

Expert Systems as Adjuncts in Assessing the Interpretation of Print Advertisements by Potential Customers

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Abstract: - Marketers need to assess the interpretation of an advertisement by the public prior to, during and subsequent to its release. This is a difficult task, because it aims at obtaining, in an artificial survey environment, spontaneous interpretations similar to what respondents are likely to make when encountering the advertisements in the street. In order to ensure the validity of results, the present study follows the communication interpretation model suggested by Relevance Theory. Based on this model, a three-section questionnaire was devised to assess the interpretation of five print advertisements, with the help of an expert system built in the *Corvid* platform developed by *Exsys*. The bulk of work was allotted to encoding the system, namely to defining three types of variables, and building the logic and command blocks. In the end, the system confirmed that, indeed, it was able to provide four types of answers: the respondent's initial assumption, her assumption after viewing the advertisement, the cognitive effect (if any) responsible for the change of assumption, as well as the interpretation that the respondent makes of the advertisement.

Key-Words: - marketing, expert system, print advertisement, interpretation, Exsys Corvid, Relevance Theory

1 Introduction

Advertising is a multi-billion industry which has stopped being a complementary business operation for a long time. It has indeed become the “soul of

the business”, the prime source of competitive advantage of any organisation [7].

Print advertisements date back to the beginnings of advertising, and still remain one of the most efficient categories. Their immediate impact is due

to their ability to compress a wide array of meanings into textual and graphic elements, as well as to their extensive coverage in almost all possible media: from the press, the Internet, to posters and other external media [3][6][7][11].

However, it is not enough for an advertisement to be in the media; it needs to be known by its audience in order to really exist [2][7]. This is why advertising agencies need to make sure, prior to, during and after an advertising campaign, that their advertisements manage to catch the public's interest [5][6].

Over the course of time, the need to evaluate advertisements at every stage has created countless evaluation tools. They are attributable not only to the continuous emergence of new technologies, but also to different stances as to what measures an individual's interpretation of the advertisement, whether it is the advertisement's words, pictures, a mixture of the two, or the individual's feelings, beliefs and/or purchase behaviour.

This study is also the fruit of technological development, combined with a theoretical interpretation stance. It uses the tenets of a generic theory of human communication, Relevance Theory, applied to advertising communication, and incorporates them into an advertising interpretation questionnaire which is backed by an expert system developed in Exsys Corvid. The interpretation evaluation tool which is the outcome of this research is not only useful, but necessary for a relevant assessment of what a print advertisement means to a wide variety of individuals.

Henceforth, our paper shall discuss the different stages that led to the formation of the expert system behind the online questionnaire. Our first attempt is to explain the concept of relevance, as it stands at the core of our measurement tool. This will enable a clearer understanding of our study objectives. Afterwards, the main focus will shift to the construction of the expert system behind the questionnaire, which will prove the achievability of the objectives.

2 Relevance and Advertisements

The question here is how an advertising evaluation tool can measure a somewhat homogeneous advertising message along so many individuals who each have their own way of interpreting it, resulting in countless heterogeneous meanings.

Meaning in advertising is determined by two factors: the creator's intentionality, on the one hand, and the reader's cognitive environment (corresponding, roughly, to her knowledge and

beliefs), on the other [10][11][13]. Therefore, in order to take hold of the meaning of an advertisement, it is necessary to consider variations in cognitive environments, as they function as a filter for intended meaning. Our meaning measuring tool uses relevance as a fundamental concept in determining what part of meaning is filtered by individuals.

It is time to explain what relevance is, and how it is of any help to our endeavour. Every day, one is bombarded with information, which roughly falls into two categories: relevant or irrelevant (to one). One unconsciously submits every bit of information to relevance assessment and, based on it, one either pursues its interpretation (and, consequently, integrates it into one's cognitive environment), or rejects it as irrelevant. This applies to advertisements, as well: a bald man will tend to ignore an advertisement for a hair conditioner. In other words, the meaning of an advertisement for a person is only what is relevant to her and her alone.

But how can the meaning of an advertisement be rated as more relevant (to an individual) than another, and thus be considered the more likely meaning to be associated with the advertisement (by the individual in question)? According to Relevance Theory, when two meanings require the same amount of processing effort to arrive at, the richer in cognitive effects will undoubtedly be more relevant, and therefore preferred to the other [13].

So far, one can draw the conclusion that interpretations are ranked by their relevance, which is measured by the cognitive effects of the interpretation on the individual. This requires a clear description of what cognitive effects represent.

There are three types of possible cognitive effects that an assumption (or interpretation, in our case) may have on an individual's cognitive environment: contradiction, strengthening, or contextual implication [11][13].

| CONTRADICTION | STRENGTHENING | CONTEXTUAL IMPLICATION |
|---|---|--|
| Contradicting an old assumption. | Strengthening an old assumption. | Combining with an old assumption to yield a conclusion |
| new assumption = stronger > opposite old assumption | new assumption = stronger > same old assumption | new assumption + old assumption -> derived conclusion |

Fig. 1. The three types of cognitive effects of an assumption (Source: adapted from [13])

For instance, a hair conditioner advertisement for a competing brand might contradict one's opinion that the product one uses is the best on the market. Or, on the contrary, it might strengthen it, so that one's new positive assumption about one's brand

will be even stronger than the previous one. Or, if the person has problems when drying her hair, and the advertisement tells her that conditioner X helps in such occasions, she will derive the contextual implication that conditioner X will help her in drying her hair. However, the same advertisement lacks relevance to a bald person, as it fails to produce any cognitive effects on him.

Therefore, out of a series of possible interpretations for an advertisement, it is possible to sort out the ones which are most relevant for most individuals by assessing whether they have any cognitive effects on the individuals.

3 The Questionnaire: Objectives

After laying down the theoretical grounds of the study, the attention will turn to the questionnaire proper. Next to its purpose, special attention will be allotted to the method used in devising it, as well as to the rationale behind its structure.

Our study has two main objectives:

1. to obtain interpretations of five selected print advertisements from a certain number of subjects;
2. to identify the most widespread interpretations and explain their occurrence.

The two objectives were achieved separately, dividing the study into two steps. In order to achieve the two main objectives, not one, but two questionnaires, had to be devised: a classic open-ended questionnaire (for the first objective), and a close-ended questionnaire built on an expert system (for the second objective). It is the second that stands at the core of the present paper and will be referred to hereafter as “the questionnaire”; however, some words must also be said of the means used to achieve the first objective, without which the second stage of the study could not have been reached.

3.1 First Objective

The semi-free questionnaire used to achieve the first objective consisted of five print advertisements, below which the subjects were asked to write their own interpretation of the advertisement. Following Freud’s free association model in psychology, the subjects were expected to write down freely their thoughts as they occurred; what made the task semi-free is that the subject’s mind could not run freely in any direction, but only towards what is related to the advertisement.

This approach is also in accordance with the relevance-theoretic view that individuals interpret

advertisements semi-freely, i.e. based partly on the advertisement and partly on their cognitive environment, deriving from it interpretations which are relevant to them [13].



Fig. 2. The open questionnaire used in step 1 of the study (Source: screenshot from the first advertisement)

3.2 Second Objective

In order to proceed to the second objective, it was necessary to make a selection of the most frequent interpretations in step 1. After this first selection, it was still necessary to narrow them down, with the help of another questionnaire - the main focus of this paper. At the same time, this second questionnaire was meant to provide the necessary data to account for the individuals’ preference for an interpretation over another.

The study hinges on the assumption that, other things being equal (i.e. the advertisement), the different interpretations of advertisements will be accountable by the different cognitive environments of the various interpreters. Thus, we devised a questionnaire testing assumptions which reveal aspects of the individuals’ cognitive environments before (t_1) and after (t_2) viewing the advertisement.

The difference in the cognitive environment of an individual, reflected by the change of one of their assumptions from t_1 to t_2 , is the result of viewing the advertisement. This is where lies the meaning that the advertisement has for that particular interpreter. Following Relevance Theory, whenever the logical structure of an assumption changes from t_1 to t_2 , the advertisement carries a relevant assumption for the interpreter, i.e. it has some meaning for the interpreter. Moreover, the change of the assumption from t_1 to t_2 is the result of any of three types of cognitive effects (strengthening, contradiction, or contextual implication).

In conclusion, the difference in an assumption from t_1 to t_2 is what evidences the cognitive effect of

the advertisement on the interpreter. Therefore, the questionnaire was expected to test three variables (the individual's assumption at t_1 , the very same assumption at t_2 , as well as the cognitive effect in hand), in order to reach the final goal, the interpretation.

Fig 3. The classic version of the questionnaire in step 2 (Source: screenshots from the three sections of the questionnaire)

Our endeavour was marked by a first failed attempt, in the shape of a classic questionnaire, as illustrated in Fig. 4. Nevertheless, the basic concept behind it was not wrong at all: a first section identifying initial assumptions, a second section allotted to viewing the print advertisement, followed by a third section identifying any changes in the assumptions triggered by section two. The problem was in the classic questionnaire's failure to compare questionnaire choices selectively (ex. the choice for item 1 in section 1, compared with the choice for item 1 in section 3). But even if it did manage to do that, it would still not be able to label these changes in an intelligent way as one of the three types of cognitive effects listed before. And, without these elements, it would be practically impossible to reconstruct the meaning of the advertisement out of the subject's choices in the questionnaire.

Therefore, the classic version of the questionnaire had to be abandoned. This is where the idea of an expert system fitted very well with the need to intelligently sort through the respondents' answers and interpret them in a smart way. However, this did not mean abandoning the three-section structure (initial statements, the viewing section, and final statements that check any changes in the individual's cognitive environment).

The important change is that the new system was able to show four types of co-dependent results for every assumption in an intelligent way:

1. the interpretation of the advertisement (which determined the change in the assumption);
2. the cognitive effect (responsible for the same change);
3. the individual's initial assumption;

4. the individual's final assumption after viewing the advertisement.

For example, when the advertisement for McDonald's created a change in an individual's assumptions about the company's environmental practices, the system detected it, put a label on it (the cognitive effect), and reconstructed the interpretation that the individual might have made of the advertisement.

4 Designing the Expert System

Expert systems have proven highly versatile in providing solutions in a wide array of business sectors [4][8][9]. The reliability of their solutions is due not only to their emulating the decision-making process of human experts in the field, but also to their possibility to deconstruct the reasoning process that led to any solution [8].

Expert systems consist of two environments: the development environment and the consultation environment. The development environment is used by those who build the system (who always update it with data from experts in the field and make use of the data generated by the system). System users, on the other hand, use the consultation environment to obtain advice and solve specific problems.

As for our system, it was primarily designed to provide to its developers the four types of results listed before.

According to Turban et al. [12], the steps to be taken in designing an expert system are the following: defining the problem, acquiring knowledge, selecting the system building tool, encoding and evaluating the system.

In designing the system, we have gone through the following steps, in this order:

1. Defining the problem involved stating what the system is intended to do, namely sorting and interpreting the responses of subjects on various topics related to advertising messages, as well as quantifying the effects of advertising on the subjects who completed the survey.

2. Acquiring knowledge: aimed at obtaining all the data needed to build conceptual models and a complex knowledge database to be included in the system. Situations that required solutions were identified, as well as features that the system used to make decisions and recommendations.

3. We chose to build the system on *Exsys' Corvid* due to the ease of using, implementing, updating and maintaining these systems.

4. Encoding the system (converting the questionnaire logic into the syntactic forms used by *Corvid*) involved completing three types of

operations that are specific to the platform, namely: defining variables, building logic blocks, and building command blocks.

Variables are major factors involved in solving the problem. We defined three types of variables: static, collection and confidence variables.

Defining static variables meant setting system messages addressed to users before and after viewing the advertisements, together with response variants. In other words, we introduced into the system the questions and answers that appear on the final user interface, in the questionnaire proper.

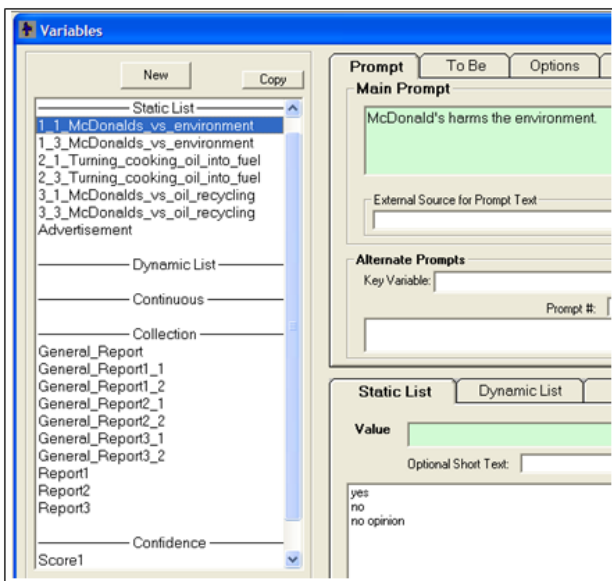


Fig. 4. System variables. (Source: Screenshot from the application, copyright Exsys Inc [14])

Collection variables were defined in order to provide final system reports, while confidence variables were created in order to quantify user responses. At this stage, we also designed the system interface by customizing the header, message display, response variants, the background, picture display etc.

Then we proceeded to the logic block, *the reasoning base of the system* [9]. It was built using the decision rules previously set in the knowledge collection and representation stage.

Using IF-THEN rules, we quantified each response option by assigning numeric values to confidence variables, and established the results to be displayed in the reports provided by the collection variables.

The logic block was designed so that, in the end, depending on the values of the confidence variables, the system is able to evaluate the effect of advertising on system users (one of several types of cognitive effects- desired or undesired, or no effect),

as well as the interpretation that the system user attributes to the advertisement.



Fig.5. The system logic block. (Source: Application screenshot, copyright Exsys Inc [14])

The system design was completed by defining the command block. The command block determines how the system will interact with the user, including the order of execution and the final interface of the results generated by the system.

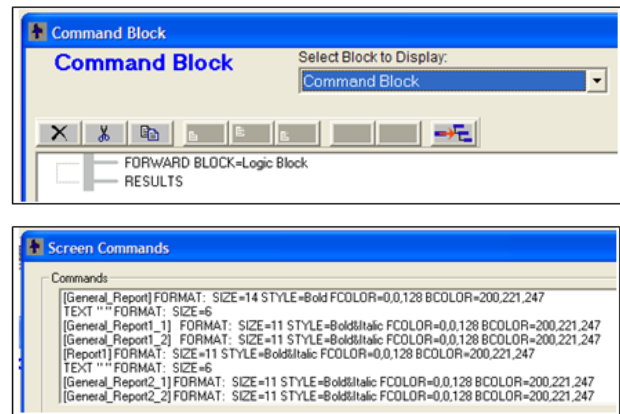


Fig. 6. The system command block. (Source: Application screenshots, copyright Exsys Inc [14]).

5. Evaluating the system included verifying and validating the system. Verifying ensures that the knowledge database contains all the acquired data and that there are no errors in the encoding stage. Validating confirms that system can solve the submitted problem correctly.



Fig. 7. The online questionnaire. Screenshot while running the application.

After completing the questionnaire, the system displays an easy-to-use, user friendly interface, consisting of the results. The system is able to sort and interpret user responses, providing thus the four sets of results which we need for a relevance-theoretic interpretation of print advertisements.

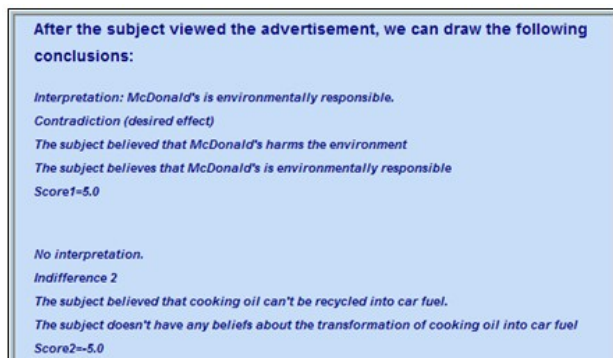


Fig. 8. The results after filling in the questionnaire. Screenshot while running the application.

5 Conclusion

An expert system was the right solution only due to the appealing interface it establishes with the survey respondent, but especially owing to its intelligent way of adding up selectively response numeric values and providing consistent interpretations. The system was able to integrate tasks which in a classic questionnaire would have required days of statistic work. Moreover, it was able to create inner connections between responses depending on system user responses: once the user answers two questions that are linked in the system, the numeric values of their answers are added up instantaneously.

This leads to three results for each advertisement (i.e. three interpretations of the user's responses): the user's initial assumption, the user's assumption after viewing the advertisement, as well as the cognitive effect responsible for the change in the assumption. And these three results offer the key to the fourth and most important result at hand: the user's interpretation of the advertisement (see Fig. 8).

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