# ValueML: A Proposal for Representing Values Embedded within Web Resources

Elio Toppano
Dipartimento di Scienze Matematiche, Informatiche e Fisiche (DMIF)
Università di Udine,
Udine, Italy
e-mail: elio.toppano@uniud.it

*Abstract*— **Growing on recent research work in the fields of Value Sensitive Design, Design for Well-Being and Disclosive Computer Ethics, this paper focuses on values embedded in multimodal web resources during the design and development processes. They are inscribed within the artifact as symbolic meanings or as a built-in use consequence. We propose a preliminary version of a markup language, called ValueML, that may be used for value representation and annotation. After a brief review of various perspectives on the concept of value and relevant taxonomies and vocabularies, we discuss the syntax and semantics of ValueML together with examples of manual annotation of video commercials.**

***Keywords-value; annotation; semantic web; markup languages.***

## I. INTRODUCTION

This paper addresses the issue of values embedded in web information resources, their representation and annotation. It is an elaboration and extension of previous work presented in the IARIA Sixth International Conference on Building and Exploring Web Based Environments [1].

We are interested in how ethical, political, aesthetic and cultural values (to name only a few types) are, intentionally or unintentionally, constructed and articulated during the design and development of a product; how they are actually inscribed within the artifact and materialized through various semiotic resources (e.g., written and spoken texts, still and moving images, music and sound effects); how the values can be used for resource annotation and exploited in content retrieval, filtering, repurposing and reuse.

The need for value annotation of information resources is present in several application domains. In the fields of Marketing and Brand Communication, for instance, values constitute an important component of websites, commercial videos and advergames. They may refer to the advertised good or service (i.e., a value proposition) or, more generally, to a company's brand identity (i.e., the brand core values) and brand world (i.e., the brand world ethos).

Political parties, religious communities, non-profit organizations as well as social activists focus on values as one of the fundamental content and theme of their messages in designing websites and blogs. The project Values at Play (VAP), for example, is an initiative aimed at investigating how social and political values can be intentionally embodied in a digital game's architecture, interaction paradigm, and mechanics [2].

In the same vein, Value Sensitive Design [3], Value Centered Design [4], Design for Subjective Well-Being [5], Disclosive Computer Ethics [6] and Design for Sustainability [7] explore conceptualizations and methods for consciously addressing human values and related ethical concerns during the analysis and design processes of information systems.

All these initiatives assume that artifacts (and technologies, in general) are not morally neutral and that it is possible to identify *tendencies* in them to promote or demote particular values, and norms [6]. Such tendencies are embedded in the artifact in the sense that they can be identified and studied largely or wholly independently of actual uses of the artifact, although they manifest themselves in a variety of uses of the system (not necessarily in all uses!).

In addition, values are an important component of national, organizational and professional cultures. Therefore, independently of explicit design intentions, values are inevitably inscribed within information resources as a reflection of the culture of their clients, designers and developers (Culture *in* Design). Furthermore, communicative artifacts may be intentionally designed to adapt to the culture of target users (Design *for* Culture). This is at the base of the localization of web resources, a challenging issue addressed by several approaches in the field of cross-cultural design. The explicit representation and annotation of values present advantages in both cases: on the one hand, it forces the designers and developers to reflect on the intended or unintended values and the way they are embedded in their products; on the other hand, value annotation facilitates the identification and selection of those resources that are more appropriate for a target culture.

In spite of the growing interest on values manifested by several research studies, there is not yet a markup language and a value ontology or taxonomy that can be used for annotation of textual documents and multimodal resources on the web. This is a little disappointing considering the efforts that have been made, in the past, to model other experiential concepts such as pleasure, emotions, opinions and sentiments [8] [9]. The present work is a preliminary proposal aimed at filling this gap.

The paper is organized as follows. In Section II we discuss the concept of value from different perspectives and we illustrate available taxonomies and vocabularies of values. Next, in Section III we state the scope and the aim of the study. The main requirements of a language for value

annotation are, then, introduced in Section IV together with a possible solution, i.e., the ValueML. Section V is devoted to illustrate an example of annotation in the domain of video advertising. To this end, two paradigmatic cases have been selected among those used in the experimental activity made, so far. Section VI discusses some limitations and problems emerged during the assessment process of the current version of the language. Finally, in Section VII, some conclusions highlighting the benefits of value annotation are reported.

## II. STATE OF THE ART

### A. Defining value

The concept of value has several meanings according to the specific perspective from which it is considered. Looking at existing literature [10] [11] [12] [13] [14] [15], the term "value" has been interpreted variously as:

- an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end state of existence (i.e., value as enduring belief system);
- the monetary sacrifice people are willing to make for a product (i.e., value as exchange);
- the utility of the physical properties of the product, which is realized only upon its use (i.e., value as perceived utility);
- an indicator of how much one desires a product or fears of loosing it (i.e., value as attachment);
- an index of social status, lifestyle, modernity (i.e., value as sign or meaning);
- an indicator of how the interaction with a product is aesthetically, cognitively or affectively worth to be made (i.e., value as good experience).

In his Value Theory [13], Schwartz, defines values as "desirable, trans-situational goals, varying in importance, that serve as guiding principles in people's lives". Most importantly, he identifies five main features of the conception of value that are implicit in the works of many theorists and researchers:

- values are beliefs tied inextricably to emotions;
- values are a motivational construct. They refer to desirable goals (e.g., idealized qualities or conditions in the world) people find good and strive to attain;
- values transcend specific actions and situations;
- values serve as standards or criteria to guide selection or evaluation of action, policies, people or events;
- values are ordered by importance relative to one another.

One aspect worth highlighting is the relationship existing between values and behavior. As claimed by Rokeach: "... values are determinants of virtually all kinds of behavior that could be called social behavior or social action, attitudes and ideologies, evaluation, moral judgment and justification of self to others, and attempts to influence others" [15].

Given the polysemy of the term value, one critical problem when using this concept for content analysis is to decide which interpretation is relevant for the purpose at hand. In addition, there is the need to disambiguate among different concepts that are in some way correlated such as values, needs, desires, preferences, and goals (see for example [10]). For some scholars values are abstract, desirable trans-situational goals; for others they are relatively stable individual preferences that reflect socialization; yet others consider values as cognitive representation of needs.

Another issue regards the classification of values. In [16] Brey illustrates an articulation of axiology - a branch of philosophy concerned with a general analysis of value - that provides structure and overview to relevant values belonging to traditional theories including cultural values of Theories of Good applied to new media. Figure 1 schematizes this classification.

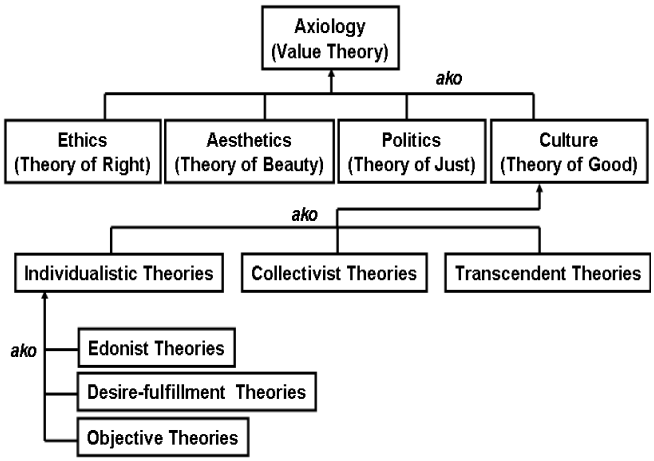


Figure 1. A classification of values according to Brey [16].

As shown in the figure, axiology can be decomposed into four main fields each one devoted to a specific type of value: Ethics concerning with the *right* (i.e., the understanding of what kinds of actions are right and, therefore, obligatory and which ones are wrong and, therefore, impermissible); Aesthetics concerning with the *beautiful*; normative Politics concerning with the *just* (i.e., the understanding of how the state ought to operate in relation to its citizens and how it should distribute powers and goods); and Theories of Good concerning with the sort of things in life that are considered *good* and, thus, worth striving for such as well-being, happiness and personal flourishing (i.e., eudaimonia). In particular the individualistic study of well-being has yielded three major types of theories namely hedonist (well-being consists of the presence of pleasure and the absence of pain), desire-fulfillment (well-being lies in the fulfillment of one's desires) and objective theories (well-being is the result of objective conditions of persons such as liberty, friendship, autonomy, wisdom, etc.). Collectivist theories hold that the greatest good is not the good of individual human beings but the good of a community or society at large; Transcendent theories point to one or more transcendent state-of-affairs or qualities that are held to constitute the highest good such as

the glory of God, the natural order of things, eco-systemic integrity, knowledge or information.

*B. Value inventories and taxonomies*

What emerges from research literature is that a unified theory or model of values currently does not exist. Available proposals differ along several dimensions, including:

- *representational approach*: the simplest and most wide-spread approach is the *categorical* approach that uses a word/label to represent a value. An alternative approach is the *dimensional* one that tries to capture the essential properties of values, by positioning them on a continuous space spanned by two or more dimensions. Holbrook, for example, proposes intrinsic-extrinsic, self oriented-other oriented, and active-reactive, as the main dimensions for classifying values [17];
- *purpose*: most of the proposals have been designed for survey research; only few have been applied to content analysis [14];
- *scope of application*: proposals span a wide range of scopes and application domains. Some proposals regard personal or individual values; some represent the values of groups of people, communities of practice or interests, institutions or companies, others focus on national values. Domains include psychology and social research; professional ethics (e.g., the values that guide the day-to-day activities of business managers), marketing and advertising; design, technology, and more;
- *number and type of distinct values*: proposals widely vary in the number of specific values (or dimensions) that are considered relevant;
- *structural organization of values*: most proposals are unstructured lists or inventories of items representing different types of values; others present hierarchical structures or taxonomies. Some proposals distinguish between instrumental and ends values; some organize values according to similarity/affinity or opposition/contrast relationships. Yet other proposals use part/whole relations (i.e., mereologies) to represent both elementary and aggregate (or composite) values;
- *conceptual definitions*: few proposals provide a clear and accurate definition of value categories or dimensions. Therefore, there are ambiguities (i.e., multiple interpretations of values), and "semantic confusion" both within and across the various proposals;
- *terminological realizations*: proposals use different vocabularies for denoting value categories. In some cases, the same term/label is used, within different vocabularies, for representing different value concepts (a case of homonyms). As an instance, the term "autonomy" is defined, within Value Sensitive Design [18], as: "people ability to decide, plan, and act in ways that they believe will help them to achieve their goals". The very same term in [19] is used to denote: "feeling that one's activity is self-chosen and self-endorsed". In other cases, different terms are used to denote the same value concept (a case of synonymy). What is termed "autonomy" in one vocabulary [19] is denoted by "self-direction" in another proposal [13]. Moreover, some terms (e.g., autonomy, self actualization) are common to various proposals while others (e.g., informed consent, humor) are present only in some specific vocabulary;
- *homogeneity/heterogeneity*: some inventories represent homogeneous values; others merge values having different nature such as hedonic values (e.g., pleasure) with ethical (e.g., morality, virtue), political (e.g., justice), and cultural values (e.g., life quality, happiness) or different generality or aggregation levels. Some examples are as following.

Schwartz proposed a set of fifty-six human values that are organized into ten basic categories: self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence, and universalism [13]. These categories constitute a circular pattern where congruent values (e.g., achievement and power) are located on adjacent positions while conflicting values (e.g., achievement and benevolence) on opposite sides. At a more general level, basic categories are aggregated into four macro-categories, namely, openness to change, self-transcendence, conservation and self-enhancement.

Boztepe, focusing on user's values, proposed a classification including nineteen different values organized into four main categories namely, utility, social significance, emotional, and spiritual [11].

Value Sensitive Design uses a flat list of values to be used in computer systems. Examples are: privacy, freedom from bias, informed consent, accountability, property rights, to name only a few [3].

Specific taxonomies have been proposed in marketing [20] and in game design [21]. Floch, for example, distinguishes four types of product values - practical, critical, utopian, and ludic values - that are at the base of the main marketing strategies. Flanagan et al. use a set of seventeen values (e.g., diversity, justice, inclusion, equality, environmentalism, creativity, trust, etc.) for the analysis and design of digital games. Recent research in Positive Design focuses on hedonic values (e.g., pleasure) and eudaimonia (e.g., personal flourishing) [5].

It should be clear, from the above discussion, that it is difficult to select a proposal as a common reference standard or to create a shared standard by combining elements from existing vocabularies. Ideally, for content annotation in a given application domain, an adequate *value ontology* (i.e., conceptualization and vocabulary) should be manageable, that is, it should contain the minimum number of relevant value categories for the task at hand, and minimize conceptual ambiguity and redundancy by making each value concept unique and independent from the other concepts. For example, concepts such as "achievement" and "success" may be ambiguous when they are in the same inventory. However, by synthesizing them under the concept of "accomplishment" may avoid the ambiguity. A prerequisite

is that values do not remain underdeveloped: their nature and meaning must be clearly defined and distinguished. This is an important step for applications in the Semantic Web field. As a final remark it should be noted that a value inventory or taxonomy not only displays what values categories are available for analysis but also provides a descriptive tool for researchers to focus their discussion about values.

## III. SCOPE AND AIM OF THE STUDY

### A. The values inscribed within a web resource

Figure 2 shows the general framework we have adopted for communication-based design [22]. It accounts for the real sender and receiver. They are connected by means of an instrumental medium - a device such as a PC, a tablet or a smart phone and a channel such the Internet - that enables the circulation of a web resource. By the term *web resource* we mean an information object (e.g., a message) that is realized by at least one accessible web representation and encoded in a media type.

The sender is involved in the design and realization of the web resource. It is usually a team including, for example, the designers and developers as well as the client, sponsor and firm/company. The interaction between the sender and the resource takes place within a production context involving space-time location, the organizational and socio-cultural environments with roles, norms, policies, standards and technologies.

The receiver, an individual or a group, interacts with the resource within a context of use that may, or not, be synchronized with the production one as in the case of different cultural contexts. In this framework the web resource plays the role of a *mediator* between the intentions of the sender and the interpretation of the receiver.

We shall focus on the production context of the above framework: we are interested in the values that are inscribed (or embodied) within the resource as a kind of meaning during its design and development. We call these values the "values *in* the product" to distinguish them from other kinds of values such as, for example, the economic value of the product (i.e., its exchange value), the value that a resource gains passing through a chain of activities (i.e., the value chain) or the value of the product as experienced by a user during its use (i.e., the perceived use value). These interpretations can be referred to as the "value *of* the product".

The values in the product have different sources. Some values are strictly related to the stakeholders (the firm, the designers, or the users). These include, for example, the values that are associated to the personality of a brand, its identity, the brand world's ethos or the assumed values of the target user group to whom the message is directed. These values are usually explicitly expressed by a set of non-functional requirements. As an instance: to design a video commercial or a website to promote the core values of a company or to resonate with the cultural values of a specific community of practice or interest.

Other values (called collateral values) are, intentionally or unintentionally, embedded within the web resource as the result of specific design or implementation decisions. It should be noted that a design solution is always under-determined by specific functional requirements leaving to designers and developers numerous open-ended alternatives as they proceed through the process, including some that implicate values [23].

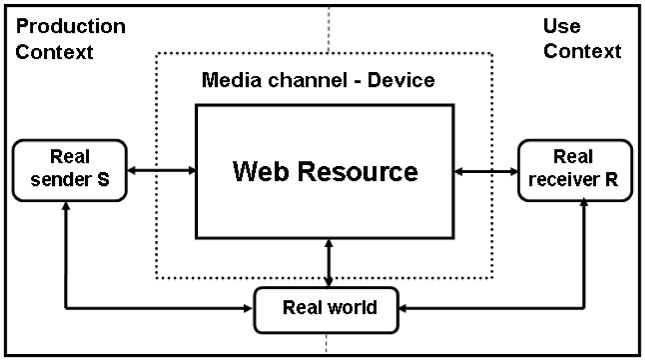


Figure 2. The communication-based design framework adopted in the study.

The selection of an alternative solution with respect to another is guided by criteria that are often value-laden and reflect the personal or professional beliefs, preferences, cultural milieu of these persons.

In the case of information resources, design decisions may refer to several aspects such as, for example, i) the adopted conceptual model or metamodel of the resource; ii) the articulation of content meaning; iii) the kind of semiotic media used for meaning presentation or expression, iv) stylistic choices (e.g., space-time layout of information, colors, typography); (v) the specific technologies employed during the implementation of a design solution, and vi) the definition of intended use in the destination context.

Here are some examples. The adoption of the Semantic Markup for Web Services (OWL-S) instead of the Web Service Modeling Ontology (WSMO) reflects different values and has different ethical implications as discussed in [24].

In a narrative commercial clip, ethical or aesthetic values can be inscribed in the story (content) or in the visual and auditory qualities (expression); in a digital game they can be embodied in game mechanics (e.g., in game elements, actions, rules, reward system), game dynamics (e.g., player's point of view, course of action) or experience (e.g., game atmosphere, narrative theme, expressed or induced emotions).

According to [6], it can be useful to distinguish the following two main cases:

- an information resource may be expressive of values (i.e., *expressive conception* of embedded values) in that it contains symbolic meanings that refer to values. These values may represent the values of designers, clients or users;
- an information resource may have embedded values understood as special kind of built-in consequences. This conception (i.e., *causalist conception* of

embedded values) relates values to causal capacities of the resource to affect the environment. In other words, the resource use causes a state of the world that realizes some kind of value. In Persuasive Technologies [25], Design for Sustainable Behavior [7], and in applications inspired to Nudge Theory [26], values are directly related to the intended behavior or state we want to be enabled, induced or fostered in users.

Of course, the fact that a resource is expressive of values does not imply that it also functions to realize these values. Whether this happens or not remains an open question.

### B. The problem addressed: value analysis and annotation

Generally speaking, value taxonomies and vocabularies can be exploited in four different use cases:

- manual annotation of multimodal resources with inscribed values. By *multimodality* we mean the use of two or more representational modalities (or semiotic "languages") to express the content of an information resource. An example is to identify and represent the values communicated by the visual (i.e., written text, images) and auditory (i.e., spoken language, music, effects) tracks of a video commercial;
- automatic value detection and classification. The goal, here, is to model the means-ends relationships existing between measurable features of multimodal artifacts and abstract constructs such as value concepts. An example is to infer the values that are at the base of behaviors or situations depicted by an image; or to infer the values that produce certain emotions expressed by the characters of a story;
- value generation, that is, simulation of specific values by an appropriate selection and composition of multimedia content and expression. An example is to select the actions of the characters of a story that best communicate some specific values;
- value assessment, that is, the use of value inventories for empirical tests aimed at measuring how people would rank or rate the relative importance of items in the given list of values. An example is to profile a group of individuals to adapt the design of a new resource to their values.

An important aspect that is exploited in automatic detection and generation is that values have been acknowledged as a key predictor and explanatory factor in investigating human and social dynamics.

Our study focuses on the first use case. The problem we intend to address is, thus, the following: to design a general-purpose language for the manual annotation of values inscribed within a multimodal resource.

The language should let the annotator to define the scope of a value annotation and to describe the value itself by referring to a specific and shared vocabulary. Notice that, the focus is on message production rather than use. This is not to deny that annotations made by the users are important. Simply, social tagging comes after the product has been developed and published and has different goals. It may be used, for example, to assess the effectiveness of intended value communication.

We envisage several possible ways in which the annotation could be used including:

- retrieval and selection/filtering of resources or part of them on the base of intended embodied values. It may be possible, for example, to annotate specific fragments of a multimodal resource with intended values and then retrieve the fragments using the values as keywords;
- reuse of a resource for new goals or contexts (i.e., repurposing). The identification and value annotation of multimodal fragments enables a designer to reuse the content of the fragment for new goals/objectives or in new communication contexts;
- exploitation of design knowledge embodied within an artifact for new products. Linking values to fragments is a way to explicitly represent how values are communicated in *that* artifact. This knowledge is design knowledge that may be used as inspirational for innovative products and design solutions;
- construction of a shared data base of value annotation resources that can be used as a ground base or training set for automatic recognition of values or for scientific research.

## IV. THE VALUEML LANGUAGE

### A. Language requirements

The following is an initial list of requirements for the development of a language for value annotation. They are based on an understanding of the needs arising from concrete scenarios of manual annotation of multimodal texts. We have structured requirements according to a specific model of annotation that distinguishes among: 1) *annotated data* (i.e., the subject or target of the annotation), 2) the *annotating data* (i.e., the object or body of the annotation), 3) the *annotation relation* (i.e., a predicate that defines the type of relationship existing between annotated and annotating data) and 4) the *context* in which the annotation is made [27]:

- *Annotated data*. The desired language should allow the annotator to associate values to an entire resource or to specific parts of it at different aggregation levels. This requires a mechanism for addressing spatiotemporal segments of the resource (e.g., a part of an image, text section, video or audio segment). In addition, it should be possible to annotate different semiotic modalities (e.g., written texts, spoken words, still images, music, videos). Values can be communicated in sequence or in parallel (i.e., simultaneously); within a single modality or multiple modalities so the language is requested to provide means to address all these possibilities.
- *Annotating data*. The desired language should allow the annotator to use a wide range of value types (i.e., categories) and taxonomies. We are interested in moral, ethical, political, aesthetic, and cultural values. As discussed in the previous sections any attempt to standardize the description of values using

a finite set of fixed descriptors is doomed to failure: even scientists cannot agree on the numbers of relevant values, or on the names that should be given to them. Given this lack of agreement on value descriptors and classification, the only practical way to tackle this problem is to allow annotators to "plug in" vocabularies that they consider appropriate for their applications. As a consequence, the language should be sufficiently flexible and modular so that the appropriate vocabulary of descriptors for the target use can be chosen. The aim is also to make scientific concepts of values practically applicable. Available alternatives that have been developed in literature are not sufficiently known, so people generally use a restricted set of not well defined values without asking themselves if they are the most appropriate choices for the application at hand.

- *Annotation relation*. It should be possible to explicitly represent the functional role played by the object with respect to the target of annotation. Moreover, the language should allow the annotator to represent means-ends relationships linking values to their material realization in the given resource. A means-ends chain can be followed in two directions: top down from a value to specific resource features in order to understand *how* the value has been materialized in the resource; bottom up, from specific features to values in order to understand *why* the resource has been design the way it is. This information can be used to unfold design knowledge embodied in a given resource. In addition, if values are viewed as a kind of meaning then they may be dispersed across content (e.g., narratives, denotative and connotative meanings) as well as expression (e.g., visual and auditory qualities). As an example, brand values and brand ethos could be communicated by a storyline while aesthetic values by the product look and feel.
- *Context*. The language should allow the representation of contextual information including: i) general metadata regarding the type of annotated resource, its location, the author of the annotation, the intention and the method of annotation, etc. ii) a measure of relevance (importance) of a given value with respect to the other values within the same resource; iii) a measure of confidence in the accuracy of the annotation. It should be noted that the expression of a value in an informational resource may be masked by another one, it may be inhibited, minimized or even exaggerated. Therefore, the human annotator needs to indicate the degree of importance and confidence that a certain attribution is correct.

Additional requirements regard: i) a compatibility with the broad range of existing value theories; ii) the interoperability of the desired language, i.e., the possibility to embed it in other markup languages (e.g., EmotionML, SMIL); iii) extensibility, i.e., the possibility to extend the language in order to satisfy future use cases and thus avoid rapid obsolescence. The following section describes the main features of a draft language proposal intended to satisfy most of the above design requirements.

### B. Language syntax and semantic

In developing the ValueML language we take inspiration to the recent W3C initiative of EmotionML for the annotation of emotions [8]. ValueML may be seen as a complementary tool for describing experiential and socio-cultural aspects of web resources. The language uses an XML-based syntax. Table I illustrates the main elements of a document structure. The root element of a standalone ValueML document must be `<valueml>`. It may contain a single `<info>` element, providing metadata regarding the annotated information resource such as, for example, its media type, name, description, or web location. The `<info>` element may be followed by the declaration of a controlled vocabulary specifying the set of value labels (or categories) that can be used in the annotation. We draw on existing literature to propose the set of value categories. One or more value annotations may follow that are self-contained within the `<value>` element. One of the envisaged uses of ValueML is to be used in the context of other markup languages. In such cases, there will be no `<valueml>` root element, but `<value>` elements will be used directly in other markup. In order to address these cases the `<value>` element has been provided with the attribute "`vocabulary-set`" for specifying the URI of the external vocabulary to be used. Each value annotation includes two children elements namely the `<category>` and the `<reference>`. The `<category>` element has three attributes (see Table II). The attribute "`name`" is used to specify a value. Its content must be an item of a controlled vocabulary (internal or external to the document).

The attribute "`relevance`" is used to express the relative importance of the value with respect to other values embodied within the resource. This information is described by a floating-point number in the close interval [0,1]. Finally, the attribute "`confidence`" is used by the annotator to express his or her confidence that the annotating value is correct. Again, this information is described by a floating-point number in the close interval [0,1].

Similarly, the `<reference>` element has three attributes (see Table III). The attribute "`uri`" is used to refer to the annotated resource or part of it. Its content must be a Media Fragment URI [28] consisting in four parts:

```
<scheme name>:<hierarchical part>
[?<query>] [#<fragment>]
```

There are, therefore, two possibilities for representing the media fragment addressing URIs: the URI query part, or the URI fragment part. For dynamic resources such as sound objects or videos, segments are represented by time intervals. An interval is denoted by specifying begin and end times, e.g., t=t1,t2 where ti is expressed in seconds and milliseconds according to NPT (Normal Play Time). For static resources such as images, segments are represented by regions. A region is denoted by a rectangular selection, e.g.,

xywh, where x,y represent the top, left corner of the selection and w and h denote width and high, respectively.

The attribute "`role`" specifies the type of relationship existing between the annotated and annotating information. Currently, we suggest two possible instances: a value *is signified by* a resource or a value *is expressed by* the resource. The rationale is that we adopt a semiotic stance according to which an information object can be viewed as a structured system of signs constituted by a content layer (the signified) and an expression layer (the signifier).

Finally, the attribute "`modality`" can be used to describe *how* the value is communicated. It allows the annotator to specify the representational modality used for value communication (e.g., written text, sound objects, images or videos) and the specific features that are used for the task. As an instance, an image can be read in terms of plastic features (i.e., shapes, colors, textures, positions, orientations, sizes) or in terms of figurative elements (i.e., the objects, persons, actions, and scenes depicted in the image). Both kinds of readings may by used to convey values. Currently, we have identified a limited set of possible instances of the "modality" attribute including: by *storylineContent*, by *imageExpression*, by *imageContent,* by *soundObjectContent*, to name but a few. Tables II and III summarize the main features of the above discussion. Table IV illustrates the main elements used by ValueML to define a value vocabulary as a list of items representing value categories. The `<info>` element can be used to specify metadata associated to the vocabulary, e.g., the scope and purpose of the inventory. Currently, the type of vocabulary must be a categorical one.

## V. CASE STUDIES

In order to assess the feasibility of value annotation with ValueML in concrete cases we focused on annotation of video commercials. Video commercials are a particular subclass of audio-visual resources that are characterized by specific properties in terms of: purpose, form, editorial context and use. Generally speaking, video commercials are designed to promote goods, services, ideas, brands or persons (e.g., politicians). This can be done by using several forms of appeal (i.e., logos, ethos and pathos) and different rhetorical strategies including analytical (e.g., logical argumentation) and narrative processing (e.g., storytelling) [29]. In particular, it has been shown that narrative advertising is particularly effective in persuasion (e.g., belief change) due to the transportation effect that has been studied and empirically demonstrated by [30].

To give an example of value annotation, we have selected two paradigmatic cases. The first case - the Citroen BX ad campaign - is a narrative video promoting a specific model of car by describing an experience of use of the good. The second case - the Thai Insurance ad campaign - is a narrative video that does not advertise a specific product or service but is aimed at communicating the core values of the Thai Insurance brand using a story. The following sections describe each case in detail. In both cases annotation is preceded by an analysis of the clips that is driven by a semiotic metamodel of the video as discussed in [27] [31]. The metamodel distinguishes four interrelated levels of analysis (Figure 3): i) the textual level representing the concrete/physical manifestation of the video content in terms of audio-visual features; ii) the discourse level referring to thematic, figurative, rhetorical aspects; iii) a shallow narrative level describing the story told by the video in terms of abstract roles (called actants) and narrative schemes (e.g., the narrative canonical scheme), and, iv) a deep narrative level that uses a specific tool called semiotic square to articulate deep semantic meanings such as narrative values (axiology). Signification unfolds by crossing these levels from shallow features of the video to the most abstract and deep ones. This metamodel is particular interesting because it explicitly represents the values inscribed in the product and relates these values to the storyline content and expression (i.e., sensorial qualities). Value annotation concerns the deep Semio-Narrative level.

### A. The Citroen BX ad campaign

The clip selected for analysis and annotation represents a well-known ad campaign by Citroen [32]. It was produced in 1982 to advertise the BX model. The video lasts 47 s. It is constituted by a sequence of 18 shots. The narrative is based on a *valorization process*. By this term we intend a process by means of which an object/service (a car model in this case) is staged in a way that emphasizes (i.e., gives value to) some attributes of the object with respect to others according to specific consumer's values. Therefore, content annotation must be based on a classification of this kind of values. A possible choice is the model proposed by Floch [20].

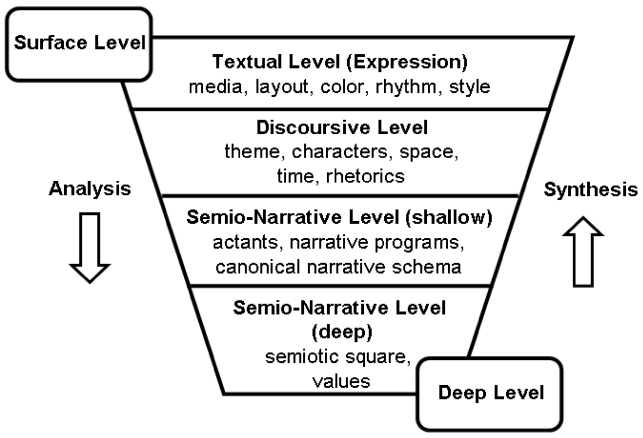


Figure 3. A schematic view of the metamodel used for the analysis of narrative video commercials.

In his model, consumer's values are classified into four classes namely, practical, critical, utopian and ludic values. They represent the vertices of a semiotic square (see the bottom of Figure 3). Briefly: practical values refer to utility, usefulness; critical values to convenience, performance, quality; utopian values to identity, reflection, social relations, and ludic values to surprise, madness, astonishment, irony and pleasure including aesthetic pleasure.

TABLE I. MAIN ELEMENTS OF A VALUEML DOCUMENT STRUCTURE.

| **Annotation** | <valueml> |
|---|---|
| **Definition** | The root element of a ValueML document. |
| **Children** | The element may contain a single <info> element providing metadata about the annotated resource. It may contain one or more <vocabulary> elements. It may contain one or more <value> elements. |
| **Attributes** | Required:<br>• version: indicates the version of the specification to be used in the document. Documents using this specification must use 1.0 for the value.<br>• namespace: declaration for ValueML. |
| **Occurence** | This is the root element; it cannot occur as a child of any other ValueML element. |

| **Annotation** | <value> |
|---|---|
| **Definition** | This element represents a single value annotation. |
| **Children** | The element must contain a single <category> element followed by a <reference> element. |
| **Attributes** | Optional:<br>• vocabulary-set: a URI indicating an external repository of value vocabularies and the specific vocabulary to be used. Note: this attribute is requires if no vocabulary is declared within the ValueML document. |
| **Occurence** | As a child of <valueml> element. |

TABLE II. THE <CATEGORY> ELEMENT.

| **Annotation** | <category> |
|---|---|
| **Definition** | Description of a value using a category name. |
| **Children** | None. |
| **Attributes** | Required:<br>• name: indicates the name of a value category, which must be contained in the declared vocabulary.<br>Optional:<br>• relevance: specifies the importance of a value. It must be a floating-point number in the closed interval [0,1].<br>• confidence: the annotator's confidence that the annotation given for this category is correct. It must be a floating-point number in the closed interval [0,1]. |
| **Occurence** | As a child of the <value> element. |

TABLE III. THE <REFERENCE> ELEMENT.

| **Annotation** | <reference> |
|---|---|
| **Definition** | This element is used to relate a value to the annotated resource or part of it. |
| **Children** | None. |
| **Attributes** | Required:<br>• uri: a URI indicating the actual reference target. The URI may be extended by a media fragment or a media query.<br>Optional:<br>• role: specifies the type of relation between the value and the external item referred to. Its content must be one of "signified_by", "expressed_by".<br>• modality: describes the modality through which a value is signified or expressed. Possible instances are "by_storylineContent", "by_imageExpression", "by_imageContent", "by_soundObjectContent", "by_soundObjectExpression". Note: the above list is an open set to allow for a more fine-grained distinctions. |
| **Occurence** | As a child of <value> element. |

TABLE IV. THE <VOCABULARY> AND <ITEM> ELEMENTS.

| **Annotation** | <vocabulary> |
|---|---|
| **Definition** | This element contains the definition of a value vocabulary. |
| **Children** | A <vocabulary> element must contain one or more <item> elements. It may contain a single <info> element providing metadata about the vocabulary itself. |
| **Attributes** | Required:<br>• id: a unique vocabulary identifier.<br>Optional:<br>• type: must be "category". |
| **Occurence** | As a child of <valueml> element. |

| **Annotation** | <item> |
|---|---|
| **Definition** | This element represents the definition of one vocabulary item. |
| **Children** | None. |
| **Attributes** | Required:<br>• name: a name for the item, used to refer to this item in the <category> element. |
| **Occurence** | As a child of <vocabulary> element. Note: a vocabulary must contain at least one <item> element. |

In the considered video clip, values are communicated as follows:

- the first segment of the video (time interval: [0 s, 33 s]; 14 shots) represents practical values (see Figure 4). A red car leaves Paris at midnight (Minuit, Paris ...) under the rain. After 8 hours it gets to the sea (... 8 heures, la mer). The car is presented as a safe, confortable, and quick mean to escape from the everyday city life. Onboard a young lady, takes off her hat, smiling. An off screen voice (by Julien Clerc) sings: "J'aime, J'aime, J'aime";


Figure 4. Four key frames of the first segment of the video clip representing practical values.

Figure 5. Two key frames of the second segment of the video clip representing ludic values.


Figure 6. A key frame of the final segment of the video clip representing utopian values.

- a following segment (time interval: [34 s, 40 s]; 3 shots) is used to communicate ludic values (see Figure 5). The car suddenly dives in the sea without it could be possible to attribute this mad action to the driver that is never shown. The plunge, unexpected and irrational, represents the negation of practical values shown in the previous segment;
- a final segment (time interval: [41 s, 47 s]; one shot) represents utopian values (see Figure 6). Here, the car (Citroen BX) is no more an instrument, it is a subject, it lives (Citroen BX. Elle vit.).

Figure 7 shows the semiotic square used to represent the logical articulation of a basic opposition between practical and utopian valorizations. Arrows represent the trajectory of values expressed by the Citroen BX clip during presentation. Practical and ludic values are communicated through the visual track, while the utopian valorization is explicitly expressed by a voice over.

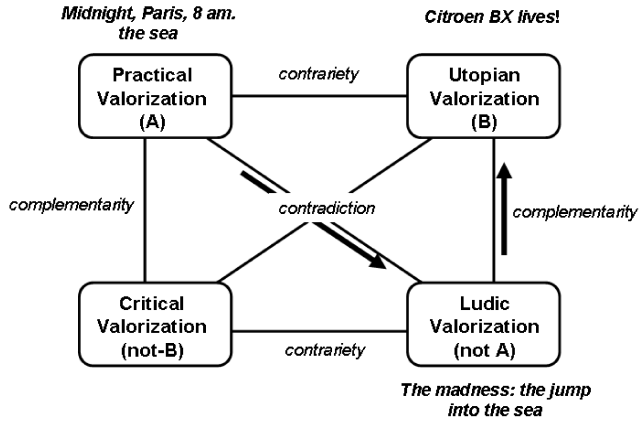


Figure 7. Semiotic square of consumer values

Figure 8 shows an example of annotation of the considered video clip using the ValueML.

Some observations are worth mentioning. First, the controlled vocabulary used for the annotation - the Floch's classification - has been defined within the document itself using the `<vocabulary>` element. The relevance of the annotating value has been assigned on the base of the time span of the video segment to which the value is associated. Therefore, values associated to longer video segments have a greater relevance with respect to values associated to shorter ones. This is a raw estimation of relevance that does not take into account other aspects such as, for example, the presence of multiple modalities communicating the same value within a segment.

Confidence is high. The rationale is that the discovery of values and the association of values to specific video segments is based on the availability of the original script and critical essays about the considered video that provide the main source of annotation knowledge [20]. Therefore, we consider the annotation as a correct annotation. Annotated segments are represented by query segments. This choice produces a new resource and allows for transcoding activities. Therefore, if a URI query addresses a single frame

out of a longer video it can be transcoded into a still image. This is not possible with URI fragments [28].

```
<valueml version="1.0" xmlns="http://www.example.com/2018/valueml"
xmlns:meta="http://www.example.com/metadata">
 <info>
  <meta:media-type> video </meta:media-type>
  <meta:media-name> citroen_bx.webm </meta:media-name>
  <meta:doc> Commercial clip by Citroen. The spot has
   been produced by RSCG in 1982. It is available at the
   URI:https://www.youtube.com/watch?v=jH2HLRpIq2Y </meta:doc>
 </info>
 <vocabulary id="Floch-semiotic-square">
   <item name="practical-valorization" />
   <item name="utopian-valorization" />
   <item name="critical-valorization" />
   <item name="ludic-valorization" />
 </vocabulary>
 <value>
  <category name="practical-valorization" relevance="0.7"
    confidence="0.9"/>
  <reference role="signified_by" uri="file:citroen_bx.webm?t=0,34"
    modality="by_storylineContent"/> </value>
 <value>
  <category name="ludic-valorization" relevance="0.2"
    confidence="0.9"/>
  <reference  role="signified_by" uri="file:citroen_bx.webm?t=34,41"
    modality="by_storylineContent"/> </value>
 <value>
  <category name="utopian-valorization" relevance="0.1"
    confidence="0.9"/>
  <reference  role="signified_by" uri="file:citroen_bx.webm?t=41,47"
    modality="by_soundObiectContent"/> </value>
</valueml>
```

Figure 8. Annotation of the BX video clip with ValueML.

## B. *Thai Life Insurance ad campaign*

The video commercial [33] represents a snapshot of the daily life of a young man, his encounters and emotional experiences. It lasts 3 minutes and it is constituted by a sequence of 76 shots. Because there is not a specific object to be promoted, we refer here, for the annotation, to the classification of universal values proposed by Schwartz [13]. Figure 9 shows the declaration of the relative vocabulary using ValueML. This example is aimed at showing how the markup language can be used to define an external repository of value vocabularies.

One problem we encountered during the analysis of the Thai clip regards how to assign values to the events of the story in a way that could be sufficiently "objective" and reproducible. The idea was to exploit the link existing between values and behaviors. To this end, we used the Portrait Values Questionnaire (hereafter, PVQ) developed by Schwartz for the measurement of users' values [34]. The PVQ uses a list of forty *portraits*, each one describing what is important for a hypothesized male or female individual and what he/she likes. For the sake of clarity the following are four examples of portraits (the numbers reflect their position in the original PVQ list):

*P-1*: thinking up new ideas, and being creative is important to him. He likes to do things in his own original way;

*P-2*: it is important to him to be rich. He wants to have a lot of money and expensive things.

*P-12*: it is very important to him to help people around him. He wants to care for their well-being;

*P-19*: he strongly believes that people should care for nature. Looking after the environment is important for him.

```
<valueml version="1.0" xmlns="http://www.example.org/2018/valueml">
 ...
 <vocabulary id="Floch-semiotic-square">
   <item name="practical-valorization" />
   <item name="utopian-valorization" />
   <item name="critical-valorization" />
   <item name="ludic-valorization" />
 </vocabulary>
 <vocabulary id= "Schwartz-value_types">
  <info> .. general metadata.. </info>
   <item name="power" />
   <item name="achievement" />
   <item name="hedonism" />
   <item name="stimulation" />
   <item name="self-direction" />
   <item name="universalism" />
   <item name="benevolence" />
   <item name="tradition" />
   <item name="conformity" />
   <item name="security" />
 </vocabulary>
 ...
</valueml>
```

Figure 9. Definition of a repository of value vocabularies with ValueML.

In value surveys, the PVQ is used by asking users to mark the portraits that better reflect themselves. An algorithm is then executed to map answers with value categories. As an instance, portrait P-1 above is associated to self direction; P-2 to power, P-12 to benevolence, and P-19 to universalism. We re-purpose the tool for content analysis by using it to characterize the behavior of characters in a narrative. In other words, instead of using the PVQ for the analysis of users we employ it for the analysis of the main characters in narratives. The method we have envisaged/foreseen for this task can be summarized as follows:

*Step 1*: decompose the video into its constituent shots, then aggregate shots into scenes on the base of the unity of intent or action/behavior of the characters represented in the shots;

*Step 2*: use the PVQ list of portraits to characterize each scene obtained in the previous step. This step exploits the strong association existing between portraits and expected behaviors. The annotator is assumed to perform an abduction process to infer a portrait on the base of observed behaviors in the video;

*Step 3*: map portraits and relative scenes with their associated values according to the PVQ algorithm;

*Step 4*: evaluate the relevance of each value by computing the total time of occurrence of the value (i.e., the sum of the time duration of all the scenes/shots in which the related behaviors are presented) with respect to the duration of the whole clip.

The application of the method has been supported by the use of the ELAN tool [35]. Results indicate that three main values are inscribed in the commercial video namely universalism (relevance: 19%), benevolence (relevance: 38%) and tradition (relevance: 12%). Figure 10 shows key

frames extracted from scenes showing behaviors associated to these values.

Figure 11 illustrates a fragment of the video annotation using ValueML.

Figure 10. Key frames obtained from scenes that represent specific values: universalism (top frames), benevolence (middle frames) and tradition (bottom frames).

Some observations are worth mentioning. First, the definition of an external repository of vocabularies (see Figure 9) allows the annotator to potentially use different vocabularies in the same document. Notice that a URI fragment is used to specify a vocabulary as the content of the "`vocabulary-set`" attribute in each `<value>` element. Second, each value is communicated by one or more portraits that are spread over several scenes. Benevolence, for example, is associated to five different portraits that are well represented in several scenes/shots of the video. These portraits are:

*P-3*: he thinks it is important that every person in the world be treated equally. He believes everyone should have equal opportunities in life;

*P-19*: he strongly believes that people should care for nature. Looking after the environment is important to him;

*P-23*: he believes all the worlds' people should live in harmony. Promoting peace among all groups in the world is important to him;

*P-29*: He wants everyone to be treated justly, even people he doesn't know. It is important to him to protect the weak in society;

*P-40*: it is important to him to adapt to nature and to fit into it. He believes that people should not change nature.

The main consequence is that a value category is associated to more than one reference element in the annotation.

Third, the modality attribute can be further specialized by taking into account the specific component of a storyline content that is used, in the clip, to express the value (in this case the main character's behavior).

Another observation concerns the audio track of the video. This is composed by a combination of music, effects and voice over. The voice over contributes to the communication of the values but in a very different way: it does not express the intended value by a description of the associated behavior but through the negation of the opposite behavior (or portrait).

```
<valueml version="1.0" xmlns="http://www.example.com/2018/valueml"
xmlns:meta="http://www.example.com/metadata">
    ...
<value
vocabulary-set="http://www.example.com/2018/vocabularies.xml#Schwartz-
value_types" >
  <category name="benevolence" relevance= "0.38"
    confidence="0.7"/>
  <reference role="signified_by" uri="file:thai_ins.mp4?t=11,15&t=45,8,52,2"
    modality=" by_characterBehaviour"/> </value>
<value
vocabulary-set="http://www.example.com/2018/vocabularies.xml#Schwartz-
value_types" >
  <category name="benevolence" relevance= "0.38"
    confidence="0.7"/>
  <reference role="signified_by" uri="file:thai_ins.mp4?t=22,7,32,4"
    modality=" by_characterBehaviour"/> </value>
    ...
<value
vocabulary-set="http://www.example.com/2018/vocabularies.xml#Schwartz-
value_types" >
  <category name="universalism" relevance= "0.19"
    confidence="0.7"/>
  <reference  role="signified_by" uri="file:thai_ins.mp4?t=5,8,8"
    modality=" by_characterBehaviour"/> </value>
    ...
</valueml>
```

Figure 11. Partial example of annotation of the Thai clip.

As an instance, the voice over of the Thai clip says :"He does not want to be rich" referring to the character of the story. This expresses an opposite value with respect to power (a value associated to the portrait P3: he wants to be rich). Looking at the Schwartz circle of values the opposite of power is universalism that is coherent to what is communicated by the visual track. The problem of coherence of meaning expressed by different modalities is a critical issue during the design of a multimedia and a useful source of redundancy for annotators during analysis and annotation.

Another dimension of coherence concerns the degree of localization of the video commercial. Are the values embodied in the clip adapted to the Thai Culture? If we refer to the characterization of national cultures made by Hofstede's theory [36] then the answer is definitely yes. Thailand is considered a nation that scores very low in individualism and masculinity. This means that the society fosters strong relationships where everyone takes responsibility for fellow members of their group and that dominant values are caring for others and the quality of life. These characteristics are coherent with the values of universalism and benevolence that we discover in the clip. Therefore, the video features a high degree of localization.

A final observation regards the effects of the values inscribed within informational resources. In the following we shall report a comment to the Thai clip made by a subject after having viewed the video on YouTube:

*"This video touched me on an unthinkable level so much that I'm almost reevaluating my life right now on how I can do nicer things to people. I strongly believe they should*

*show this to as many people around the world no matter what religious beliefs or race or language they speak"*

This is an example of consequential effect as described in Section III.

## VI. DISCUSSION

We are actually experimenting the use of the ValueML language with a dataset of commercial videos collected from the web. The dataset includes videos advertising objects or services as well as videos that campaign for or against something, e.g., for preserving the environment or against bullying, and videos that communicate brand personality or identity. The aim is to validate the proposed markup language, to obtain insights about how to refine the language and to reach a better understanding of some critical aspects regarding the communication of values through video commercials.

The experiments show that specific pairs of valorizations very often come together. As an instance, a practical value is often accompanied by a critical one: the advertised good is not only valorized by emphasizing its utility and function but it is usually compared to other goods by presenting its characteristic features and benefits. Analogously, utopian valorizations are often presented with ludic ones. Although the current version of the ValueML allows the association of more than one value to the same segment of a clip, it seems to us that the simultaneous presence of these pairs introduces a precise semantic meaning that cannot be captured by the simple sum of the meanings of its component parts. By looking at recent semiotic literature, we found that Semprini proposed a classification of consumer's values that could be useful to address the above problem [37] [38]. The proposal, called "semiotic mapping of consumer's values", follows a dimensional approach and uses two pairs of values (borrowed from the Floch's inventory) to represent a bi-dimensional continuous space of possible valorizations. Four aggregated values emerge, that correspond to the four quadrants of the space. These are: information (practical and critical values); mission (critical and utopian values), project (utopian and ludic values), and euphoria (ludic and practical values). Semprini's model is interesting for its semantic interoperability with respect to the Floch's one. However, in order to exploit this feature the actual version of the ValueML language should be enriched by allowing the definition of dimensional models of values that are currently not yet supported. Another open issue regards the modality attribute. The experiments with narrative videos show that values can be expressed not only through the characters' behaviors as shown in the Thai clip but also by means of other narrative elements such as, for example, the kind of space and time represented in the story: the setting, the personality of the characters, the relations existing between the characters, the expressed passions, emotions, and events. Therefore, there is the need to further develop and articulate the set of possible modalities in order to take into account these possibilities.

An interesting open issue regards the links existing between values and emotions. According to appraisal theory [39], emotions are generated by the evaluation (an appraisal process) of a given situation, object, action (a stimulus) with respect to a personal value, goal, aesthetic or ludic preference, and expectations (a concern). This fact opens up the possibility of hypothesizing the value, given the emotion and the stimulus. This is important if we want to embed the ValueML in other languages such as the EmotionML language [8]. Are annotated emotions coherent with annotated values? Is it possible to infer the values from represented emotions (and vice-versa)?

As shown in Section V, the annotation of values can be exploited in cross-cultural design to select the resource that best match the culture of the destination audience. Moreover, the explicit representation of how a value has been inscribed in the information resource is valuable information for multimodal designers and a source of inspiration for the development of new resources [27]. Analogously, the annotation can be exploited to assess the consistency of the values communicated through a collection of advertisement products belonging to the same ad campaign or to study the diachronic evolution of valorizations of a brand in a given time interval. As an instance, it can be shown that Benetton started its ad campaigns in the 60s by exploiting practical and critical values then it moves towards ludic valorizations (in the 80s), and to utopian values in the 90s.

Finally, the presentation of the ValueML made in Section IV left a number of technical problems unsolved.

It is unclear, for example, if it is better to use continuous or discrete, unipolar or bipolar, scales for representing relevance and confidence. The current choice, a continuous unit-less scale such as [0,1], may be overly restricted. Human annotators often use a set of discrete labels such as a five-point Likert scale ("very low", "medium low", ... ," medium high", "very high"). Temporal intervals are currently represented using start and end time points that are measured with respect to the beginning of a clip. This is consistent with similar conventions used in other XML languages such as SMIL. Time instants are specified using the normal play code. Alternatives are SMPTE time code or real world clock time. Another problem regards the association of the same value to multiple time intervals. Should it be made using different value elements and media fragment URIs (one for each segment) or by a single value element and media fragment URI (see Figure 11)?

We have postponed a final decision about these topics after the acquisition of more knowledge.

## VII. CONCLUSIONS

In this paper we address an aspect that has not been tackled before, namely, analysing and annotating web resources with embedded values. To this end, we propose a markup language, called ValueML, and illustrate its use in two paradigmatic cases. Some specifications are still sub optimal, such as the specification of multiple vocabularies; other aspects are currently missing but will be likely required by annotators such as the use of dimensional models of values or the use of qualitative scales. Nevertheless, experiments with video commercials have confirmed the feasibility of the approach and the effectiveness of this preliminary version of the language.

We highlight some aspects of the approach that we deem important. First, our interest is on model-based annotation made by professionals during resource production [27]. The term model-based is used, here, to stress the fact that analysis and annotation are driven by a metamodel of the genre of resource to be annotated (see Figure 3) and exploit theoretically founded value taxonomies. These tasks require specific competencies and a particular analytic sensibility since values are often embedded within implicit features of a resource (e.g., its atmosphere) that are not easily accessible by non expert people. The annotator may be the author/designer of the resource. In fact, she is in a privileged position to provide annotating knowledge. Other possibilities include multimedia critics, semioticians, commentators. If the interpretation is not the designer's one, then it should be, at least, an interpretation that the designer would consider as a possible one. The consequence is that for the same resource, several annotations could exist, each one representing a specific interpretation according to the interests, the perspective and the value taxonomy used by the annotator.

Second, manual annotation is time-consuming but the experiments with video commercials we have worked out showed that it is a feasible approach due to the limited time extension of these genres of media artifacts. The effort is largely rewarded by the benefits we may obtain that are numerous. In the field of Brand Marketing and Communication, for example, the use of ValueML allows producers to explicitly represent the brand identity core values that are inscribed within an advertising message. As a consequence, ad resources can be selected, compared, and aggregated to made portfolios on the base of embedded values. Moreover, value annotation makes is easier to evaluate the degree of consistency of ad messages communicated by different resources belonging to the same ad campaign or through different brand signals (e.g., product design, packaging, testimonials, flagship stores and exhibitions). In the field of Cross-Cultural Design, value annotation makes it easier to select the resource that best match a given context of use, i.e., a resource that could resonate with the values of the target consumers or with the values of a destination culture. In addition, the ValueML language allows the annotator to unfold design knowledge embedded within a resource. It allows, for example, to use the "`modality`" attribute in order to explain *how* a value is inscribed within the ad message. This is inspirational for designers who may exploit these insights for addressing new design problems. We claim that this kind of knowledge can be exploited also for automatic recognition of values. This is in line with a growing interest in automatic understanding of images and video advertisements as reported, for example, in [40]. Having a dataset of professionally annotated video commercials can be used, in the future, as a *ground truth* for supervised learning techniques. To this end, we claim that model based annotation could provide better results with respect to current approaches based on the exploitation of Amazon Mechanical Turk annotators.

Finally, the use of ValueML may help designers to better focalize their attention on the ethical aspects embodied in their products, and the final consumers to become more aware of the technological mediation effect produced by persuasive messages.

Our current work is devoted to enrich our dataset of annotated resources with new cases. We think that this phase is needed for stabilizing the language in a form suitable for final formalization. A further step will be the design and implementation of an ontology to define the terms of the ValueML language, to relate the terms to one another, and to define mappings between value vocabularies when possible. We are also investigating opportunities for promoting the standardization of the ValueML as a recommended format for value representation.

## ACKNOWLEDGMENTS

The author would like to thank the editor and reviewers for their comments and suggestions. Special thanks also to Massimo Romanin for his help in developing the first version of the ValueML language.

## REFERENCES

[1] M. Romanin and E. Toppano "Value annotation of web resources: the ValueML language," Proc. WEB 2018: The Sixth International Conference on Building and Exploring Web Based Environments, IARIA, Nice, France, pp. 32-37, 2018.

[2] J. Belman, H. Nissenbaum, M. Flanagan, and J. Diamond, "Grow-A-Game: a tool for values conscious design and analysis of digital games," Proc. of DiGRA Conference, Vol. 6, pp. 14-17, 2011.

[3] B. Friedman, P. H. Kahn, A. Borning, and A. Huldtgren, "Value sensitive design and information systems," in Early engagement and new technologies: opening up the laboratory, pp. 55-95, Springer, Netherlands, 2013.

[4] G. Cockton, "A development framework for value-centered design," Proc. CHI EA '05, pp. 1292-1295, 2005.

[5] P. M. A. Desmet and A. E. Pohlmeyer, "Positive Design: an introduction to Design for Subjective Well-Being," International Journal of Design, Vol. 7, No. 3, pp. 5-19, 2013.

[6] P. Brey, "Values in technology and disclosive computer ethics," The Cambridge Handbook of Information and Computer Ethics, Ed. L. Floridi, Cambridge University Press, pp. 41-58, 2009.

[7] F. Ceschin and I. Gaziulusoy, "Evolution of design for sustainability: from product design to design for system innovation and transition," Design Studies, 47, pp. 118-163, 2016.

[8] W3C. Emotion Markup Language (EmotionML), May 2014, URL: https://www.w3.org/TR/emotionml/ [retrieved: November, 2018].

[9] E. Cambria, "Affective computing and Sentiment analysis," IEEE Intelligent Systems, March/April 2016, pp. 102-107, 2016.

[10] S. Kujala and K. V.V.Mattila, "Value of Information Systems and Products: Understanding the Users' Perspective and Values," Journal of Information Technology Theory and Application, 9:4, pp. 23-39, 2009.

[11] S. Boztepe, "User Value: competing theories and models," International Journal of Design, Vol. 1, No.2, pp. 55-63, 2007.

[12] C. A. Le Dantec, E. S. Poole, and S. P. Wyche, "Values as lived experiences: evolving Value Sensitive Design in support of value discovery," Proc. CHI 2009, ACM, pp. 1141-1150, 2009.

[13] S. H. Schwartz, "An Overview of the Schwartz theory of Basic Values," Online Readings in Psychology and Culture, 2(1), Article 11, 2012, https://doi.org/10.9707/2307-0919.1116

[14] A. Cheng and K. R. Fleischmann, "Developing a meta-inventory of human values," ASIS&T, Vol. 47, No. 1, pp. 1-10, 2010.

[15] M. Rokeach. The nature of human values. New York: Free Press, 1973.

[16] P. Brey, "Theorizing the cultural quality of new media," Technè, 11:1, Fall 2007, pp. 2-18. URL: http://scholar.lib.vt.edu/ejournals/SPT/v11n1/brey.html [retrieved: November, 2018].

[17] M. Hollbrok. Consumer value: a framework for analysis and research, Routledge, New York, 1999.

[18] B. Friedman and P. H. Kahn, "Human values, Ethics, and Design, " in Handbook of Human-Computer Interaction, J. Jacko, A. Sears, and N.J. Mahwah, Editors, Lawrence Erlbaum, pp. 1177-1201, 2003.

[19] K. Sheldon, A. J. Elliot, Y. Kim, and T. Kasser, "What is satisfying about satisfying events? Testing 10 candidate psychological needs," Journal of Personality and Social Psychology, Vol. 80, No. 2, pp. 325-339, 2001.

[20] J. M. Floch, Semiotics, Marketing and Communication: beneath the signs, the strategies. Palgrave MacMillan, 2001.

[21] M. Flanagan, J. Belman, H. Nissenbaum, and J. Diamond, "A method for discovering values in digital games," Proc. DiGRA Conference, pp. 752-760, 2007.

[22] N. Crilly, A. Maier, and P.J. Clarkson, "Representing artifacts as media: modelling the relationship between designer intent and consumer experience," Journal of Design, Vol. 2, No. 3, pp. 15–27, 2008.

[23] M. Flanagan, D. C. Howe, and E. Nissenbaum, "Embodying values in technology. Theory and Practice," in: Information Technology and Moral Philosophy, (J. van de Hoven and J. Weckert Eds.), Cambridge: Cambridge University Press, pp. 322-353, 2008.

[24] L. Anticoli and E. Toppano, "Technological mediation of ontologies: the need for tools to help designers in materializing ethics," International Journal of Philosophy Study, Vol. 1, Issue 3, pp. 23-31, 2013.

[25] B. Fogg. Persuasive Technology: Using Computers to Change What We Think and Do. Morgan Kaufmann, San Francisco, 2003.

[26] R. H. Thaler and C. S. Sunstein. NUDGE. Improving decisions about health, wealth, and happiness, Yale University Press, 2008.

[27] E. Toppano and V. Roberto, "Semiotic annotation of narrative video commercials: bridging the gap between artifacts and ontologies," International Journal on Advances in Internet Technology, vol. 10, nr. 3&4, pp. 145-162, IARIA, 2017, http://www.iariajournals.org/internet_technology/ [retrieved: November, 2018].

[28] W3C. Media Fragments URI 1.0, September 2012, URL: https://www.w3.org/TR/media-frags/ [retrieved: November, 2018].

[29] C. Chang, "Narrative advertisements and narrative processing," in Advertising Theory (S. Rodgers and E. Thorson Eds.), Routledge, pp. 241-254, 2012.

[30] M. C. Green and T. C. Brock, "The role of transportation in the persuasiveness of public narratives," Journal of Personality and Social Psychology, Vol. 79, No. 5, pp. 701-721, 2000.

[31] C. Bianchi, "Semiotic approaches to advertising texts and strategies: narrative, passion, marketing," Semiotica 183, 1/4, pp. 243-271, 2011.

[32] Citroen Bx Campaign, YouTube, URL: https://www.youtube.com/watch?v=jH2HLRpIq2Y [retrieved: November, 2018].

[33] Thai Good Stories, YouTube, URL: https://www.youtube.com/watch?v=cZGghmwUcbQ [retrieved: November, 2018].

[34] S.H. Schwartz, G. Melech, A. Lehrnami, S. Burgess, M. harris, and V. Owens, " Extending the cross-cultural validity of the theory of basic human values with a different method of measurement," Journal of Cross-Cultural Psychology, 32, 519-542, 2001.

[35] B. Hellwing, and D. Uytvanck, "EUDICO Linguistic Annotator (ELAN)," Version 2.0.2, software manual, 2004.

[36] G. Hofstede, G.J. Hofstede, and M. Minkov, Cultures and Organizations. Software of the mind. Mc Graw Hill, 2010.

[37] A. Semprini, Marche e mondi possibili. Un approccio semiotico al marketing della marca. Franco Angeli, 2007.

[38] G. Rossolatos, "Applying structuralist semiotics to brand image research," The Public Journal of Semiotics, IV(1), pp. 25-82, 2012.

[39] E. Demir, P. M. A. Desmet, and P. Hekkert, "Appraisal patterns of emotions in human-product interaction," International Journal of Design, Vol. 3, No. 2, pp. 41-51, 2009.

[40] Z. Hussain, M. Zhang, X. Zhang, K. Ye, C. Thomas, Z. Agha, N. Ong, and A. Kovashka, "Automatic Understanding of Image and Video Advertisements, " Proc. IEEE 2017 Conference on Computer Vision and Pattern Recognition (CVPR), pp. 1100-1110, 2017.