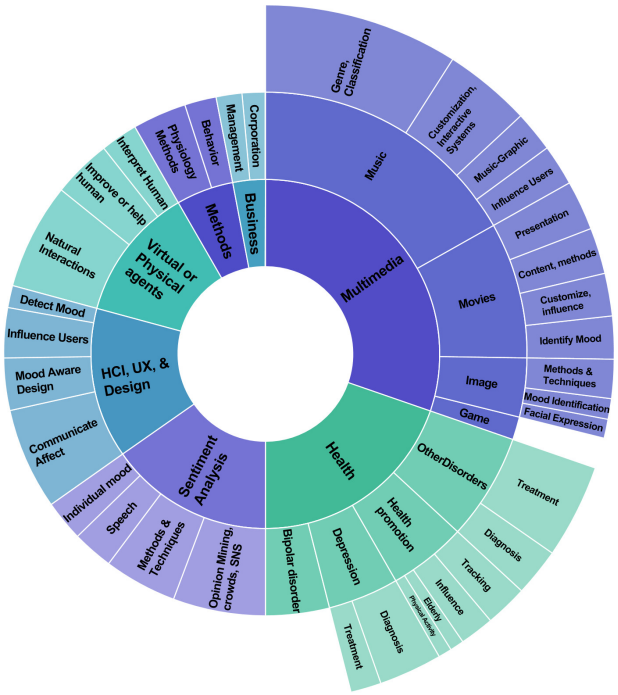

Figure 2. Affect Research Taxonomy. A bigger section (cluster) in the diagram shows a higher number of the papers in that cluster. Seven high-level clusters are: multimedia (30.3%), health (19.7%), Sentiment in social media, crowds, language, text, & speech (15.3%), HCI & design (13.9%), robots, virtual agents (12.5%), affect & behavior methods (5.3%), and business related contributions including decision-making aids (3%)

to the patients' mood fluctuations, are good examples of the specialized use of *mood* in the medical domain. In the health promotion sub-cluster, the discussions are mainly concerned with tracking and providing users with awareness while considering their mood.

Sentiment analysis in text and speech is another cluster in the taxonomy. The papers in this cluster use text and speech to classify, identify, model, and predict the users' mood states, their behaviors, and their opinions. These papers cover a wide range of applications in various scientific domains and explore mood of individuals and crowds, as well as the influence and consequences of an individual's mood on others.

The cluster of virtual and physical agents includes robots, virtual characters, animation characters, relevant sensors, and other intelligent agents that try to attain a natural interaction with an individual, interpret human behavior, or help and influence humans toward better performance, experience, and behavior. Mood generation by agents or machines are exclusive to this cluster.

The cluster HCI, user experience (UX), and design mainly aims at providing mood-related solutions for designing or adapting interactive systems for the users. These solutions can be an interactive or mood-aware system or a service that detects mood, influences the users, or helps the users to communicate their feelings.

The remaining clusters are methods and business clusters. Methods comprises studies that mention the users' mood, focus on the measurement of physiological reactions, and try to model, detect, or recognize users' behavior. The business cluster includes a few studies that address mood in the management, decision making, performance, marketing, stock, or supply chain domains.

4. Analysis of the Research Perspectives

Presenting a general insight into the structure of mood-related research in the community, the results of this study also highlight several other points. In this section, we first explain the outcome of a high-level breakdown that shows the overall perspectives and purposes of mood-related research in the community. Second, we discuss various meanings of mood in computer science research in three categories: content, individual, and crowds. Third, comparing mood-related research, we explain in which clusters the distinctions between mood and emotion has been a relevant topic of discussion.

Categorization of perspectives. With an upper-level categorization, we found six groups of studies (table 2) that show both the research attitude toward mood and what researchers do with mood in general. The percentages in the table are rounded to the nearest whole number and shows the share of each category in the $1,264$ papers we reviewed.

TABLE 2. THE RESULTS OF AN UPPER LEVEL ANALYSIS

#	Category	ca.%
1	Identifying & modeling users' affective state or its consequences such as their behaviors, symptoms, intentions, etc.	30%
2	Considering users' mood and then, influence the users. e.g. improving users' life, experiences, performances, etc.	25%
3	Being concerned with mood of a content, e.g. classification, creation, or presentation of a mood as a state or an attribute	23%
4	Trying to customize the contents, products, services, or the contexts for users considering their mood	10%
5	Addressing non-human agents ability to show affective states and present natural human-like interactions with the users	6%
6	Helping users communicate their affective states to others	6%

Mood meanings. Mood has various use and applications in ACM and IEEE papers and it may represent slightly diverse concepts in these applications. In fact, one may argue that mood of the content, mood of an individual, and mood of crowds may represent rather inconsistent concepts with the psychological definition of mood in affect research. Mood of the content refers to multimedia content as well as the environment, light, art, design, and any item or object that provides data for human perception. Mood of an individual has been discussed as a folk term as well as the psychological concept of mood, which refers to the temporary and subjective phenomenological experiences of an individual [7]. In contrast, the mood of crowds is not only about single users, but studies groups of the users as a whole and investigates both their group behavior and its consequences.

Mood of a content, such as a movie or music, can possibly have two meanings. While some studies use *mood*

as the users' mood state (e.g. users' induced states), some others use *mood* as a term that explains an attribute or property of the content similar to the genre and closer to the folk term. In fact, music mood represents a feature of the content, that depending on the study may not be the same as the mood states that are frequently mentioned in affect literature. For example, romantic music [12] is more of a music genre or type rather than a user's internal mood state. This ambiguity most likely occurs since some of the content classifications and annotations are using folk terms and the users' judgments. In other words, for some studies, researchers, as the content's mood, assigned a user's internal mood state to the content with which he or she interacts, and for some other studies, they just used the term *mood* regardless of the users' mood states. Furthermore, in these studies, mood and emotion are sometimes not differentiated, e.g. [13], or music emotion recognition and music mood recognition are considered equivalent, e.g. [14].

The mood of an individual is concerned with the users' internal mood state. Researchers study, use, and develop various methods for capturing or identifying the users' mood. Nevertheless, one may argue that not all of these studies use self-report mood questionnaires and measurements that are commonly used by psychologists. Even those studies that use these measurements usually modify them – sometimes carelessly – and do not follow up with validation or a comparison with an existing measure. This is possibly because they consider mood measurement as simply a tool and not as the main focus of their study. In several other cases, researchers develop a new self-report questionnaire for capturing mood, and, similarly, do not focus on the measurement design or its validation. This particularly limits the reusability and reproducibility of these mood measurement approaches. While researchers are especially interested in identifying one's mood automatically, the application and prediction of the users' mood independent of the self-reports are nevertheless still limited. In the category of mood of an individual, mood and emotion are sometimes used interchangeably depending on the study's domain. Particularly, numerous studies use physiological measures to determine one's mood, yet, physiological and expressive components are traditionally considered mainly as the indicative of emotion rather than mood [7]. Finally, one can also find studies that consider mood as a one-dimensional phenomenon, for instance, with the minimum scale value representing sadness and the maximum value representing happiness, e.g. [15].

The category of mood of crowds represents studies that are often interested in group behavior and look at mood, not as an individual's mood but as a collective and group phenomenon. Some of these studies consider *mood* as a concept for the opinion of users toward something rather than their internal subjective experiences. These studies are likely to be closer to the concept of mood in social psychology, social mood, and subjective well-being. Consequently, the underlying theories, measurements, and the literature for these studies may address mood from this particular perspective.

Long-term tracking of the users' mood versus single point of measurement is another common difference for studies that mention mood. Papers that study mood according to the concept of internal subjective state usually track the users' mood and are interested in seeing the users' mood fluctuations. In fact, one may argue that mood experience is subjective, thus one can only assess an individual's mood based on his or her previously reported mood states. In particular, health applications usually track the users' mood over a certain period of time. However, several other papers do not follow this argument and consider only a one time assessment of the users' mood. These studies may focus on the users' general positive versus negative mood states.

While numerous papers in the community study mood or emotion, many of them do not differentiate between them. Mood has been employed in various research fields such as psychology, economics, health, etc., and depending on its origin, may therefore represent varying concepts. In addition, it has been used as a folk term that does not comply with the scientific definitions of mood in affect science. It must be noted that different areas tend to make more or fewer clear distinction between mood and emotion. For example, general sources such as the affective computing handbook [1], as well as health-related studies are more likely to stress the differences between the two concepts. The health and HCI clusters in the taxonomy, as well as a few papers in the management sub-cluster seem to use the term in a manner closest to the psychological definition of mood as the subjective experiences distinct from emotion. On the other hand, the multimedia, virtual or machine agents, sentiment analysis, and methods clusters represent the highest ambiguity between mood and emotion. Consequently, one can observe that mood-related studies in these clusters often have goals and methods similar to emotion-related studies. According to the classical differences between mood and emotion, it is likely that emotion-related studies focus on psychophysiological components such as expressive and physiological symptoms or signals more than mood-related studies, which focus more on subjective experiences and the users' judgments.

5. Discussion

The bottom-up approach in establishing a taxonomy of mood-related research reveals the variety of domains and applications as well as the diversity of concepts and perspectives in mood in research. This diversity implies the potential for interdisciplinary research on mood and at the same time, warns the scientific community about the constrictions and risks of misconception. Considering this diversity, having a commonly agreed upon definition and concept for mood in affective computing seems to be necessary for both shaping ACM and IEEE mood-related research and preventing future potential ambiguity or confusion in the field. Mood-related research is not just about affective computers, as Schwark [9] considers affective computing to be, which is about the computers that can identify, show, communicate, and react to humans' affect. However it is also concerned with improving humans' mood, helping them to communicate their mood with each other, and customizing

the services, environments, and products for them, which fits into the definition of affective computing by Picard [16]. By comparing the number of publications, one can however assume that affective computing is less explored in areas that concentrate on users' mood as their internal states. Moreover, due to a specific design or modification, numerous invented or modified mood assessment approaches in the community are study-dependent, thus it is unclear if one can expand or re-use them in further studies. To resolve this issue, researchers should carefully consider the validity and reliability of a chosen method both before re-using or after modifying it. It is also essential to carefully use the term *mood* in the studies, and clearly address its concept, domain, and background.

The taxonomy also suggests the areas in which mood research can expand. The cluster of methods shows a potential for more research on both finding specific methods for detecting users' mood as the subjective experience, as well as modeling users' longer term behavior. Although research has been conducted on identifying the users' mood, automatic mood detection is both limited and domain dependent. Mood research therefore still highly relies on self-reports and one cannot find an expandable alternative solution for various systems. Further research can also be conducted on designing mood-aware or mood-adaptive systems as well as on its implications for both design and users. The mood of the content is limited to multimedia and text, while mood-based customization can be used in every system and all applications with which users may interact. Studies in clusters of Multimedia, Sentiment Analysis, and Virtual or Physical agents can also expand by considering users' mood as the subjective experience in addition to the users' emotion.

Additionally, while the scientific community's focus is on detecting and identifying users' mood or its contents, it is still unclear how services or applications should be modified or customized for users so that it provides a higher user satisfaction. Adding the users' individual differences such as personality, intentions, and expectations, this would be a challenge to overcome. In particular, the relations between the users' privacy, their mood, and personalization is an area that has been overlooked, though it plays a crucial role in mood-based personalization. Furthermore, the ethical implications of influencing the users based on their mood and behavior create a challenge that requires specific attention in the future. Mood versus emotion, and their identification and evaluation can help the scientific community to reveal their connections and unlock their behavioral implications. Affective computing scientists can study mood and emotion together both in multiple domains and in the users' daily life as well. Comparing the domains may also reveal more about the structure of mood and emotion, and such findings are particularly useful for mental health promotion, mood regulation using technology, affective design, and many other areas. While this taxonomy and these results offer a conceptualization of and insight into mood-related research, when using them, one also needs to consider their limitations, namely a manual assessment, focusing only on mood-related research, and specific target community.

6. Conclusion

Using a bottom-up approach, we found general domains, perspectives, and purposes of mood-related research in the community. Obtaining a taxonomy of mood-research, we also found that in nearly 60% of studies, researchers try to identify users' mood, influence it, or assists in its communication. While emotion research is dominant in affective computing studies, mood research has the potential to address specific domains that emotion cannot, health support and health promotion in particular require tracking of users' internal mood state. The growth of mood-related research and its interdisciplinary nature emphasize the importance of having unified categorizations and definitions of the concepts for mood. Despite the growth of mood-related research, there are still unexplored aspects that are necessary for developing affect-aware and affective solutions.

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