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"Transforming Global Consumer Engagement with a new polyglotte digital conversational Avatar"

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1. Introduction

In today's hyper-connected and experience-driven market, consumer-centric product development has become essential in the cosmetics industry. Consumers demand more than product functionality; they seek personalized, emotionally engaging experiences that resonate with their individual preferences and cultural backgrounds. At the same time, brands face challenges in gathering scalable, reliable, and actionable insights from a diverse global audience.

Traditional consumer studies—such as static surveys or in-person interviews—often fall short in addressing these modern expectations. They lack real-time adaptability, cultural sensitivity, and emotional depth. These methods are either very subjective and limited by reducing preferences to paper questionnaires where the panelists try to explain the origins, however unconscious, of their choice, or very biased by conducting multiple interviews by experimenters who are certainly very professional but whose context strongly influences the cosmetic experience.

In this context, artificial intelligence and cognitive science offer new avenues for innovation. This paper presents a digital, AI-powered conversational avatar built into a SaaS platform. This multilingual, multimodal tool transforms how brands interact with consumers throughout the product lifecycle, from early-stage development to post-market monitoring, offering an accessible, personalized, non-biased and reproducible method for collecting high-quality, real-world insights.

2. Materials and Methods

2.1 Technology Architecture

Functionalities of the lab (Fig. 1):
The SaaS platform offers an ergonomic and very easy-to-use interface to set up conversational simulation. In a few clicks, it is possible to choose your avatar (face, voice, language from 27 languages), add media (videos of a make-up gesture or a brand context), images, classic questions (scientific scales, questionnaires), action buttons (to start the experience, contact support) and share the interview guide to be conducted by the avatar.

There are two types of AI: encrypted (in which the avatar will read word for word what is asked of it, for example to present the objectives of the study and the instructions in a rigorously identical way between panelists from all over the world) or conversational (for which it will be necessary to give instructions to the avatar who will then manage an exchange in a spontaneous and conversational way with the panelist and will be able to react, following these answers).

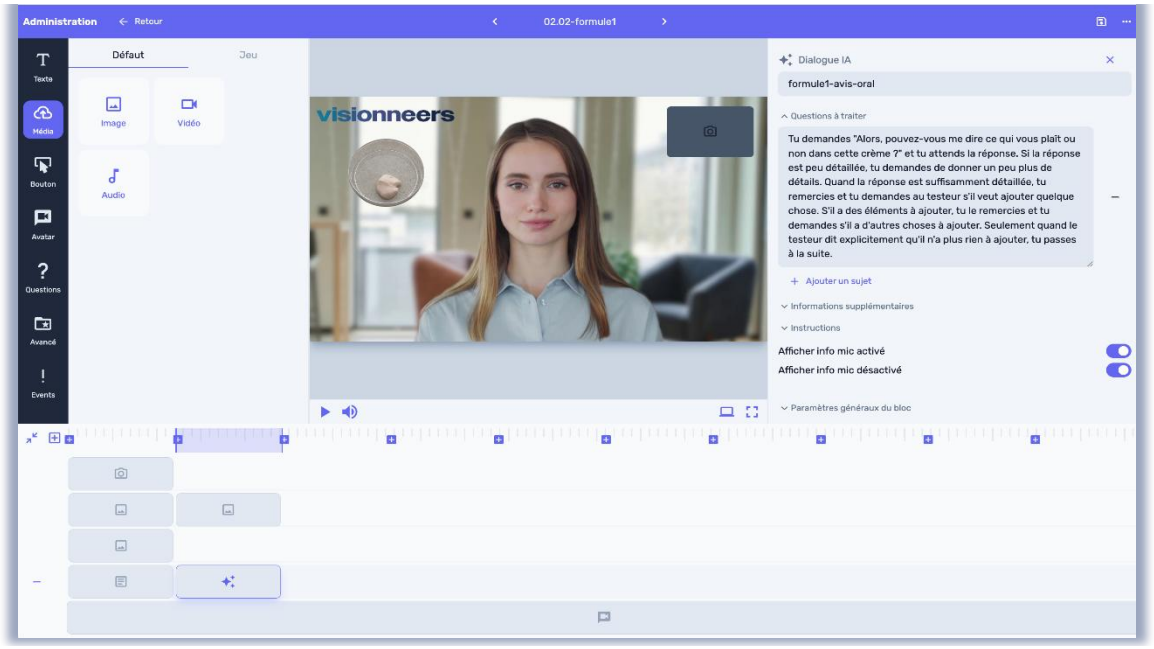

Figure 1. Technology Architecture. Ergonomic and easy to use SaaS platform to create a conversational simulation with an avatar in a few clicks to collect consumer opinions from all over the world.

Role of the Conversational AI Avatar:

Objective: to ask questions in a neutral, reproducible and unbiased way simultaneously to panelists from all over the world

- The AI avatar is used to guide the exchanges with the panelists in an intuitive and interactive manner. This avatar simulates natural conversations and asks both open and closed questions to gather user impressions.
- The AI is programmed to adapt its questions based on the panelists' responses, enabling deeper exploration of certain aspects (e.g., asking for more details about a design preference or criticisms of the features).
- The AI avatar can also provide clarifications on the product features, answer panelists' questions regarding the study, and guide them through the evaluation process.
- The use of the avatar rather than a human experimenter guarantees a neutral, unbiased, reproducible collection between all panelists from all over the world. This is a prerequisite to guarantee reliable, quality data, and to detect emotions in real time strictly provoked by the tested product itself.
- Natural language processing (NLP) models enable lifelike dialogue across 27 languages. The engine is capable of tone detection, semantic intent analysis, and emotional classification.

Types of Questions Asked by the AI:

- **Closed Questions:** The AI asks questions to gather quantitative data in the form of ratings or evaluations. For example: "On a scale of 1 to 10, how would you rate the sleeping mask?"

- **Open Questions:** The AI asks panelists to provide detailed qualitative responses. For example: "What do you like or dislike about the product?"
- **Exploratory Questions:** The AI offers additional questions to dig deeper into certain topics. For example: "What are your sleep habits?"

Data Collection Method:

- **Choices and Voice:** Panelists can interact with the AI via voice interface, making the experience smoother and more interactive. The responses are then automatically transcribed for analysis.
- **Emotion Analysis:** The conversational AI can also detect emotions in the responses (e.g., frustration, enthusiasm) by analyzing hybrid measures (verbal / paraverbal / non verbal) to identify emotional reactions during the all experience (Fig. 2).
- **Real-Time Collection:** All responses are collected in real-time, allowing teams to access a rich emotional feedback database immediately after each interaction.

Data Security:

- The interactions are encrypted, and the panelists' personal data is anonymized to ensure confidentiality. Only the responses related to the vehicles and evaluation criteria are analyzed by the research team.

Data Collection and Analysis Process (Fig. 2)

Objective: Collect quantitative and qualitative data from both explicit (verbally expressed) and implicit (emotional impact) while ensuring consistent measures of the emotional impact of the product and potential future evolutions.

- **Data Collected on PC in real-time:**
- **Explicit Data:** Spontaneous speech during conversational AI, click and choices for liking and purchase intention (questionnaires).
- **Implicit Data:** Voice analysis, gesture, facial expressions, cardiac rythm, inspiration.
- **Dashboard:** Provides brands with intuitive access to results, including emotional impact maps, satisfaction scores, and AI-generated recommendations.

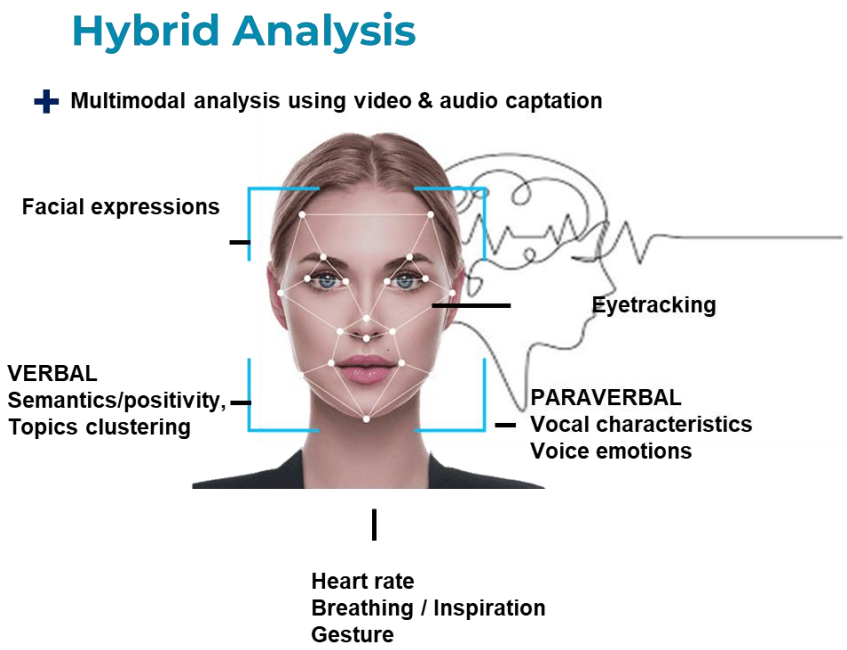

Figure 2. Data Collection & Analysis. During the conversational AI-interview, video & audio of the panelists are recorded allowing to evaluate in real time verbal (spontaneous speech, topic clustering, semantic analysis, text sentiment), paraverbal (prosody, voice emotion) and non verbal measures (eyetracking, facial expression, gesture, inspiration, heart rate).

3.2 Consumer experience

Instructions for Panelists:

- The panelists received a QR code or a web access link to connect individually to their panelist space in order to carry out their product evaluations at home.
- Once the product is in hand and at home (if home usage testing), the panelist connects to its digital space to carry out the evaluation of the product.
- After consent, and rigorous presentation of the study, the evaluation is guided by a conversational-avatar. Panelists, facing the PC, interact with the AI avatar and apply the product or discover the packaging on the screen, and share in real-time their experience.

User Interface Design:

- An intuitive interface is developed to allow panelists to easily share their impressions of the product and provide interactive feedback through conversational AI.
- The interface is adapted for a smooth experience on both PC and smartphone, with high-resolution visuals and simplified interactions in 27 languages.
- The virtual avatar guides the interview, asks questions about the cosmetic experience and its benefits, encouraging panelists to explain their preferences and critiques. As a conversational agent, it follows up with panelists in a relevant way to dig deep and gain relevant and valuable insights.

3. Results

3.1 Consumer experience

Global Accessibility and Multilingual Deployment

- 94% of satisfaction using the solution and 97% of positive feedback.
- Easy of use & practicality: Simple access with a QR code or a web link.
- Personalized & adapted experience: Users are able to communicate effortlessly in their native languages. 27 languages and cultural adaptation to ensure panelist engagement.
- Pleasant & enjoyable experience: Simple, ludic & positive interaction with avatar / AI sharing spontaneously impressions and discussing naturally without click action.

3.2 Impact on brands

Efficiency and Reproducibility

- A new and ergonomic SaaS platform to create an international conversational simulation in a few clicks (Fig. 1).
- Data collection in real-time all over the world collecting reviews from all over the world in just a few hours.
- Data analysis and reporting in real-time to follow internationally and manage daily.
- The reproducibility of unbiased user interviews across markets ensured a high degree of scientific rigor, facilitating comparative international studies.
- Consumer engagement increased compared to static survey formats.
- The AI-avatar allows ecological testing at home with repeated applications.
- The AI-avatar can also be used for clinical or laboratory tests to ensure unbiased collection and rapid, reliable, objective and enriched analysis of feedback.

Enriched Emotional and Sensory Data Insights

- Explicit responses combined to implicit emotional markers (facial expressions, gesture, heart rate, vocal modulations) revealed objective consumer reactions.
- Brands were able to segment users not only by demographics but by **emotional impact** and sensorial preferences.
- Emotional insights for R&D, Marketing or medical direction to follow patient's condition or skin issues.

The avatar bridges the gap between brands and global audiences, offering accessibility and cultural relevance anywhere at anytime in the world. Its versatility supports every stage of the product lifecycle, from pre-R&D consumer insights to real-time user feedback, fostering an

immersive, fully digital experience. Consumers can easily engage via smartphone, tablet, or computer, simply by scanning a QR code to share impressions in real-world contexts.

The avatar is deployed in three major phases of the product journey:

1. **Pre-R&D Phase**:

Objective: enable brands to tailor products precisely to individual preferences, emotional impact or skin condition.

- Gathers detailed insights on skin type, conditions, cosmetic preferences, and unmet needs in the real life at home.
- Evaluates reaction to preliminary concepts (e.g., textures, fragrances, packaging) and the perceived efficiency and safety of products.
- Suggests optimal formulation directions using consumer data modeling.

2. **Product Trial Phase (Panelist Evaluation)**:

Objective: help brands refine their offerings and meet consumer's needs and preferences by maximizing the emotional impact of products.

- Conducts structured interviews to assess sensorial experience, performance, and satisfaction.
- Ensures standardized data collection across users and locations.
- Enables real-time feedback during or after product use in actual home conditions.

3. **Post-Launch Support (Vigilance)**:

Objective: empower brands and R&D teams to regine strategies and improve customer care swiftly.

- Collects satisfaction data, detects adverse reactions, and maintains consumer engagement.
- Functions as an always-on virtual customer support agent, reducing workload on human teams and taking care in real-time of consumers issues.
- Builds long-term brand trust and gathers continuous consumer intelligence.

4. Discussion

Capable of conducting interviews in 27 languages, the avatar uses natural language processing and real-time emotional recognition to engage participants in a natural and unbiased dialogue.
The conversational avatar allows both a unique, fluid and engaging panelist experience in the real context of product use, but above all to guarantee an unbiased collection of quality data. By asking questions in a neutral and identical way in all countries, the avatar guarantees control of the drivers and ensures that the emotions detected in an ecological environment are indeed provoked by the product experience monitored in real time.

This AI-powered conversational avatar introduces a paradigm shift in consumer research by replacing one-way, static questionnaires with two-way, adaptive dialogues. The result is a deeper understanding of user perception, emotional response, and evolving expectations in real time.

Key differentiators include:

- Personalization at Scale: Conversations are tailored to individual profiles and cultural contexts.
- Multimodal Emotional Insight: Implicit and explicit data collection leads to more accurate consumer understanding.
- Cost and Time Efficiency: Automation reduces reliance on manual data processing and fieldwork logistics.
- Scientific Validity: The solution is grounded in neuroscience and cognitive science methodologies, ensuring validity of emotional data modeling.

Moreover, the avatar allows brands to shift from reactive consumer care to proactive emotional engagement, transforming the user relationship from transactional to experiential.

5. Conclusion

The conversational avatar described in this paper represents a breakthrough in how cosmetic brands understand and interact with their global consumers. By combining artificial intelligence, cognitive sciences, and real-world usability, this tool delivers real-time, reproducible, and emotionally rich data across the entire product lifecycle.

This digital conversational avatar is designed to revolutionize consumer engagement and data collection in the cosmetics industry. Built on a robust SaaS platform, this innovative solution ensures reproducible, unbiased data while enabling seamless, personalized interactions worldwide across 27 languages. For consumers, the solution is a simple, immersive and engaging experience to really share impressions and allows for in-depth evaluation.

This innovation addresses the growing demand for personalization, transparency, and trust in the cosmetics sector, enabling brands to anticipate trends, optimize formulations, and build lasting consumer relationships—all while enhancing productivity and reducing costs. The future of consumer research is not just digital—it is emotionally intelligent, accessible, and adaptive.

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