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**Information technology — Affective
computing user interface (AUI) —**

**Part 2:
Affective characteristics**

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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC1, *Information technology*, Subcommittee SC 35, *User interfaces*.

A list of all parts in the ISO/IEC 30150 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

Introduction

Affective computing builds a harmonious human-computer environment by enabling computing systems to recognize, interpret, and simulate human affects. Affective applications promise new insights into what people are feeling and can better serve their needs. It is important to consider affective characteristics of humans in the design and presentation of affective computing user interface (AUI).

Limitations on affective computing include diverse affective characteristics currently used and the way to interpret and identify these affective characteristics. A general and systematic technical report is needed to identify and distinguish different affective characteristics in different levels within human-computer interaction regarding usability and accessibility.

This document identifies a range of affective characteristics that are designed for development of affective computing. This can be a general principle for affective computing user interface. It also provides references to the selection of specific characteristics of particular interest, and to the identification of affective characteristics in affective computing user interface (AUI).

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Information technology — Affective computing user interface (AUI) —

Part 2: Affective characteristics

1 Scope

This document identifies the affective characteristics for affective computing user interface (AUI), including universal, cultural, individual and situational issues relating to the affective needs of users. This document also describes the selection criteria of these affective characteristics, and the methods to identify or apply them.

This document focuses on developers of affective computing user interfaces who want to meet the needs of users.

This document does not specify the implementation of affective computing.

2 Normative reference

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

3.1

affective characteristic

particular type of affect that is believed to be useful

Note 1 to entry: A complex compound of interests, attitudes, and self-views. Affective characteristics are considered as properties that are used to describe users' affective experience in AUI.

[SOURCE: ISO/IEC 30150-1:2022, 3.3, modified — A note to entry has been added.]

3.2

affective

relating to moods, feelings, and attitudes

3.3

satisfaction

extent to which the user's physical, cognitive and emotional responses that result from the use of a system, product or service meet the user's needs and expectations

[SOURCE: ISO 9241-11:2018, 3.1.14, modified — Notes to entry have been omitted.]

3.4

cognition

mental actions or processes of acquiring knowledge and understanding through thought, experience, and the senses

[SOURCE: ISO 21801-1:2020, 3.2]

4 Organizing affective characteristics

This document organizes affective characteristics in terms of how broadly they apply:

- a) Universal – relating to all users
- b) Cultural – relating to well-defined groups of users
- c) Individual – relating to single users, combining to make each user unique
- d) Situational – relating to a single user only in some situations

The organization of this document is one possible way of identifying and organizing affective characteristics. There are many other possible groupings of affective characteristics, and this grouping has been chosen because it clearly distinguishes between emotions (which are situational) and other major types of affective characteristic.

This document focuses on a selection of characteristics that are particularly likely to be dealt with in affective computing applications, but that there are many other possible ones that can also be used.

Affective characteristics are considered in the affective domain. Both the affective domain and the cognitive domain are related to affective computing applications, see [Annex A](#).

[Clauses 5](#) to [8](#) describe universal, cultural, individual and situational affective characteristics, respectively.

5 Universal affective characteristics

5.1 General

Universal affective characteristics refer to affective characteristics that affect all people equally and at all times. These characteristics are based on human needs and can be identified and treated in a similar manner for all users.

5.2 Hierarchy of human needs

According to Maslow's hierarchy of needs, there are a set of affective needs that are shared by all humankind, including:

- a) Physiological needs: the needs for basic physical stability by the provision of food, clothing, shelter and other basic physical needs.
- b) Safety and security needs: the needs to ensure that a person will continue to have their physiological needs met and that they will be free from threats of harm.
- c) Belonging needs: the needs for the individual to have family and friends.
- d) Esteem needs: the needs for receiving the esteem of others, having self-esteem, and even providing esteem to those others who have earned it.
- e) Self-actualization: the needs for realizing personal ideal and ambition and giving full play to personal ability.

Maslow assumed a person's needs can be satisfied at lower levels before a person will concentrate on meeting needs at a higher level. But this trend of needs is not completely fixed, it can change under different circumstances. Individual differences in the level required to satisfy an individual's needs occur between different users.

5.3 Human needs and application designs

5.3.1 General

The designers and developers can take considerations in users' needs and motivations involving in a certain system or application.

5.3.2 Application designs for each level of needs

Physiological needs can disrupt computing processes, which cannot readily be predicted for most users. The guidance for designers and developers is that tasks can either be short or easily interruptible so that users can attend to physiological needs when they arise.

The need for safety and security demands designer to seek and prevent potential threats of applications from users, which can cause anxiety and feelings of inadequacy.

The users unsuccessful in achieving sense of belonging usually turn to new groups. Social applications and systems that provide groups and communities can help these users fill the need of belonging with inner communications and mutual commitments.

Esteem usually can be receiving within the systems or applications from users themselves or others. Apps and webs can use the need for esteem to motivate users by means of communication tasks that can provide opportunity for users to increase esteem from others and tasks that can help users succeed in completing to increase self-esteem and avoiding decreasing self-esteem.

Self-actualization involves being fulfilled and doing what one "is fitted for". Apps and websites can avoid attempts at faking motivations that might appeal to self-actualized people, since they are likely to discover the fakes anyhow. Rather, apps and websites will find that honest disclosure of intent and providing quality content that meets widespread needs will be most motivating to self-actualized people.

5.4 Applying hierarchy of needs

Even though the needs in the hierarchy can be in different levels, some activities in a lower level can also satisfy some higher-level needs. The overlap of different levels of needs and motivations can help find the substitutes for other activities or designs.

The hierarchy of need is also important in its concept of satisfaction of specific motivations and needs. It suggests that individuals determine unique levels at which they consider a need to be satisfied. There is little or no motivation for them to go beyond that level. This same relationship holds true for functionality and usability. Users will shift their attention from functionality to usability once a basic level of functionality is achieved. They might again shift their focus once a basic level of usability is achieved to more specific motivations. At this point, further changes cannot be allowed to bring either factor below its basic required level.

6 Cultural affective characteristics

6.1 General

Culture is a set of customs, traditions and values shared by members of a society, community, organization or other groups. Cultural issues relate to well-defined groups of people at all or most times. Cultural issues affect large groups of people (at all or most times) and are different for different groups of people.

6.2 Cultures as a source of belief and action

Cultures teach their members beliefs and methods/actions of responding to a variety of situations. While these beliefs and actions are generally based on widespread experience of members of the culture, they can be as dependent on the affective experiences as they are on the factual experiences of those members. These beliefs and actions are shared among the members.

It is difficult to try and evaluate these characteristics (loyalty, susceptibility, conformity, obedience to authority) because individuals can have and apply these characteristics at either a public or private level. These characteristics can vary depending on the particulars of a given situation. It is easier to evaluate the potential consequences of individuals acting on the beliefs and with the methods of different groups.

6.3 Recognizing the effects of cultures

There are two basic approaches to recognizing the influences of a culture on an individual: an exclusive approach and an inclusive approach.

The exclusive approach assumes that one culture will always take precedence over another culture. Given a situation, response can be made by individuals based on the beliefs and methods exclusively from user groups, dominant social group, personal experience and other social groups in sequence.

The inclusive approach requires that each social relationship of individuals can and may affect the responses of an individual to a given situation. It also recognizes that different cultures will take precedence, intentionally or unintentionally, at different times. Actual precedence is based on the importance of the current relationship to the task and the importance of relevant beliefs from that culture to the individual.

6.4 Cultures and designs for user interfaces

The major types of cultures include family relationship, ethnicity and nationality, religion, professions, business relationships, organizational relationships, and casual relationships.

The types of cultures indicate similarities, diversities and needs of certain groups of people. Considerations can be taken once the cultures that users involve have been recognized.

Membership in a family generally develops over a long period of time with loyalties and expectations. Family affiliations can be considered in the design of many applications and websites. Social computing applications can be performed in a family setting or for family purpose. Users cannot be made to choose between their loyalty to their families and loyalty to another social grouping.

Ethnicity and nationality mean different values, myths and laws, which regulate the members in some manners, reflecting the certain symbols and taboos. Once the ethnicity and nationality are recognized by designers and developers, the systems and applications can follow the rules of conducts of certain ethnicity and nationality.

The designs of application concerning religions are similar to that concerning ethnicity and nationality. Additionally, the religious controversies and denominational biases can be avoided since the religious culture.

Various professions and occupations have developed their own cultures to deal with issues within their "professional" scope of interest. These cultures can act similarly to how ethnic and national cultures act, and due to their large number of members can be treated in a similar manner.

There are an infinite set of possible business relationships, organizational relationships, and casual relationships that can provide cultural effects on individuals. However, like families, their large number of members makes it infeasible to utilize these relationships in affective computing.