On the Impact of Fallacy-based Schemata and Framing Techniques in Persuasive Technologies

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Abstract. Persuasive technologies can adopt several strategies to change the attitudes and behaviors of their users. In this work we present some empirical results stemming from the hypothesis - firstly formulated in [3] - that there is a strong connection between some well known cognitive biases reducible to fallacious argumentative schemata and some of the most common persuasion strategies adopted within digital technologies. In particular, we will report how both framing and fallacious-reducible mechanisms are nowadays used to design web and mobile technologies in domains ranging from e-commerce [4] and news recommendations [1] to the jihadist propaganda. We will also show how and to what extent such persuasive strategies have an impact in nudging the choices of the users in digital environments.

1 Fallacies, Framing and Persuasive Technologies

Logical fallacies are a particular class of non-deductive inferences studied in logic since the antiquity [2] (the first classification of such reasoning schemas goes back to Aristotle in the *De Sophistichis Elenchis*). They, in fact, enjoy a special status: even if invalid from a formal point of view, appear as plausible and therefore are psychologically persuasive. During the centuries different research areas such as logic, rhetoric and argumentation theory dealt with the problem of fallacies, pointing out that they are suitable techniques for achieving persuasive goals [2]. Recently, the connection between fallacious-based arguments and their use in the area technology-based persuasion has been first pointed out by [3, 4], where we created a persuasion matrix mapping some well-known fallacious arguments to some design features available in websites and mobile apps. In the rest of this section, we briefly present the identified connections between some well-known logical fallacies and some of the techniques used in the field of persuasive technologies (the results obtained by such connections are discussed in detail in the referred papers)[3].

The logical fallacy known as "appeal to the majority" (or Argumentum Ad Populum), consists of accepting a certain thesis based on the mere fact that the majority of people accept it. A typical characterization of such a fallacy is: "Most people think that X is true/false, then X is true/false" (where "X" can be any statement). This fallacy can be compared to those strategies, commonly used in the realm of persuasive technologies, which owe their persuasive potential to the exploitation of social dynamics and is associated to the presence of best-seller products in website and mobile apps. Another well known fallacy, based on the so-called *halo effect* according to which a positive evaluation on a specific aspect (e.g., physical attractiveness) produces a halo which determines an extension of such an evaluation to other, unrelated, aspects (e.g., expertise in a certain field), is the so-called "appeal to the authority" (also Argumentum Ad Verecundiam). It refers to cases of inappropriate transfer where some theses are assumed to hold merely because the people asserting them are wrongly assumed to be authorities about a certain topic due to their achievements and fame obtained in other, unrelated, fields. This fallacious arguments hold when some improper testimonials are used to nudge a given product or idea vehiculated via digital technologies. The Accent, finally, is a fallacy occurring when a particular emphasis on a part of a sentence is used to manipulate the actual meaning of a proposition. It is commonly adopted with a persuasive intent in computer technologies, especially in its visual variant where certain elements are made more visually prominent in order to emphasize (or de-emphasize) them. A common example of the (visual) accent fallacy occurs when special offers (e.g., discounts) are highlighted with big fonts and bright colors, while the possibly restrictive conditions to enjoy them are made scarcely visible. This kind of presentation is fallacious since the inference drawn by the users is than one of considering relevant the emphasized information (e.g., the suggested conclusion is: take the special offer!) and not relevant the de-emphasized one (in our example: the restrictive constraint conditions). Finally, another well-known persuasive technique that is not fallacious per se but is based on some well-known cognitive biases in human decision making - is the so-called framing effect. It refers to the role of the context in shaping people's decisions. In fact, using a particular wording instead of another might determine a different configuration of a given problem that consequently, may lead to a given interpretation of a sentence's meaning. Our analysis show that the combined use of fallacy-based techniques has an impact on almost half of the users. Finally, we found that negative framing, combined with visual accent, represents a quite effective persuasive strategy.

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[3] We mention here only a subset of the matrix proposed in [3].