How Can Intelligent Persona Systems Support Online Advertisers' Daily Work Tasks?

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Abstract. This chapter discusses the role of personas–more particularly, intelligent personas, which are personas enabled by intelligent systems, in online advertising work. Through a conceptual analysis, we find that intelligent personas can contribute to all central parts of the online advertising work process, including segmentation, targeting, ad creation, account structuring, optimization, and reporting. We discuss an intelligent advertising system in which personas are a central hub for actions.

Keywords: Personas, Intelligent Systems, Intelligent Personas, Online Advertising

1 Introduction

This chapter discusses the role of *intelligent personas* and *intelligent systems (IS)* in supporting online advertising work practices. We first define key concepts and then describe online advertising work practices. Afterward, we conceptually analyze how intelligent personas and systems can help in this domain.

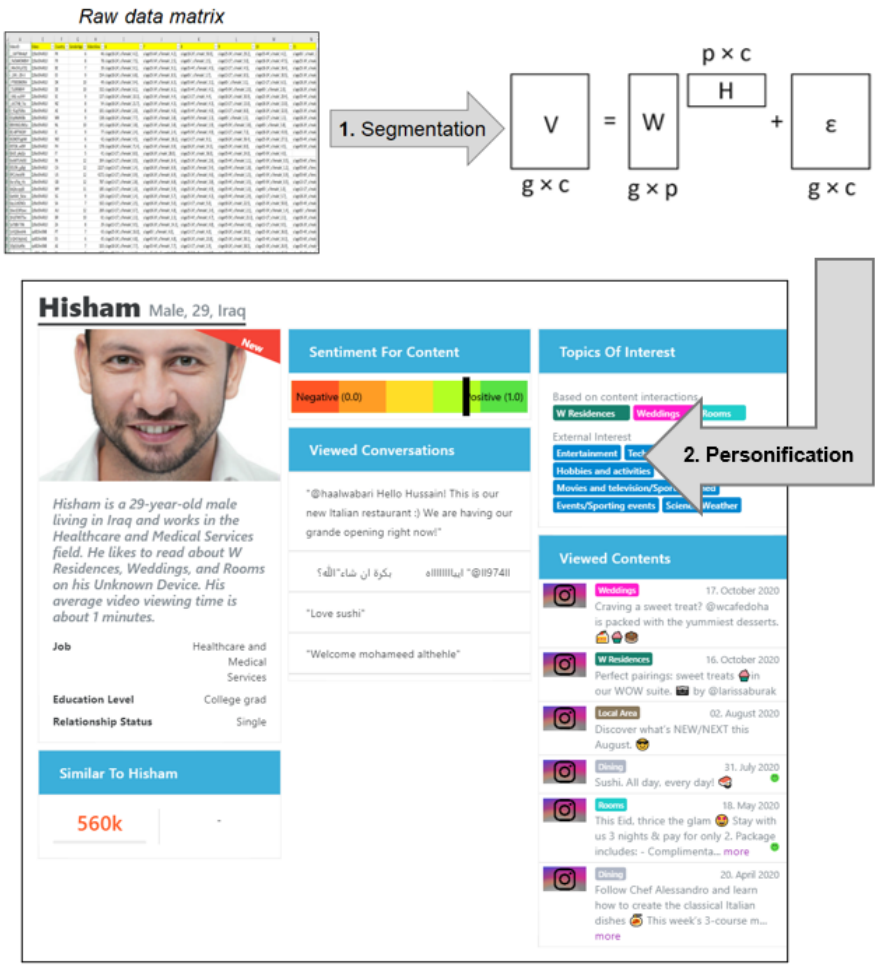
Personas (also known as 'user personas,' 'marketing personas,' 'buyer personas,' and so on) are fictitious representations of groups of users or customers, usually presented as profiles (see Fig. 1) that marketers use to understand how a product will be used by groups of people with different needs, interests, and backgrounds [40]. Personas are typically based on research and data collected about customers, which is then segmented and enriched to create persona profiles. Personas can be applied in many use cases, including market segmentation, customer segmentation, targeting, ad customization, and so on (we will discuss these use cases later in this chapter).

Intelligent personas can be defined in two ways: (a) the intelligent features of an interactive persona system or (b) personas generated using *Artificial Intelligence* (AI) and machine learning (ML) technology. Related concepts include AI persona [22], data-driven [38] or algorithmically-generated personas [45]. In the literature, intelligent personas are associated with understanding web and social media analytics data; that

is, they represent an alternative to numbers, graphs, and tables in the process of forming an idea or mental model of "who our customers are" [24,27,28,44,46].

Interactive persona systems provide a user interface (UI) for interacting with the personas, for example, to learn more about the personas' needs [9,11,12,14,27]. In these interactive persona systems, the persona is no longer a flat file such as a piece of paper or a static online document but an entity whose information the advertiser can access interactively by making choices, such as searching, filtering, and simulating likely responses.

Intelligent persona systems take this interactivity one step further by incorporating intelligent features into the system's use. These intelligent features aim to help advertisers make the most of personas and achieve their advertising objectives better.



Outputted persona profiles

Fig. 1. An example of an algorithmic persona creation process that results in a data-driven persona profile. The persona profile can connect to intelligent features of an intelligent persona system. From a technical perspective, intelligent personas rely on standard ML techniques, but presenting a cluster as a fictive persona is valuable since it enables the advertiser to understand customer characteristics in a simple, non-technical way. Thus, intelligent personas exemplify how to present statistical constructs in a human-centered way.

Intelligent systems (IS) perform functions that typically require intelligence when done by a human [19]. This includes planning, analyzing, interpreting data, and making decisions—all tasks requiring cognitive capability. Examples of IS include self-driving cars, expert systems (in medical diagnosis, for example), and robotics; however, any system that carries out tasks requiring intelligence is an IS.

Intelligence refers to thinking and reasoning. From an etymological perspective, the word *intelligent* comes from the Latin verb *intelligere*, which has a close meaning to "to understand." "Intelligent" is the possession of capacity for specific cognitive capabilities such as abstraction, logic, understanding, learning, reasoning, emotions, creativity, and problem-solving [53,56]. In the context of IS, intelligence refers to the ability of a machine or system to perform cognitive tasks that are typically performed by humans, such as natural language processing (NLP), acquiring information, image recognition, clustering, recognizing patterns, making decisions, and so on.

Online advertising involves using the Internet to accomplish communication and performance goals related to branding, sales, and other strategically valuable areas [1]. Traditionally, the advertising process consists of market research, strategic planning, media mix planning and buying, ad creation, performance evaluation, and reporting [41]. These steps require multiple activities related to analyzing consumer behavior, following recent trends in technology and consumer preferences, monitoring competitors and best practices, and evaluating performance.

2 History of Intelligent Advertising

One of the earliest references to "intelligent advertising" in marketing academia is by Moriarty in his 1925 article in The American Economic Review [39]. Moriarty's definition of intelligence in advertising is centered on economic efficiency, i.e., maximizing the conditions for profitable advertising to achieve its objectives with the minimum possible cost for the advertiser. This tenet has persisted over time and is as relevant today as it was nearly a hundred years ago. However, what has changed is our understanding of the role of human conditions in the advertising process – namely, the complexity of persuading and re-persuading target groups to take action that we, as advertisers, wish they would take.

Since Moriarty's times, advertisers now benefit from many tools that were not available for the scientific advertising pioneers (e.g., Claude Hopkins) in the 1920s, and here we emphasize that these tools contain not only software technology but also conceptual frameworks. Alongside AI, central concepts used among industry players and scholars include ML, IS, intelligent advertising [53], computational advertising [59], and so on. Collectively, these concepts emphasize the ever-increasing role of

technology as a toolbox for advertising work. However, tools often offer a pretense of simplicity while cloaking the underlying mechanisms, either under technical jargon or contemporary buzzwords, without specifying what each tool does. So, it is worth to critically examine the value propositions of such software tools when analyzing how "AI" and "intelligence" actually assist in advertising work.

McCarthy and Hayes [37] compared the outputs from content analysis conducted by humans and algorithms, and their results suggested that humans may display better performance than machines in terms of coding some brand-specific content, such as brand identification and sentiment analysis, which is also known as opinion mining [6]. This issue was exemplified by a failure in targeting mechanisms based solely on text and traditional keyword matching. An example might be that a blogger complaining about the safety of a car brand is ultimately exposed to ads from that brand since the topic of the article and the use of keywords matches quite well [42]. In other tasks, however, ML models already outperform humans, for example, in distinguishing real product reviews from computer-generated ones [48].

In parallel to the previous example, Thomas and Fowler [54] underline the possibility that AI-based influencers (also known as 'virtual influencers') might act in a way that can damage the brand's reputation and state that using a human celebrity could mitigate that risk. Thus, IS-based advertising may induce some challenges to the value of the work and the originality of human creativity and empathy [10]. The virtual influencer argument, however, overlooks the fact that humans ultimately control the virtual influencers, as human creators either design the prompts for content generation or even the whole virtual influencer, thus entitling humans the decisive power in how virtual influencers are deployed in social media marketing.

These examples and perspectives illustrate the role of creativity and the reasoning abilities of the human component regarding the key functions of online advertisers [42]. Nevertheless, dehumanization in the advertising industry is a possibility as novel algorithms are developed to replace the human component and start to mimic humane features such as emotions and empathy. Indeed, some tasks that formerly required the human component, such as content creation and ad copywriting, can be carried out by large language models (LLMs) such as ChatGPT (also known as Generative AI). Hence, online advertisers should be prepared and improve themselves so that they know the basics of AI applications in online advertising, the role of creative components, and what to do to compensate for the weaknesses of the existing technologies.

Intelligence in online advertising is promising since IS can simulate or mimic human intelligence and learn from previous experiences, improve themselves over time so that they can perform a given task with increased accuracy and efficiency, and provide more effective and intelligent decisions when compared to traditional (non-intelligent) advertising [8].

3 Challenges and Opportunities in Online Advertising Work

The everyday online advertising work typically involves creating and managing digital advertising campaigns, writing ad copytexts, and analyzing and optimizing campaigns

based on their performance. Online advertisers use different online platforms such as Google Ads (search advertising), Facebook Ads (social advertising), and various publisher websites (programmatic advertising) [7,17,59]. In this chapter, our thesis is that marketing professionals would benefit from the additional support of intelligent personas (and persona systems) alongside the other systems they use. In the most basic example, intelligent personas can be used to create more customized and relevant campaigns. By understanding a specific target audience's demographics, interests, and behaviors, advertisers can craft messaging and imagery that resonates with that audience. However, as we will discuss, the use cases of intelligent personas go far beyond this basic example.

As online advertising is rapidly evolving, online advertisers face several challenges in their daily activities.

First, managing the daily activities and technological tools in the online advertising space is continuously becoming more time-consuming due to the technologizing of marketing [30], as advertisers are exposed to information from different tools and platforms. In particular, the application of AI into online advertising, with concepts such as computational advertising [23], has occurred so rapidly that advertising concepts have dramatically changed, and this rapid change brings unclarity to the work definition, i.e., what do online advertisers actually do? The insufficiency of literature regarding the mechanisms of advertising and the examination of IS has raised a need for in-depth research [41].

Second, compared to previous decades, online advertisers are now bombarded with massive amounts of data and literature from different sources, resulting in the difficulty of finding reliable and relevant sources of information, as well as making sense of the influx of marketing data.

Third, another problematic idea in advertising technology is centered on the belief that AI might replace the human component (or 'human touch' [36]). This skeptical point might threaten the peace of mind felt by online advertisers. Particularly, Snee and Smulowitz [52] touched upon how the role and scope of AI should be in online advertising work practices (p. 255):

> *"Computers are not going to replace creative pros – but machine learning and artificial intelligence can be powerful tools in the storytelling process. AI should be used for 'grunt work' to provide more time for humans to recognize, develop and take advantage of insights to produce outstanding creative work for their clients."*

In the Journal of Advertising, creativity is mentioned as a defining feature of advertising, and advertisers are distinguished from other practitioners by their creative skills [5,57]. Prior studies distinguish the creation process of AI from that of humans by their motives, such that AI creates based on the established precedence [5,57]. In contrast, human creativity originates from a meaningful purpose [34], i.e., pursuing a specific target or goal. However, this view may be contested as intelligent algorithms also optimize for a goal, e.g., minimizing a loss function [31]. Neural networks, for example, rely on a backpropagation algorithm to adjust the neurons' weights based on observed classification errors, gradually improving the accuracy of the network [4]. So, there are both differences and similarities in how humans and algorithms operate

regarding online advertising tasks. Nonetheless, as in any knowledge work, also in online advertising, a fundamental question in computer-assisted labor is [49]: *How can tasks between advertisers and algorithms be distributed in a way that optimally reaches advertising goals?* Here, intelligence plays a role.

So, while online advertising has many challenges, novel technologies also bring about many opportunities. One of the major advantages of IS-enabled advertising is the automated analysis of consumer behaviors and characteristics. However, with the emerging AI technologies, big data is obtained from several sources or providers, and it is essential to process and filter that data to achieve a meaningful output. Such data includes users' web and shopping search history, click and skip rates, previous purchases, geographical position, and demographic information (age, gender, etc.) [7], click-through rate (CTR) [51], user-generated content (UGC), and so on.

4 Toward Intelligent Persona Systems

So, what does the work of advertisers *really* entail? Let us consider the key elements involved (see Fig. 2). Firstly, there is *segmentation*. This involves dividing the overall market into distinct and identifiable groups, known as segments. One effective approach is to utilize personas as segments, represented by specific individuals with names and faces. By employing personas, segmentation can be carried out in a persona-driven manner, resulting in the creation of personas as outcomes. It is worth noting that segmentation also involves *platform selection*, i.e., selecting the ad platforms where advertising takes place.

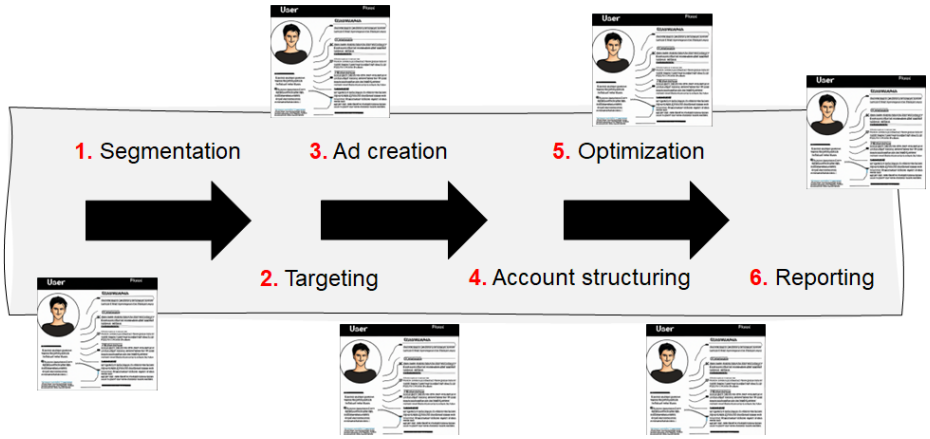


Fig 2. Keeping personas in the loop of the online advertising process.

Once the segmentation is complete, the next step is *targeting*. Advertisers determine which segments they want to concentrate their efforts on. At this stage, an IS can provide valuable assistance by recommending specific personas to target based on explicit goals such as maximizing reach, engagement, or sales. These recommendations

can help advertisers make informed decisions about the most effective segments to focus on. Using personas based on social media and web analytics data can also help advertisers to better target the population for their campaigns in terms of demographics, location, language, and timing. Additionally, personas can help identify potential growth areas and uncover new opportunities for advertisers via persona-based gap analysis [25,26].

Once the target segments have been identified, the *ad creation* process begins. This involves crafting compelling and persuasive ad content (e.g., text ads, social media ads, video ads, mobile ads, etc.). Here, an IS can be beneficial by generating personalized ad headlines, texts, and even imagery tailored to the selected personas. By leveraging data and insights about the personas, the IS can create ad content that resonates with their specific needs, preferences, and motivations – applying persona-based (group) personalization. Advertisers can create personalized ads meeting the persona's needs. For instance, based on the persona segment's historical data, it is possible to know whether the segment has made prior contact with the brand and the ads to avoid too many repeated exposures to the same content [7].

Once the ad content has been developed, advertisers move forward with *account structuring*, which involves creating campaigns within the advertising platform and configuring various settings. In this process, an IS can provide valuable assistance by establishing a structure where campaigns are organized around personas. This ensures the naming and targeting criteria align with the targeted personas [8]. Organizing campaigns based on personas gives advertisers an advantage in the subsequent stage: optimization. Furthermore, applying different strategies (i.e., campaigns) or actions to each persona becomes possible.

Optimization entails making informed decisions based on the results obtained from running the campaigns. Optimization can be defined as monitoring campaign performance and making optimizations and adjustments based on data analytics [7]. It includes, among other activities, setting feasible bids and budgets in online ad platforms [41,53]. Optimization also requires creating novel content (ad copy, images, written content, video, etc.) to keep campaigns engaging, fresh, and vivid [10,17] and analyzing audiences, and researching target audiences' attitudes and behaviors [58].

Another essential part of optimization is *platform management*, which includes experimenting with campaigning on various impactful or trending online ad platforms, such as TikTok Ads, Google Ads, and Facebook Ads [17], and allocating budgets according to performance. As the campaigns generate data, organizing this data by personas becomes beneficial as an optimization framework. When data is categorized by personas, budget allocation based on persona-based marketing performance becomes easier. Using the persona system as a hub for campaign data allows for more effective and efficient decision-making, as spending can be allocated according to segment-based responses.

Finally, advertisers are bound to report the results at regular intervals, so *reporting* is an integral part of the online advertising workflow. Here, the results can be reported as "Here is how our campaigns performed with Persona 1 (Mike)" instead of (or in addition to) reporting aggregated and unsegmented results. An integral part of reporting is engaging with other teams and individuals, including superiors and inferiors. In these

engagements, the persona metaphor can facilitate the creation of shared mental models and the intuitive communication of results.

In summary, the work of advertisers encompasses several crucial elements. It starts with segmentation, where the market is divided into segments, including personas. Targeting follows, with advertisers selecting the segments they want to target, aided by IS recommending specific personas based on defined goals. After this, ad copywriting takes place, with the assistance of IS that generates personalized ad content for the selected personas. After the ad content is created, advertisers proceed to campaign set-up, where campaigns are created and configured within the advertising platform. Utilizing an IS, campaigns can be organized around personas, aligning the naming and targeting criteria. This provides an advantage during the optimization stage, as data generated by the campaigns can be organized by personas, enabling better decision-making when adjusting budget allocation based on the actual marketing performance of each persona, as well as reporting the results.

Overall, the above process aims to result in more effective ad campaigns. By understanding the personas of their target audience, advertisers can develop campaigns that are more tailored to their customers' needs and interests, which can lead to increased sales conversions and, thus, a profitable return on investment [16].

The performance gains are based on the combination of soft and hard benefits (Fig. 3) of intelligent personas—essentially, providing customer-centric inputs when and where needed.

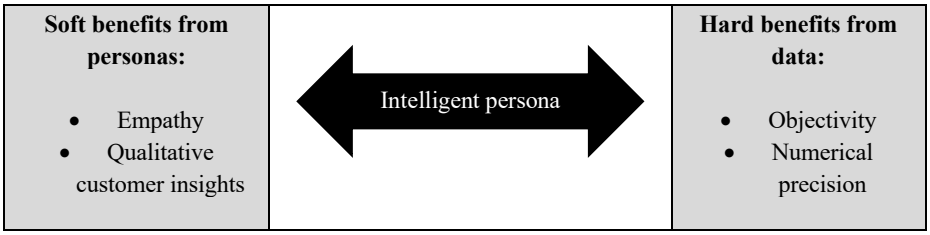


Fig. 3. Intelligent persona systems bridging the soft and hard skills required in online advertising.

For each stage, we envision intelligent persona features that support core tasks associated with the specific stage (see Fig. 3). Essentially, intelligent personas can be used to create AI-driven algorithms targeting specific audiences with tailored ads. Personas can also provide insights into how people respond to different forms of advertising, helping AI-driven campaigns to be more effective and efficient. Intelligent personas can also be deployed in predictive analytics, for example, to predict how a given persona (that represents a certain audience segment) is likely to engage with given ads before making said ads public [2]Through predictive analytics, personas can support online advertising by helping identify target audiences and providing insights into how they might react to different advertisements. This reduces the risk of wasted impressions due to ineffective advertising.

Fig. 3. Concept example. In scenario (a), we have an array of personas, each accompanied by ad text and image boxes (highlighted in red). This layout facilitates ad text creation and image selection, simplifying the process for human marketers. Moving on to scenario (b), we see a view where the persona profile for Tyler has been clicked and expanded, providing a more comprehensive look at the persona's characteristics. In this expanded view, there are also ad text columns tailored for multiple advertising channels, making ad text creation and image selection for the persona more convenient and efficient.

5 Discussion and Concluding Remarks

In addition to technological efforts, a conceptual rethinking of managing online advertising is required to extract full value from intelligent persona systems.

The accelerating rate of novel technologies has also resulted in ethical issues among consumers, cascading into the advertising profession. The application of AI technologies in online advertising was initially so rapid that it was perhaps impossible to consider the full ramifications and drawbacks of these technologies regarding societal issues such as privacy, trust, and safety [10]. For instance, billboards with built-in cameras tracking customer information such as gender, age, or mood have been placed around the shopping malls before any comprehensive debate on ethical concerns has been held [21]. During these rapid changes, online advertisers might experience a heightened sense of responsibility since they can be seen as responsible among the public with limited knowledge about AI.

Regarding privacy concerns, it is interesting to observe that some of the current changes in the online advertising industry gravitate toward models that are conceptually similar to personas. For example, federated learning of cohorts (FLoC) [32] that Google has developed to deal with privacy issues relies on mitigating the role of individualized data in favor of using (scrambled) aggregate data – a concept highly similar to personas, as personas also represent aggregate, cluster or factor groups rather than specific individuals in the customer population. This similarity should be further explored in future work, but even at this stage, it implies enticing opportunities for personas in the new privacy-protected paradigm of online advertising. Nevertheless, the heightened reliance on aggregate "averages" and "biggest groups" casts doubts on advertisers' abilities to reach marginalized groups and achieve the ideals of inclusive design [18,47].

As online advertising evolves, the ability to interpret and act on data will become increasingly important. Therefore, organizations that rapidly adopt systems that facilitate customer analysis and the formation of a customer-centric market orientation are likely to obtain a competitive advantage in online advertising. Moreover, organizations should make a real effort to embrace digital systems so that their use does not remain fragmented and isolated. Integrating online advertising in a meaningful way into marketing and business strategy is crucial to achieving and sustaining a competitive advantage and organization-wide market orientation.

In this regard, intelligent persona systems could become *hubs* for collecting customer analytics data from various sources and presenting it to stakeholders in a human-centered manner, with *persona being the central unit of analysis* in online advertising. Thus, there is a need for an intelligent end-to-end advertising system that supports human marketers' decision-making by deploying intelligent personas throughout the stages of the online advertising process, with effective API integrations with dominant online advertising platforms. To the best of our knowledge, currently, there is no such system combining intelligent personas with computational advertising.

Personas are developed by researching target audiences (customers or users) and gathering data about their interests, behaviors, and preferences. Personas may convey information about users in various areas, such as demographics, interests, social media data, consumption patterns [3], sentiment and opinions [42], pictures posted on a social

network, and lifestyle preferences [41]. Based on personas reflecting customers' characteristics and preferences, AI algorithms can process personas' information and use it for downstream tasks. It is crucial to define and create personas at the beginning of an advertising process, so the personas provide proper support.

Conceptually, such a solution could be described as an intelligent assistant that uses the metaphorical presentation (persona) to facilitate the management of an advertising campaign. The system has a generative aspect (creating the persona) and a decision-making aspect by simulating the success of a campaign or recommending specific target personas. Also, if assuming the ultimate goal of marketing automation, it would be interesting to explore opportunities to automate the design and execution of campaigns without the advertiser being in the loop.

Given that online advertisers must deal with a wide range of tasks, intelligent personas can facilitate their work by presenting crucial and well-organized information, enabling algorithms to convert massive data into more meaningful (human-centric) data representations for companies and advertisers to undertake their decision-making [58]. This is achieved by creating rich personas from web and social media analytics data from various platforms and providing descriptive attitudes consisting of textual descriptions, numbers, and images to provide efficient output to be used in several processes, such as the segmentation of target audiences, social media analytics, and user statistics [3]. Additionally, AI may utilize intelligent personas and process them to provide insights and analytics for online advertisers to assess customer behaviors and predict successful campaign strategies.

Ideally, AI can automate several manual tasks, which are time-consuming and labor-intensive. In online advertising, decision-making ranges from insight formation to targeting, campaign and ad creation, reporting, and optimization. Therefore, intelligent personas are an opportunity to free up time for online advertisers rather than a substitution of the human component in strategic marketing [7] and also to improve the user experience of running online advertising campaigns. Online advertisers can use the freed time from tedious campaign management work to tackle dilemmas that require human intervention, such as ethical concerns like threats to user privacy [43], trust issues [35], failures in analyzing sentiments or the content [42], bias and prejudice introduced by advertising platform algorithms [13], and strategic decision-making about the marketing mix [15]. There is yet a need for humans.

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