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USAGE OF CHATBOTS OR AVATARS IN THE AIRLINES INDUSTRY: A CONTENT ANALYSIS APPROACH

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ABSTRACT

Recent Rapid Globalization paved way for usage of Chatbots and Avatars in many company's website and yet there are no guidelines or handbooks that will help website developers. The main aim of this research is to explain how airlines industry utilizes avatar and why it is being used. Top 100 airlines were selected based on the ranking from Skytrax website. The presence of avatars has been identified as sample by visiting every website individually. Coders need a predefined guidebook named as code book so that they can code every 12 variables with the specific level of levels varying from 1 to 4 and a Chi-squared analysis has also been done to validate the hypotheses. This study provides implications for both theoretical and for Managers to utilize avatar better and to use avatars in a cost-effective way.

KEYWORDS: Chatbots usage, Avatars usage, Content analysis, 2X2 Avatar Framework, airline industry

INTRODUCTION

The recent growth of artificial intelligence has fueled the growth of chatbots and avatars, which are capable of providing responses that are close to those of humans. Avatars are used in various industries for a variety of purposes. It is primarily used as a support system on company websites. Other applications of avatars are it is used as Virtual influencer through social media to endorse with companies for branding. Indian Instagram influencer Kyra, which has over a 200K followers in Instagram tie-up with Boat lifestyle, Realme, etc., for their branding. Other applications of avatars are in gaming where we can design our own avatars.

In recent years due to the increased use of internet, customers visit websites of each company to know about them before using their products. Companies invest more in websites so that it will be more

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appealing and user friendly for the consumer. But in this process, companies intend to provide all the information on the website. This creates information overload which in turn makes information search more difficult (Gordon, 2021), which frustrates customers because they cannot get their desired information. To overcome this difficulty, Chatbots and avatars were adopted. Avatars help the company by providing enhanced consumer experience through providing the right information at the right time, along with a humanoid appearance and personality (Walch, 2020). Airlines is one of the industries that operates from various nations. It involves various timelines, various network servers, various populations and various languages. Therefore, the airline industry was selected for this study. Even though chatbots and avatars have been used vastly; there is no commonalty between the usage of avatars and guidebooks on how a chatbot, or avatar should be and what kind of avatar are previously preferred by airlines companies. So, to address this gap, we have prepared a guidebook for reference for website developers through content analysis and also discussed why companies prefer a specific type of chatbot or avatar in airlines industry. This study addressed the following research questions:
RQ1: What type of avatars are used the most?
RQ2: What is the reason behind using the avatar the most?

LITERATURE REVIEW

Avatars are defined as "Digital entities with anthropomorphic appearance, controlled by a human or software that has the ability to interact" (Miao et al., 2021). Previous research has referred to avatars in various terms, including automated shopping assistants (Al-Natour et al., 2011), chatbots (Ho et al., 2018), virtual customer service agents (Verhagen et al., 2014), embodied conversational agents (Bickmore et al., 2009; Lee & Choi, 2017; Schuetzler et al., 2018), and virtual/digital assistants (Chattaraman et al., 2019; Freeman & Beaver, 2018). Miao et al. (2021) proposed a 2 × 2 avatar taxonomy that addresses the high and low levels of form and behavioral realism of avatars. Form realism refers to the external appearance of an avatar. Features such as dimension, mobility, gender, name, age, and ethnicity can be modified to produce different avatars. For example, Amelia is a 3D, dynamic female avatar that looks similar to a human and is used in various industries such as banking, healthcare, and insurance, with small modifications (Ipsoft, 2018). The behavioral realism of avatars can facilitate more natural interactions with users (Blascovich et al., 2002), and managers can manipulate the degree of behavioral realism using design elements associated with interactivity and controlling the entity of the avatar (Miao et al., 2021). For example, Yumi is an avatar of SK-II, a skincare company that responds to customers in a human-like manner by understanding their emotions.

Even though avatars are widely used, there is no comprehensive list of avatars that are used by various companies. This study addressed these research gaps. The following hypotheses are based on Miao's 2X2 Framework of Form and Behavioural realism. H4 is based on the location of avatar placed in the

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website.

H1: The number of chatbots/avatars with a low form realism is higher than that of the chatbots/avatars with a high form realism

H2: The number of chatbots/avatars with low behavioural realism is higher than that of the chatbots/avatars with high behavioural realism

H3: The prevalence of simplistic avatars is higher than other types of avatars.

H4: The number of avatars on the "support/contact us" page of a website is less than the number of avatars on the landing page of the avatar.

RESEARCH DESIGN

In this Study, Content analysis has been used in order to analyze how the avatars have been used on the website of airlines. To know this, top 100 ranked airlines company was taken as a population. These rankings were taken from Skytrax, World Airlines Award (World's Top 100 Airlines 2025 | SKYTRAX) which continuously awards airlines on the basis of their service and feedback from the customers. This year's top 100 has been listed in appendix 1 for your reference. Each website was manually visited and identified the presence of chatbots or avatar. If they had a chatbot or avatar, it would be considered as a sample. A table is prepared with name of the airlines, Image of chatbot or avatars present in the webpage, weblink to that page where chatbots or avatars are present (i.e., Landing page or Support page). This table will be used for coding by coders later. Out of top 100 airlines, only 38 airlines have chatbot or avatars deployed in their website. All the 38 samples are used to develop a Codebook.

Codebook development

A codebook was developed to ensure consistent categorization of avatar attributes across all 38 chatbots or avatars. Miao's 2x2 framework has been used for preparing the codebook. 12 attributes with minimum 2 levels to maximum 4 levels are listed in table 1.

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Table 1: Codebook for Coding the Avatars

Variables	Codes
Miao Framework	1 = Simplistic
	2 = Superficial
	3 = Intelligent unrealistic
	4 = Digital Human
Avatar Location	1 = Contact Us page/ Support page/ Help page
	2 = Landing page / Product page
Appearance / Anthropomorphism	1 = Message box/ Robot Head/ Cartoon
	2 = Human
Format	1 = 2D
	2 = 3D
Movement	1 = Static
	2 = Dynamic
Gender	1 = NA
	2 = Female/Male
Communication Type	1 = non-verbal
	2 = Both (Verbal & Non-Verbal)
Form Realism	1 = Low
	2 = High
Behavioural Realism	1 = Low
	2 = High
Avatar Response	1 = Non- AI / Preloaded Information
	2 = AI
User/Consumer Interaction	1 = text input
	2 = Both Text & Voice input
Response Time	1 = very fast (< 5 secs)
	2 = fast (5-10 secs)
	3 = slow (> 10 secs)

These codes are developed based on the Form realism and behavioural realism of the Miao Framework. Avatar's Location and their response time has been added in this study, is not a part of Miao's framework.

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Coding Procedure:

Two independent coders were recruited, and training was provided to them using the training set. After the training and sample training sets, they were allowed to have a discussion, and then the main codebook was given to them to code. Both were provided with a desktop PC with the same configuration, which was connected to the same network. After the coding is completed, intercoder reliability is evaluated, and it must be greater than 0.7 to achieve good agreement between the coders. A chi-squared analysis was performed to test the hypotheses.

Data Analysis:

After the completion of the coding, data leaning was done in order to identify whether there is any missing data and none found. Intercoder reliability was assessed using Cohen's Kappa (κ) for all 12 variables which is in table 2 and table 3. Perfect agreement was achieved with 10 variables i.e., $\kappa = 1$. The remining 2 variables one is format ($\kappa = 0.655$) and another is form realism ($\kappa = 0.638$) had less agreement which was primarily due to the clarity of chatbot or avatar (Cohen, 1960). Descriptive statistics (percentages and frequencies) were calculated for all variables. Additionally, Chi-square tests were employed to test the proposed hypotheses (H1-H4) concerning avatar characteristics and website placement.

FINDINGS

Inter-coder Reliability (Table 2 & Table 3)

The reliability of the content analysis was assessed using Cohen's Kappa (κ), indicating a high level of agreement between the two coders across all variables. At the hypothesis level (Table 2), the κ values ranged from 0.638 to 1.00, suggesting substantial to almost perfect agreement. Specifically, form realism demonstrated substantial agreement ($\kappa = 0.638$), while behavioural realism and avatar location achieved perfect agreement ($\kappa = 1.00$). The classification based on the Miao framework also showed strong reliability ($\kappa = 0.73$).

At the variable level (Table 3), most constructs exhibited excellent reliability, with several variables such as movement, communication type, avatar response, user interaction, and response time achieving perfect agreement ($\kappa = 1.00$). Other variables, including appearance/anthropomorphism ($\kappa = 0.721$), format ($\kappa = 0.655$), and gender ($\kappa = 0.894$), also demonstrated strong agreement. These results confirm that the coding scheme and codebook were robust, ensuring consistency and validity in the content analysis.

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Table 2: Inter-coder reliability – Hypotheses Level

Total number of avatars = 38						
	Levels and Percentage					
Variables/Attributes	**Low, *n***	**% of Total**	**High, *n***	**% of Total**	**N**	**Cohen's Kappa (κ)**
Form Realism	35	92%	3	8%	38	0.638
Behavioural Realism	36	94.74%	2	5.26%	38	1
Miao Framework (Form Realism) *(Simplistic avatars = Low; Superficial Avatars = High)*	34	89.47%	2	5.26%	38	0.73
Miao Framework (Behvioral Realism) *(Intelligent unrealistic avatars = Low; Digital Human Avatars = High)*	1	2.63%	1	2.63%		
Avatar Location *(Contact us/Support page – Low; Landing page – High)*	28	73.68%	10	26.32%	38	1

Descriptive Findings (Table 3)

The analysis of 38 airline websites revealed clear patterns in avatar design, functionality, and deployment.

Avatar Design and Realism

The findings indicate a strong dominance of low realism avatars. A total of 92% of avatars exhibited low form realism, while only 8% were highly realistic. Similarly, 95% of avatars demonstrated low behavioural realism, with only 5% showing high behavioural realism.

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Using the Miao framework, simplistic avatars were the most prevalent (89%), followed by superficial (5%), intelligent unrealistic (3%), and digital human avatars (3%). This suggests a clear industry preference for minimalistic and non-human-like designs.

Appearance and Format

In terms of appearance, 89% of avatars were non-human representations such as message boxes, robot heads, or cartoon-like figures, while only 11% resembled human forms. Additionally, 2D avatars dominated (95–97%), with very limited use of 3D avatars (3–5%).

Movement and Interactivity

The vast majority of avatars were static (97%), with only 3% incorporating dynamic movement. Communication was predominantly non-verbal (95%), with only 5% supporting both verbal and non-verbal interaction.

Avatar Functionality

Regarding functionality, 63% of avatars relied on non-AI or preloaded responses, while only 37% utilized AI-driven responses. User interaction was largely limited to text-based input (95%), with minimal integration of voice-based or multimodal interaction (5%).

Response Time

Most avatars demonstrated high efficiency, with 95% responding within 5 seconds, and no instances of slow responses (>10 seconds). This highlights the importance placed on speed and responsiveness in user interaction.

Avatar Placement

In terms of placement, 74% of avatars were located on support/contact/help pages, while only 26% appeared on landing or product pages. This indicates that avatars are primarily used as reactive support tools rather than proactive engagement mechanisms.

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Table 3: Frequencies, Percentage, and Intercoder Reliability for all variables

Variables	Codes	N of Coder-1	% of Total (Coder-1)	N of Coder-2	% of Total (Coder-2)	Cohen's Kappa (κ)
Miao Framework	1 = Simplistic	34	89%	34	89%	0.73
	2 = Superficial	2	5%	2	5%	
	3 = Intelligent unrealistic	1	3%	1	3%	
	4 = Digital Human	1	3%	1	3%	
Avatar Location	1 = Contact Us page/ Support page/ Help page	28	74%	28	74%	1
	2 = Landing page / Product page	10	26%	10	26%	
Appearance / Anthropomorphism	1 = Message box/ Robot Head/ Cartoon	34	89%	34	89%	0.721
	2 = Human	4	11%	4	11%	
Format	1 = 2D	37	97%	36	95%	0.655
	2 = 3D	1	3%	2	5%	
Movement	1 = Static	37	97%	37	97%	1
	2 = Dynamic	1	3%	1	3%	
Gender	1 = NA	32	84%	33	87%	0.894
	2 = Female/Male	6	16%	5	13%	
Communication Type	1 = Non-Verbal	36	95%	36	95%	1

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	2 = Both (Verbal & Non-Verbal)	2	5%	2	5%	
Form Realism	1 = Low	35	92%	35	92%	0.638
	2 = High	3	8%	3	8%	
Behavioural Realism	1 = Low	36	95%	36	95%	1
	2 = High	2	5%	2	5%	
Avatar Response	1 = Non- AI / Preloaded Information	24	63%	24	63%	1
	2 = AI	14	37%	14	37%	
User/Consumer Interaction	1 = text input	36	95%	36	95%	1
	2 = Both Text & Voice input	2	5%	2	5%	
Response Time	1 = very fast (< 5 secs)	36	95%	36	95%	1
	2 = fast (5-10 secs)	2	5%	2	5%	
	3 = slow (> 10 secs)	0	0%	0	0%	

Hypotheses Testing (Table 4)

The chi-square analysis results provide strong support for all proposed hypotheses.

H1 predicted that low form realism avatars would be more prevalent than high form realism avatars. This hypothesis was supported ($\chi^2 = 15.472$, $p < 0.001$), confirming a significant dominance of low form realism.

H2 proposed that low behavioural realism avatars would exceed high behavioural realism avatars. The results strongly support this hypothesis ($\chi^2 = 38$, $p < 0.001$), indicating a clear preference for less human-like behaviour.

H3 suggested that simplistic avatars would be more prevalent than other types. This hypothesis received strong support ($\chi^2 = 84.415$, $p < 0.001$), demonstrating that simplistic avatars overwhelmingly dominate the industry.

H4 hypothesized that avatars are less frequently placed on support/contact pages compared to landing pages. The results ($\chi^2 = 38$, $p < 0.001$) indicate a significant difference in placement patterns,

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confirming that avatar distribution across website pages is not uniform.

Table 4: Summary of Hypotheses

Hypothesis	Description	$\chi 2$	*df*	P-Value
H1	The number of chatbots/avatars with a low form realism is higher than that of the chatbots/avatars with a high form realism	15.472	1	<0.001
H2	The number of chatbots/avatars with low behavioural realism is higher than that of the chatbots/avatars with high behavioural realism	38	1	<0.001
H3	The prevalance of simplistic avatars is higher than other types of avatar.	84.415	9	<0.001
H4	The number of avatars on the "support/contact us" page of a website is less than the number of avatars on the landing page of the avatar.	38	1	<0.001

DISCUSSION

The findings of this study provide important insights into the design and deployment of avatars in digital environments, particularly in relation to realism and functional placement. Across all hypotheses (H1–H4), the results consistently indicate a preference for simplicity over high realism, both in form and behaviour, along with strategic placement on prominent website pages.

First, the support for H1 and H2 suggests that organizations predominantly adopt avatars with low form and behavioural realism. This aligns with the Uncanny Valley Theory, which posits that highly human-like agents can evoke discomfort among users. By employing less realistic avatars, firms may be consciously or unconsciously avoiding negative emotional responses and enhancing user comfort. Additionally, from the perspective of Cognitive Load Theory, simpler avatars reduce cognitive burden, enabling users to focus on task completion rather than interpreting complex visual or behavioural cues.

Second, the strong support for H3, indicating the prevalence of simplistic avatars, reinforces the role of processing fluency in digital interactions. According to Processing Fluency, stimuli that are easier to process are perceived more positively. Simplistic avatars, being visually and functionally straightforward, are likely to enhance usability and user satisfaction. This also aligns with Technology Acceptance Model, where perceived ease of use significantly influences technology adoption.

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Third, the findings related to H4 highlight the strategic placement of avatars on landing pages rather than support pages. This can be explained through Attention Economy and First Impression Theory. Organizations appear to utilize avatars as engagement tools to capture user attention during the initial interaction phase, rather than limiting their use to problem-solving contexts. This suggests that avatars are increasingly positioned as frontline engagement agents rather than purely functional support tools. Collectively, these findings contribute to the growing literature on human–computer interaction and digital marketing by demonstrating that functional simplicity and strategic visibility outweigh anthropomorphic sophistication in current industry practices. The results extend existing theories by empirically showing how firms operationalize these principles in real-world website design.

IMPLICATIONS

Theoretical Implications

This study makes several important contributions to the literature on digital marketing, human–computer interaction, and avatar-based communication.

First, it extends the applicability of the Uncanny Valley Theory by demonstrating that organizations systematically avoid high levels of form and behavioural realism in real-world implementations. While prior research has largely examined user perceptions in controlled settings, this study provides empirical evidence of how firms operationalize these insights in practice.

Second, the findings contribute to the Technology Acceptance Model by highlighting that perceived ease of interaction, driven by simpler avatar designs, may be more influential than anthropomorphic sophistication. This suggests that ease of use in digital interfaces extends beyond system functionality to include visual and behavioural simplicity.

Third, by supporting the role of Processing Fluency, the study reinforces that users prefer stimuli that are cognitively effortless to process. The dominance of simplistic avatars indicates that fluency plays a critical role in shaping digital engagement and acceptance.

Fourth, the study contributes to emerging discussions in the Human–Computer Interaction literature by bridging the gap between experimental findings and industry practices, offering a macro-level perspective on how avatar design principles are implemented across websites.

Managerial Implications

The findings provide clear and actionable insights for practitioners, designers, and digital strategists. First, organizations should prioritize simplicity over hyper-realism when designing avatars. Investing heavily in highly realistic avatars may not enhance user experience and could even lead to discomfort

or reduced engagement.

Second, firms should focus on functional efficiency and clarity in avatar behaviour. Simple, task-oriented interactions are more effective than overly human-like conversational styles, particularly in service-oriented contexts.

Third, the strategic placement of avatars is crucial. The results indicate that avatars are more effective when positioned on landing or home pages, where they can capture attention and guide user journeys early. Managers should therefore view avatars not merely as support tools but as engagement and conversion facilitators.

Fourth, from a cost–benefit perspective, adopting simplistic avatars can lead to resource optimization, as they require less development complexity while still delivering effective outcomes.

Finally, organizations should align avatar design with user expectations and context of use, ensuring that the level of realism matches the purpose of interaction rather than aiming for technological sophistication alone.

CONCLUSION

This study examined the prevalence, design characteristics, and placement of avatars on websites, with a specific focus on form realism, behavioural realism, and functional deployment. The findings reveal a clear pattern: organizations predominantly favor simplistic, low-realism avatars and strategically position them on high-visibility pages such as landing pages.

These results suggest that, contrary to the assumption that higher realism enhances user engagement, simplicity and usability are more critical determinants of effective avatar design. By aligning with theories such as the Uncanny Valley, Technology Acceptance Model, and Processing Fluency, the study demonstrates that organizations prioritize user comfort, cognitive ease, and immediate engagement in their digital strategies.

Overall, this research contributes to both theory and practice by showing that pragmatic design choices, rather than technological complexity, drive the adoption and effectiveness of avatars in real-world contexts. It also opens avenues for future research to explore user outcomes, cultural differences, and the evolving role of AI-driven avatars in digital environments.

LIMITATIONS AND FUTURE RESEARCH

Despite its contributions, this study has certain limitations that open avenues for future research.

First, the study is based on a content analysis of the top 100 airline websites, of which only 38 featured avatars. While this provides valuable industry-level insights, the relatively small number of avatar-enabled websites may limit the generalizability of the findings. Future research could expand the sample across multiple industries such as e-commerce, banking, and healthcare to enhance external validity.

Second, the study relies on observational content analysis, which captures the presence and characteristics of avatars but does not directly measure user perceptions or behavioral outcomes. Although the findings are interpreted using established theories such as the Uncanny Valley Theory and Technology Acceptance Model, future studies should incorporate experimental or survey-based designs to validate how users actually respond to different levels of avatar realism and placement.

Third, while the use of two independent coders and a structured codebook enhances reliability, content analysis inherently involves a degree of subjective interpretation. Future research could strengthen methodological rigor by incorporating larger coding teams, intercoder reliability statistics (e.g., Cohen's Kappa), or automated image and interaction analysis techniques.

Fourth, the study is cross-sectional in nature, capturing avatar usage at a single point in time. Given the rapid evolution of AI-driven interfaces and conversational agents, longitudinal studies are needed to examine how avatar design and deployment strategies evolve over time.

Fifth, the study focuses primarily on visible design and placement characteristics, without accounting for backend capabilities such as AI sophistication, personalization, or conversational depth. Future research could integrate both front-end design and back-end intelligence to provide a more holistic understanding of avatar effectiveness.

Finally, the context of the study is limited to the airline industry, which has unique service dynamics and customer interaction patterns. Future research could explore cross-cultural and cross-industry comparisons, as user expectations and responses to avatars may vary significantly across contexts.

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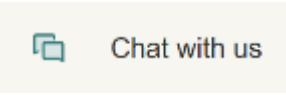
Rank 2025	Airline	Avatar Image	Website Link	Name of the Avatar/ Chatbot
2	Singapore Airlines		https://www.singaporeair.com/en_UK/in/support/kris-the-chatbot/	Kris
3	Cathay Pacific Airways		https://www.cathaypacific.com/cx/en_IN.html	Vera
6	Turkish Airlines		https://www.turkishairlines.com/en-in	TK Assistant
7	Korean Air		https://www.koreanair.com/?hl=en	Korean Air chatbot
10	Hainan Airlines		https://www.hainanairlines.com/JP/GB/Home	Xiaohai
11	Swiss International Air Lines	-	https://www.swiss.com/digitalassistant/support/webchat.html	Nelly
12	EVA Air		https://www.evaair.com/en-global/index.html	EVA

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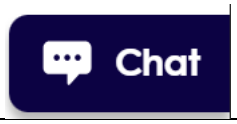
13	British Airways		https://www.britishairways.com/content/en/in/information/help-and-contacts	Random Employee
16	Virgin Atlantic		https://www.virginatlantic.com/en-IN/help	Virgin Atlantic travel concierge
17	Saudia		https://www.saudia.com/	Saudia
20	Iberia		https://www.iberia.com/	Ibot
24	Air New Zealand		https://www.airnewzealand.com/	Oscar
25	Finnair		https://www.finnair.com/in-en	Sisu
26	Etihad Airways		https://www.etihad.com/en-in/help	Etihad Airways' digital assistant
27	Malaysia Airlines		https://www.malaysiaairlines.com/hq/en/askmh.html	Mavis
28	AirAsia		https://www.airasia.com/en/gb	Bo
34	Virgin Australia		https://www.virginaustralia.com/au/en/help/	NA
35	Gulf Air		https://www.gulfair.com/	Saqer

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