Bakhtinian Understanding to Web Graphics

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Abstract

The paper introduces a new way of understanding the web graphics phenomenon. We based it on the popular culture approach by M. Bakhtin. We introduce and exemplify the categories of ambiguous messages created and communicated by web graphics. The discussion on coding of ambiguous information is given. Revolution in multimedia requires completing conventions in information coding. One day, the paradigm of unambiguous meaning of coded information will be attacked by the needs of coding of ambiguous meaning. The paper proposes one way how to code the ambiguity. For transparent illustration only the comic information is used (but not defined). One possible way of vizualization of structure of coded comic information is shown. The implication for user interface is discussed. Sharing of ambiguous visual content is undoubtely one of the prominent Web-based graphics applications.

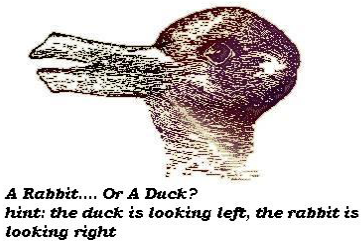

Figure 1: The famous ambiguous image. Author unknown. Part of the Internet folklore. Ambiguous here is the meaning, not the information.

1. Motivation and Introduction

A significant part of the culture in cyberspace belongs to the alternative culture. The well-known example is the joke. Jokes and other verbal folklore genres are created and communicated mainly by oral or written creativity and direct individual sharing. Recently, the mass distribution is supported by the Internet crucially. There is no official institution having neither budget nor responsibility for this. The whole system of "institutions" for verbal and graphics folklore is named the alternative culture or laughter culture. Roughly speaking, it is the creative communication of interesting paradoxes (and even blasphemy). There are two fundamental cases: double sense of one image (Fig. 1) or one image for two views (Fig. 2).

Figure 2: Historically, the first image for two views. The scull visible from the right margin. Hans Holbein jr.Ambassadors.

We have collected and/or created several typical samples of web graphics, including the animated and interactive ones. However, the most frequent practice seems to be just publishing paradoxical images or text messages. We will focus on the web graphics here. The rise of internet we understand as an analogy of the rennaissance – to provide the context for the following long quotation from the Internet Encyclopedia of Philosophy [2]:

"The high point of Bakhtin's populism can be seen in his now famous 1965 study of Rabelais (Tvorchestvo Fransua Rable i narodnaia kul´tura srednevekov´ia i renessansa, The work of François Rabelais and the Popular Culture of the Middle Ages and the

Renaissance), which is a remarkable work. Bakhtin concentrates on the collapse of the strict hierarchies Middle Ages and the beginning of the Renaissance by looking at the way in which ancient modes of living and working collectively, in accordance with the rhythms of nature, re-emerge in the forms of popular culture opposed to official culture… Bakhtin summarises the essence of the question thus:

"*It could be said (with certain reservations, of course) that a person of the Middle Ages lived, as it were, two lives: one that was the official life, monolithically serious and gloomy, subjugated to a strict hierarchical order, full of terror, dogmatism, reverence and piety; the other was the life of the carnival square, free and unrestricted, full of ambivalent laughter, blasphemy, the profanation of everything sacred, full of debasing and obscenities, familiar contact with everyone and everything. Both these lives were legitimate, but separated by strict temporal boundaries*."

The activities of the carnival square: collective ridicule of officialdom, inversion of hierarchy, violations of decorum and proportion, celebration of bodily excess and so on embody, for Bakhtin, an implicit popular conception of the world… The grotesque is the image of this becoming, the boundaries between person and person, person and thing, are erased as the individual merges with the people and the whole cosmos. As the individual body is transcended, the biological body is negated and the 'body of historical, progressing mankind' moves to the centre of the system of images. In the carnival focus on death and rebirth the individual body dies, but the body of the people lives and grows, biological life ends but historical life continues."

The rest of the paper we structure as follows… Section 2 introduces the categorisation of static ambiguous web graphics and tackles with the ambiguous meaning coding issues. In section 3 we discuss the questionability of the motivation. Section 4 continues with the dynamic part of the categorization. Section 5 draws a couple of implications.

2. Static Web Graphics Categorization

1. Unambiguous stills giving ambiguous understanding. Assume the simple unambiguous stills, which give the visual message about the interesting story, object, face… Figure 3 gives an example of such a real world story. There is no contradiction in the nature. The attractive paradoxes live in human understanding. Note that it is possible to create this category of images even automatically. The algorithmic system for caricaturing has been proposed in [4].

2. The ambiguous images. They are represented in famous Figure 1 related philosophically to L. Wittgenstein. There are two simultaneously perceivable meanings. The 3D case is illustrated in Figure 4. The coding of unambiguous information is given by international standards ([12], [13], [14], UNICODE, JBIG, JPEG, MPEG, MHEG, MIDI, MP3, VRML... and to certain extent by the functionality of ISO standardized APIs like GKS, PHIGS, IPI, PREMO, SEDRIS) or by national standards (musical information coding in ANSI standard [21]) or even by private coding.

The coding of ambiguous information is not known. This information describes not only mistakes, but information with comic, art, and scientific phenomena, too. The ambiguity is observable not only with mistakes, nonsense, failure of understanding, misunderstanding. Some known kinds of ambiguous information are provided by the following: mistaking, using lie, bluffing, kidding, playing game (e.g. chess move meaning), dreaming, artistic originality, scientific discovery, and comic inspiration. Now we give one known explanation of ambiguity.

Arthur Koestler [16] introduced a notion of *bisociation*, understanding to a fact in two different contexts. (It seems the bisociation is meant as an opposite to association. This gives an appropriate denotation: B-information for the ambiguous (coded) information.)

Figure 3: Tree between rails: non-rendered static storytelling example. Message understanding involves the story time and the anachronism.

Koestler's examples of scientific ambiguity include the understanding of the idea that the motions of tides and the motions of moon are related some way. The "Eureka!" reaction after the bisociative click is mentioned there. The 3 types of reactions are discussed: AHA, HAHA & AH! for scientific disovery, comic inspiration, and artistic originality. While Koestler's

theory [16] describes the basic pattern of creative activity, this paper applies his idea in information coding.

The different contexts are very difficult to formalize. Therefore we shall use the notion of context mapped to the parts of memory. This provides an exact measure of information, which generalizes the Shannon's one. It allows to overcome the notional mismatch which is usual in humanities. This (restricted but coded) context is defined EXACTLY.

There are always at least 2 contexts given: true and false ones, real and imaginative ones, the paradigm (or rules) and its violation, etc.

The determination of links between 2 contexts or inside 1 context remains a task for user of multimedial workstation. This is a paper paragraph about coding of ambiguous information - not about its recognition.

The first observation is as follows: B-information is possible to communicate with (coded) information, although paradoxonly B-information has no definition and no coding. It is - marvelous – something more, which is added by a man to the coded message to create the message from B-information. For example: "troublem". (Remark the fact, that there is MORE information than 8 bytes only. Could this give an idea for data compression?)

This work (make the comic message from implicitly transferred B-information) is performed again and again "manually" and very often combining the conscious and unconscious processes. Somebody could "get the point". Somebody could not. The output of "getting the point" is not coded, stored, saved, transmittable. The discussion about "the point" is thus often impossible.

Let us specify the requirements for definition of explicite coding of B-information.

Figure 4: Another parallel use of rail space… Real world photo by L. Lazar.

Context is a convention of information coding, given by standard or private coding. In other words, the context gives the meaning, sense, interpretation of coded content.

E1. Example (context). Move to the byte an octal value 61. Set the next byte to 62. In context of IS 646 (ASCII) we have coded 2 bytes and their meaning is the usual meaning - "12". (Context controls the kind of information - text, graphic, music, movie - and which particular meaning is coded.)

The **part** is a certain finite (non-recursed) portion of information, coded in a particular context. (It can be implemented by 2 pointers: P_beg, P_end, or by value.) The part has a nonnegative bit stream length.

E2. Example (parts). Consider the 2 bytes from the previous example E1. We have 2 atoms in context of IS 646. (Less than a byte has no meaning.) We have the meaning: "12". There are two 1-parts (shown by value): "1" and "2". There is one 2-part: "12". There is no 3-part defined. (0-part can have some (non)sense; it means nothing: if some information was expected and not given.)

Requirement 1: (Completeness) Let K1, K2 be contexts. Let S1, S2 be sets (files) of coded information. Let P1, P2 be parts in the sets S1, S2.

The ordered sextet (K1, K2, S1, S2, P1, P2) gives a complete description of coded B-information. (K1 = K2 & S1 = S2 & P1 = P2 is redundant.)

E3. Example (mistake): Let K1 = K2 = IS 646, S1 = S2 = ("1","2"), and P1 = "1", P2 = "2". Applying Requirement 1 we described a mistake: "1" instead of "2".

We can adopt a convention, that [K1, S1, P1] describes the correct meaning, while the other triplet [K2, S2, P2] describes the wrong meaning.

However this looks well, it is only a necessary condition. Why it is not the sufficient condition, too?

The sufficient condition is fulfilled, if the B-information provides some VALUE. Each mistake has not THE value. The value is determined by correct assignment of K1, K2 and/or S1, S2 and/or P1, P2. The decision must be performed by a man. Having 2 sets S1, S2 with M, resp. N atoms (members, items). The total number of possible sextets is 2 .This leads to the

Requirement 2: (efficiency) The final coding of B-information should be linked with not all possible parts P1, P2.

Requirement 3: (materialistic one) The B-information

be coded in bits.

Requirement 4: (minimality) More than 1 context.

E4. Example (coding calambur). Let K1 = K2 = IS 646. Let S1 = ("trouble problem"). Let S2 = ("troublem"). P1 = "trouble", P2 = "problem", P3 = "troublem". Lengths of P1, P2, P3 are 7, 7, and 8. P2 and P3 are defined only in one set. The previous requirements give not the valid sextuple to code this troublem. Evidently the comic information has been transferred, but not coded yet. We have seemingly all the bits, but no coding. The solution is given by more contexts (dimensions):

Divide S1 into S3 = ("trouble") and S4 = ("problem").

Now the ordered nonet [K1, K1, K1, S3, S4, S2, "trouble", "problem", "troublem"] describes the calambur completely. The 3 parts in the space of our understanding to the word troublem are activated simultaneously and the appropriate 2 links P1-P3, P2-P3 are given by the nonet. Calambur is coded - with 3 contexts.

Remark 1. Notice that there are many (user defined) ways to code the same troublem. Somebody else can recognize the PRONOUNCED ambiguity with "pROBLEm", "tROUBLEm" and "tROUBLE", which gives a triangle structure: 3 links of ambiguity instead of the previous 2 ones.

Remark 2. Another way is to stay in 2 contexts and to introduce operator & for sextets. It means the simultaneously token sextets: [... "trouble", "troublem"] & [... "problem", "troublem"] We shall not support the "operator" way of coding here.

E5. Different Contexts Example. Assume the case K1 <> K2. For example K1 = IS 646 and K2 = CGM. S1 = P1 = ("Yellow circle"). S2 = P2 = figure of black square, coded in CGM (fill area, etc.). This is multimedial and codable. Play to that picture and text Beethoven's fatal motif "g-g-g-es" (5. symphony, coded say by [SMDL91]). Now three pieces of differently coded information create an atom of 3-contextual B-information, which guarantees, that the coded links can be saved, stored, transmitted, processed without loosing the triple context: the comic message. (There is a couple of them which makes no fun - music with black square and music with the text. This shall we discuss later.)

E6. Mussorgsky Music Example. Another - esthetic information - example of different contexts gives Mussorgsky's famous opus **Tableaux d'une exposition** in **"6. Samuel Goldenberg et Schmuyle"**, where within the frame of tonal music two different tonal centres are used to characterize the rich and the poor Jews. To manage this in coding of tonal music in scores there is used a method to rewrite scores from the second tonal centre to the first one, in the other context with appropriate artificial shifts of meaning of scores. The fact of two tonal centres is thus hidden, lost. You need some more information to know that your right hand melody differs from the left hand melody in original author's interpretation. Like Holbein jr. in painting, Mussorgsky was probably the first composer who created this ambiguity. The good coding (based on [22]) has to solve this problem and many others, as well. Modern music is full of them. Classic method in classic music is diatonic modulation - based on ambiguity. {Imagine the space of all words from c-d-e-f-g-a-h-c (in England h=b): "Ha-ha-ha, Bach..." etc.

If we display with the music given by names of tones we have the multimedial artefact. How to code and discuss the context links? How to sort them?

Empty Context Problem. One of the contexts can be empty, not coded in bytes, but present in the understanding of the ambiguous message. My mail from USA was censored and therefore my friend Prof. Blossom S. Kirschenbaum (Brown University, Providence, RI) wrote me a postcard: "Thank You for You know what from You know whom".

To (de)code this ambiguous message we must introduce the second context to understand "who" and "what". Having not the TWO coded contexts we have no (coded) ambiguity. We cannot use it.

The Problem Of Border. The part border is often fuzzy. There are paintings by M. Escher, where cutting or shielding halfplanes do not help. In general, the unambiguous sections can be non convex even not connected.

Problem Of Structure Of Coded Comic Information

Assume the classical silent movie gag - a person falling on banana. We can recognize 2 contexts - normal and abnormal movement. This is codable by private coding, for instance [Danc90] describes "Two fully functional programs" based on symbolic dance encoding Labanotation. But the two contexts can be "coded" directly in iconic representation - by parts of movie, too. This introduces the requirement of time coding because the 2 parts of movie are distinguished by timing.

The semiotics of comic creations is extremely hard as mentioned many times by Umberto Eco.

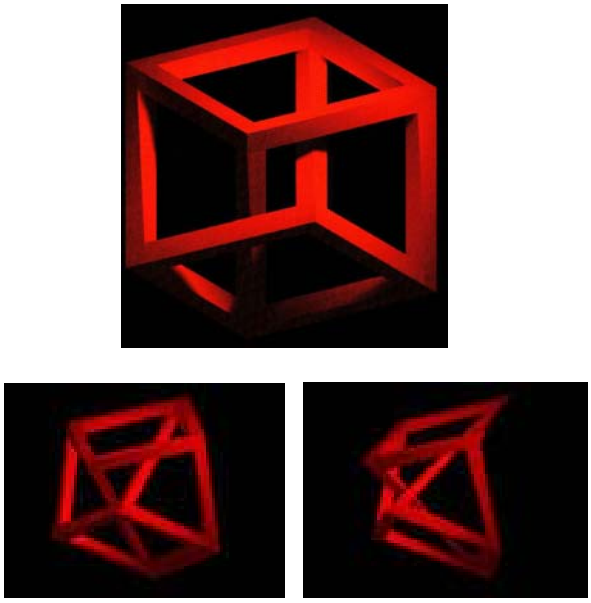

Figure 5: Cuboid by Pavol Elias [7] inspired by M. Escher painting The Belvedere.

It is well known that silent movie gagmen developed a method of smile acceleration - a string of gags finished by the strongest one - toper. The string of gags is in our language a sequence of ambiguities. How to code this? The simple example - banana gag and channel gag - falling to the open channel hole. Let channel gag be the toper. Story: the person avoids to act in banana gag and therefore acts in toper. Toper is again the violation of normal movement - walking at the street. We can recognize this sequence of contexts: normal-banana possibility-normal-but channel. The structure of this coded message is not linear - we need a plane, two-dimensional space.

The latest triplet of problems can be solved by development of the coding functionality specifications. Let us try not to solve the problems. Instead, we try to conclude with a draft definition [8]:

DEFINITION: Let N be an integer. Let K1, K2, ..., KN are contexts. Let S1, S2,..., SN are sets of coded information in contexts K1, K2, ..., KN, respectively. Let P1, P2, ..., PN, are parts of the sets S1, S2, ..., SN. Part Pi is located by a pair of pointers (Pi_beg, Pi_end), i = 1, 2, ..., N. Let R is a comment record. Ordered 3N+1-tuple

(K1, K2, ..., KN; S1, S2, ..., SN; P1, P2, ..., PN; R)

gives a coding of a unit of ambiguous information in N contexts.

Note that the above definition is a direct generalization of previous requirements, enriched by a comment record R. This record contains additional information, e.g. description of the kind of ambiguity coded.

Figure 6: Is this image ambiguous? Image courtesy P. Bourke [3].

Figure 7: Another creation by another anonymous author. Part of the Internet folklore and Escherian inspiration again.

3. Discussion

The proposed definition formalizes the ambiguity encoding which has been sharply critiqued by Gergely Krammer, after reading the previous version of the paper. He wrote: *"... here is an instant and shallow answer to your question. I try to understand the various kinds of ambiguities in presentations produced by computers. The word "ambiguous" will occure several times below, but may be not with the meaning you were thinking of.*

The question of ambiguity may arise with any kind of output.

Computers can present output only via algorithms performed on data stored in the computer. Ambiguity in one kind of the output is rooted either in the data stored or the presentation algorithm. With multiple kinds of outputs there may be ambiguity when we try to relate them to one another.

If we have a well defined set of data, we can present them in a one-to-one fashion with all data elements sensible by the man. The presentation itself would not hold more ambiguity than that already present in the data. We now, however, that we may see on a picture much more than the pure data themselves. And if the data themselves are not ambiguous, the additional information behind the data may be.

Can the stored data set be "ambiguous" itself? They may somehow be illdefined, but I don't think ambiguity would be the proper word for that. Data may have probability characteristics, they may have likelyhood, etc.

The presentation algorithm may deliver ambiguous presentation from well defined data, as the ortographic projection of a cube on a plane through one of its faces show.

By the way, I seem to have an example for the one before. Imagine the classical ambiguous picture: that of a unit cube minus a smaller cube aligned to one of the corners. One does not know if the smaller cube is cut out or added.

Even a properly shaded picture may be ambiguous unless a light source casts a shadow on it from the left. When such a real world cube-scene is looked at from very far with a camera, i.e. with almost parallel rays, the dataset thus input is an ambiguous representation of the scene. Its reproduction as a picture will have the same ambiguity.

Thus we don't seem to need multimedia to have ambiguity."

On the other hand, there is at least one example (the music piece by Mussorgsky) which in our humble opinion requires the ambiguity encoding. Analyzing the music composition, the musicologists need to formalize what they are speaking about. The encoding of ambiguity can be, naturally, thought as the mechanically-parallel coding of unambiguous information but some of the examples above give rise to doubts concerning this issue.

4. Dynamic Web Graphics Categorisation

The Bakhtinian understanding to web graphics includes the categories for dynamics, too. We recognize two kinds of dynamism with web graphics – animations and interactive hypermedia objects.

3. Animations. The static example given in Figure 5 has the animated (and interactive) counterpart. It can be found at http://www.dunako.com/pavol/cuboid/. Human perceptions system keeps amazing people all around the world. Many artists are attracted to it, many of them learned to use its features to attract the audience. M.C. Escher is probably the best example - many of his works (Belvedere. Waterfall...) use features of human perception to provoke, showing so called "impossible" objects. Impossible objects contain what we perceive as paradox (or several of them) - water flows up (Waterfall), man on a ladder climbs from inside of the building to outside and back inside again (Belvedere), cuboid shows what we see as a cube in impossible and contradictory setup. When people are presented with such images most of them are very confident that such objects are not possible in our 3D world. Obviously they are not right - such paradoxical objects can indeed exist in 3D world. To shown them they are wrong (and provoke their visual perception some more) was a goal of the student project - **Cuboid, *A study in reconstruction of paradoxical objects*** [7].

One of the basic ideas in modeling "impossible" objects is to divide figures into consistent parts, that means to reduce a paradox. Reduced figures which don't contain paradox can be easily modeled using standard methods. The second step consist of merging all parts to the final (paradoxically looking) model. In case of cuboid it is easy to place both "bases" of the cube into the proper "cuboid" position . The vertical "edges" they join the corresponding vertices. The wire edges are then expanded to form a solid structure. This is slightly more involved, but it can be done by keeping geometric relationships between adjacent vertices. The faces of the resulting object are not planar rectangles, they are twisted.

The idea of modeling cuboid as one of the "impossible" objects on Escher's Belvedere drawing was inspired by a video from Eurographics conference where the whole model of Belvedere was reconstructed. Being motivated by peers I took this as a challenge and attempted (successfully) to recreate a 3D model of cuboid - cube in "impossible" position. The results achieved with fully custom build software for all modeling, animation and playback (virtually no 3D technology was available to us at that time :-) keep amazing people many years afterwards. BTW a real world model of the cuboid was

constructed out of wires - unfortunately the model hasn't survived the attention it generated and it has felt apart...

There were more independent attempts to reconstruct paradoxical objects, e.g. on pages named Escher Revisited or Escher's Belvedere in Lego.

4. Interactive hypermedia. The dynamic example given in Figure 8 has the interactive VRML counterpart. It can be found at http://www.icg.tu-graz/~grabner.

The family of the observed categories may be refined. For instance, the category of web animations has the subcategories analogous to categories 1 and 2 for static images but they can be employed in pieces of animation. The same remark applies for interactive web pages, applets, etc. Here belongs the well-known page The End of the Internet.

Note that web graphics creations are often combined with multimedia. The survey of multimedia coordinates can be found in [1]. We may paraphrase [9], p. 112: "Human beings are apparently very good at remembering qualities of jokes…" It is said that the lecture should be started with a joke. This opens the alternative channel for communication, even, frequently, no lecture follows.

We have observed the images communicating the paradoxical story, pictures for two viewers, paradoxical images displaying 2D or 3D scenes, animations, videos and even the interactive implementations for educational purposes (the instance is given below). Moreover, to web graphics belong **emoticons**, semigraphics minimalist symbols for expressing emotionality in the text mode. The survey of them gives e.g. the awarded Helwig's Dictionary by H. Loeffelman. The example concludes this paragraph. given several lines below. Unlike emoticons, optimised to a few bytes, the largest instances of Bakhtinian communication are the paradoxical movies realized as videos or animations, silent or multimedia ones with the sound.

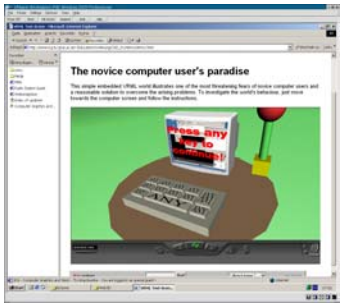

Figure 8: The novice computer user´s paradise. Interactive VRML world by Markus Grabner. The prompt "Press any key to continue!" and a keyboard where any key is ANY.

5. Implications

This paper introduces a formal coding of ambiguity of visual patterns. It is indeed an interesting problem worth studying and relevant to multimedia computing, as pointed in one of reviews. There are direct implications to user interface and/or scientific vizualization with/of ambiguous information.

1. The user interface must offer the menu for edit, save, read, etc. of files with coded ambiguities. **2.** The vizualization of B-information is a completely open problem. **3.** The key problem of this way of thinking is the application of unambiguous method of coding to the ambiguity. **4**. The use of context for the data compression is signalised by Andrew Glassner: you may listing the chord notes in text, listing the chord notes on the staff lines, depict the picture of a chord for guitr and – simply name the chord [10].

We have given the renaissance or Enlightenment analogy for internet. Guttenberg and Tim Berners-Lee discovered principally new means for communication. It lasted many years until Rabelais synthetised the new situation in a cult novel masterpiece and about 5 centuries until Bakhtin gave the explanation of what happened with the renaissance understanding. Web graphics and hypermedia await the future Rabelais and the future Bakhtin. Having no better explanation we can live with the Bakhtinian understanding. By the way, it works pretty well. ☺

6. Acknowledgements

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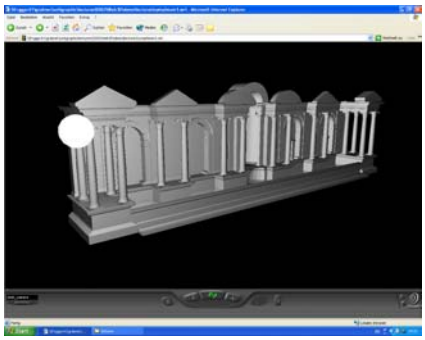

Figure 9: Intentionally wrong (none) light intensity attenuation for educational purpose. Interactive VRML worlds by Markus Grabner.

Appendix

The pseudocode encoding proposal of example E5.

```
Begin_ambiguous_information_code FILE_NAME
 {Bibliographical_data} { if any }
 Descriptor_of_ambiguity_type COMIC
 Number_of_different_contexts 3
 Ordering_of_contexts ( CGM, IS 646,SMDL )
 Time_extent 00:00:20 { from zero }
 {Descriptor_of_private_coding}

 Begin_ambiguity_in_time    00:00:00    to
00:00:20
 Begin CGM "file_name_1" { set S1 }
 { black square } { part P1 }
 End CGM
 Begin IS_646 "file_name_2" { set S2 }
 { "yellow circle" } { part P2 }
 End IS_646
 Begin SMDL "file_name_3" { set S3 }
 { g-g-g-es } { part P3 }
 End CGM
 Begin_comment_record { record R }
 { SDML }
 { CGM relativises IS_646 }
 End_comment_record
 End_ambiguity_in_time00:00:00 to 00:00:20
...
End_ambiguous_information_code
```

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