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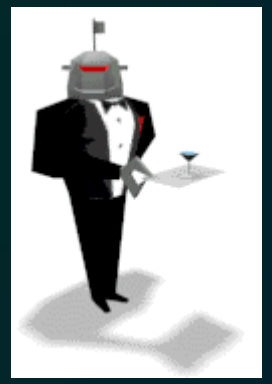
"We Make Things Talk"

Avatars 101

THE CASE FOR AVATARS

Our first avatars were for web based, multi-user worlds beginning in 1995. They were primitive but suggested a future where you could interact with characters.

Temps & Co – Genius



AOL – RoButler & Catwoman

Newfire

Robots Rule

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THE CASE FOR AVATARS

When we began building AI driven, conversational assistants in 2003, we knew intuitively that people were happier talking to characters rather than using a plain text or voice only interface. It would take years to reinforce our early instincts with hard science. This talk summarizes that science and what it means to the design of avatar based conversational systems.

NSA – Sage

Boeing – IBCSAS

US Army - eScene

CIA - Traveler

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1 WHY AVATARS

In 2009, Dimitrios Rigas conducted a study comparing voice user interfaces with text and graphics vs. the same interface with an expressive avatar. He found a 4X improvement in users who rated the interface very good as well as a 3X reduction in those that rated the interface very poor. [1]

"Photo-realistic avatars endowed with human-like voices in an online store induce increased feeling of trust, credibility, sociability and human warmth when compared with an online store with only images and text." [2]

"It has been known that visible verbal behavior (avatar animation) enhances the comprehension of verbal cues more, compared to voice only report. " [3]

1. "The Role of Facial Expressions and Body gestures in Avatars for e-Commerce Interfaces", Rigas & Gazepidis, 2009
2. "The Introduction of Avatars as a Factor of Sociability in e-Commerce Website", Alves & Soares
3. Kang, et. al., 2016

2 THE EYES HAVE IT

"People only talk to avatars with eyes." [1]

We believe that images of eyes motivate cooperative behavior because they induce a perception in participants of being watched." [2]

1. Franz Buchenberger, CEO Blaxxun 1997
2. Biol Lett, 2006 "Cues of being watched enhance cooperation in a real-world setting"

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3 SOCIAL REPUTATION

"People tend to be generous, even toward unrelated individuals" [1]

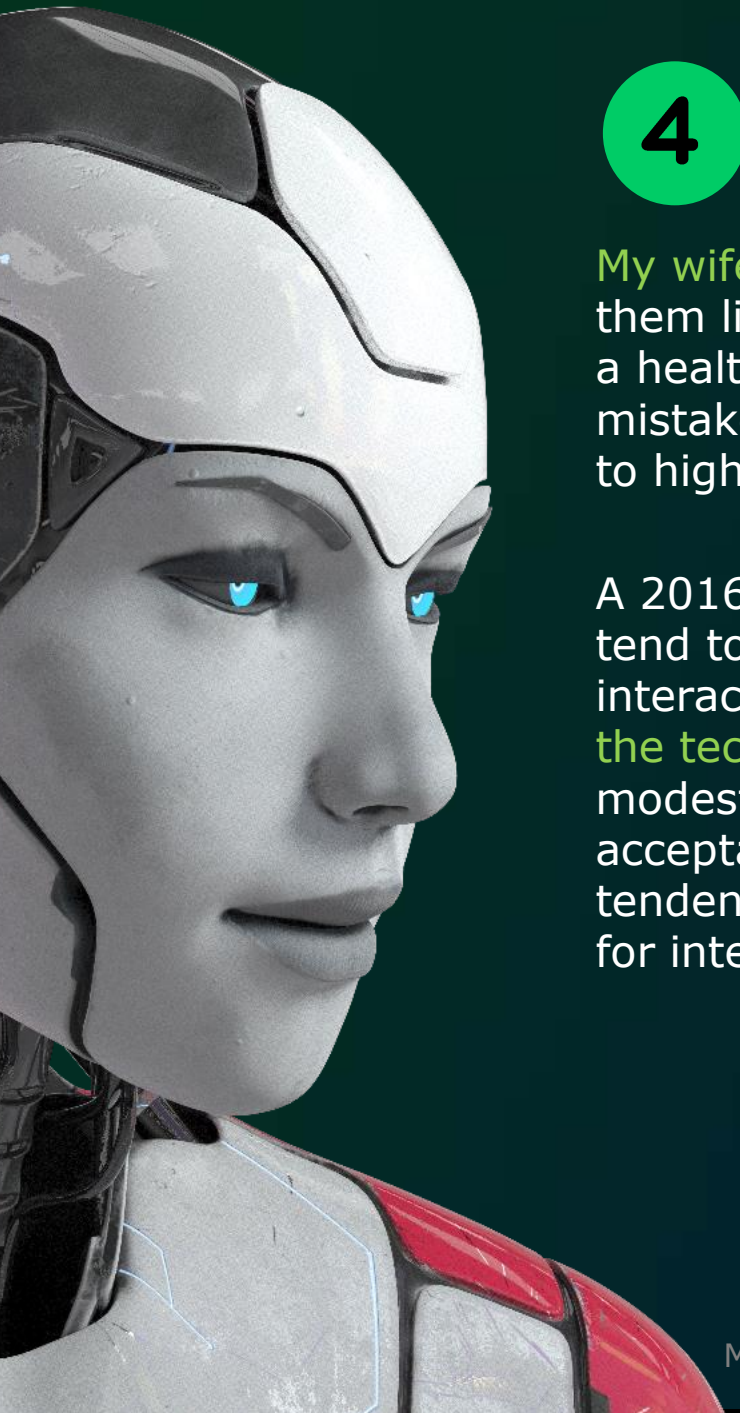
"This is true even in situations where there is no prospect of repeat interaction, and hence no potential for direct reciprocity." [2]

"A possible mechanism maintaining generosity, where direct reciprocity is absent, is the motivation to maintain a pro-social reputation." [3]

"Users' in the study tended to anthropomorphize their voice systems. Therefore, it may be useful to consider making voice systems interactions more human-like... the design of efficient and highly acceptable interactions may benefit from a clearly defined human surrogate role and personality for the system". [4]

1. Fehr & Fischbacher 2003
2. Gintis et al. 2003
3. Alexander 1987; Roberts 1998
4. National Highway Traffic Safety Administation study 2016

Hiro



4 PERSONIFICATION

My wife talks to Siri and Alexa as if they were humans. She treats them like not very intelligent children. Many of us do. I see this as a healthy and useful situation as users are also more forgiving of mistakes, when they see digital assistants as beings, which leads to higher user satisfaction.

A 2016 study of voice assistants, by the NHTSA, found that "Users tend to blame themselves for non-optimal user/system interactions" and that "People seem to understand the limits of the technology. Users' expectations for system performance are modest – they tend to find some level of errors acceptable. User acceptance of voice assistants may be partially attributable to the tendency for users to blame themselves rather than the system for interaction errors."

5 ENGAGING ASSISTANTS

As we design digital assistants, we generally develop a "backstory" for the character that describes their style of interaction, their verbosity and if they pretend to be human not. We find that colorful characters are more fun and people more readily engage with them. "People like virtual counselors that highly-disclose about themselves." [1]

"The results demonstrated that users reported more co-presence and social attraction to virtual humans who disclosed highly intimate information about themselves than when compared to other virtual humans who disclosed less intimate or no information about themselves. In addition, a further analysis of users' verbal self-disclosure showed that users revealed a medium level of personal information more often when interacting with virtual humans that highly-disclosed about themselves." [2]

1. Kang and Gratch, 2007
2. "Manipulation of non-verbal interaction style and demographic embodiment to increase anthropomorphic computer character credibility", Cowell & Stanney, 2005

George by Charlie Powell

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6 LOOKS

In the robot world, it has long been held that the best face for a robot was an abstract approximation of a human face. This was debunked in 2018 with the publishing of "What People See in 157 Robot Faces" by Evan Ackerman. [1] People like human appearing avatars!

1. https://spectrum.ieee.org/automaton/robotics/humanoids/what-people-see-in-157-robot-faces

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7 WHO DO WE WANT ?

In 2018, we conducted our own study of user preferences for avatars. We found that 22% of respondents preferred a female avatar, 2% prefered male and 70% said they wanted a variety of avatars to choose from. [1]

"Thus, the attractiveness of an avatar should influence the likeability of an avatar, and likeability should mediate the degree of persuasion (ability)." They found that a voice interface for shopping generated 15% higher user satisfaction and 21% higher entertainment value when an avatar was used. They also compared avatars that were visually optimized for attractiveness and compared them to avatars that were designed to look authoritative ("expert") and found the expert avatar was deemed 14% more expert in advice and 15% more credible but the attractive avatar was 4% more likeable. [2]

1. SapientX, 2018
2. Holzwarth, Janiszewski & Neumann, 2006

MyCareerMentor Kaitlyn

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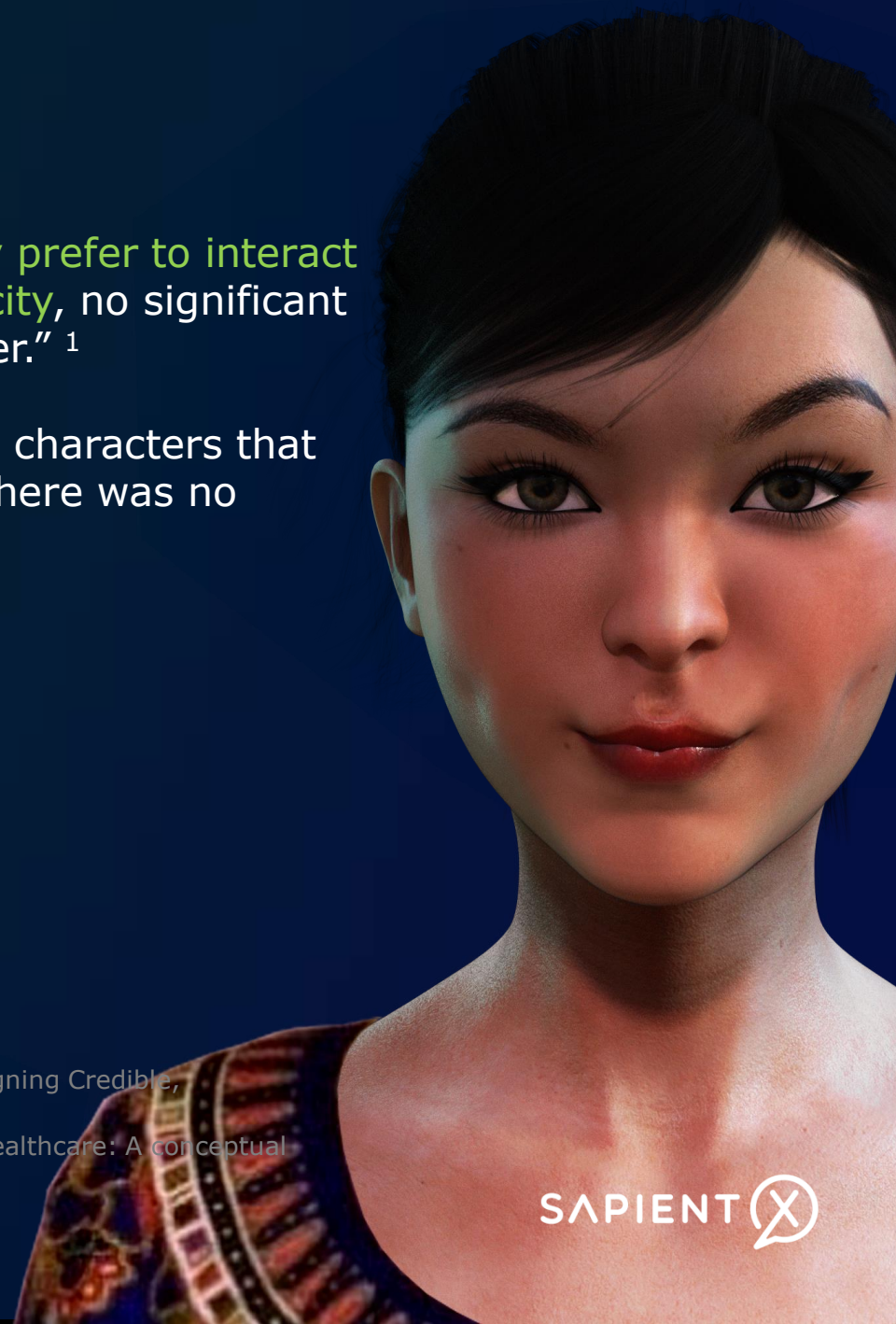
8 MY TRIBE

"Our results indicate that while users generally prefer to interact with a youthful character matching their ethnicity, no significant preferences were indicated for character gender." [1]

"It was found that users prefer to interact with characters that match their ethnicity and are young looking. There was no significant preference for gender."[2]



1. Cowell and Stanney, "Embodiment and Interaction Guidelines for Designing Credible, Trustworthy Embodied Conversational Agents", 2003
2. The Application of Anthropomorphic Gamification within Transitional Healthcare: A conceptual framework, Tuah and Willis, 2018

Singapore Airlines Kira

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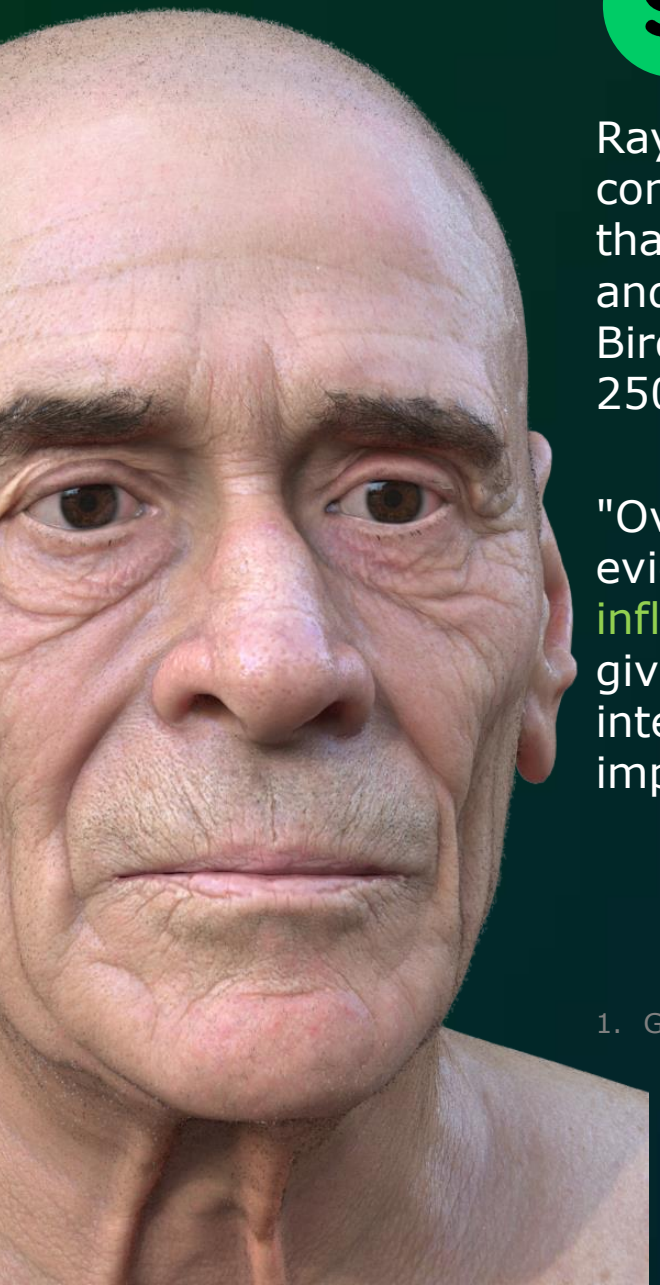


9 NON-VERBAL

Ray Birdwhistell pioneered the original study of nonverbal communication that he called "kinesics." Like Mehrabian, he found that the verbal component of conversation is less than 35 percent and that over 65 percent of communication is done nonverbally. Birdwhistell also estimated we can make and recognize around 250,000 facial expressions.

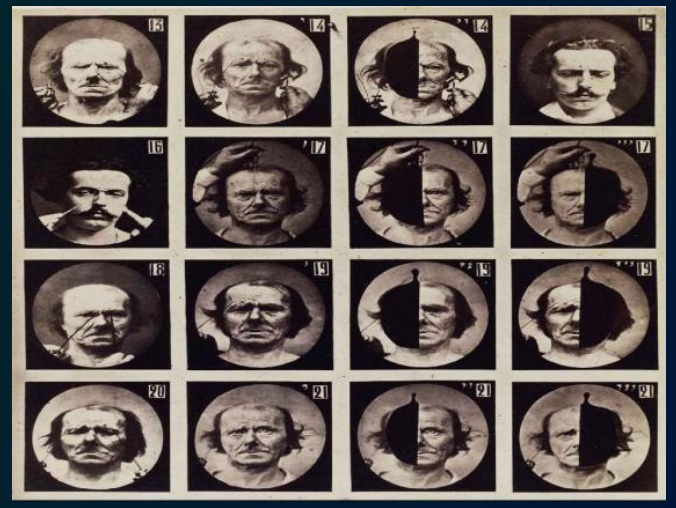
"Overall, the current study and related findings add further evidence that the nonverbal behavior of virtual characters influence the behavior of the humans that interact with them. This gives confidence that embodied agents can facilitate social interaction between humans and computers, with a host of implications for application and social psychological research."[1]

1. Gratch, Wang, et. al. at USC, ICT in their paper "Creating Rapport with Virtual Agents", 2007

10 CHARLES DARWIN

In 1872, Darwin published “The Expression of the Emotions in Man and Animals”, in which he argued that all humans show emotion through similar behaviors. He wrote that emotion had an evolutionary history that could be traced across cultures and species. Today, many psychologists agree that many emotions are universal regardless of culture including; anger, fear, surprise, disgust, happiness and sadness.

We think that avatars, capable of understanding user emotions and that can respond emotionally, will generate a more successful user experience in conversational apps.



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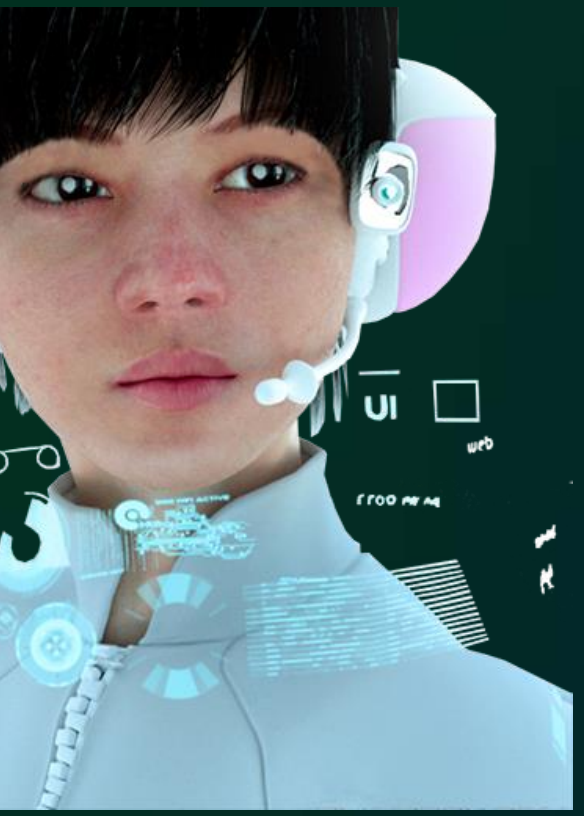
11 EMOTION



LG Eliane

Users that receive the proper emotional cues from an assistant are more satisfied and engaged. “The results show that participants are sensitive to differences in the displays of emotion and cooperate significantly more with the cooperative agent.” [1]

"Emotional displays in an artificially generated character can have the general effect of making it seem human or lifelike, and thereby cue the user to respond to, and interact with, the character as if it were another person." [2]

“Subjects found it easier to attend to voice emotions similar to theirs. On average, drivers with the same emotion (as their voice assistant) had less than half as many accidents.“ “Match and mismatch of emotion and voice tones, used by a voice assistant, with the driver’s current emotional state can have significant effects on driving behavior and distraction potential.” [3]

1. Celso M. de Melo , Peter Carnevale and Jonathan Gratch "The Impact of Emotion Displays in Embodied Agents on Emergence of Cooperation with People", 2012
2. Thomas and Johnston, 1995
3. Nass & Brave, 2005

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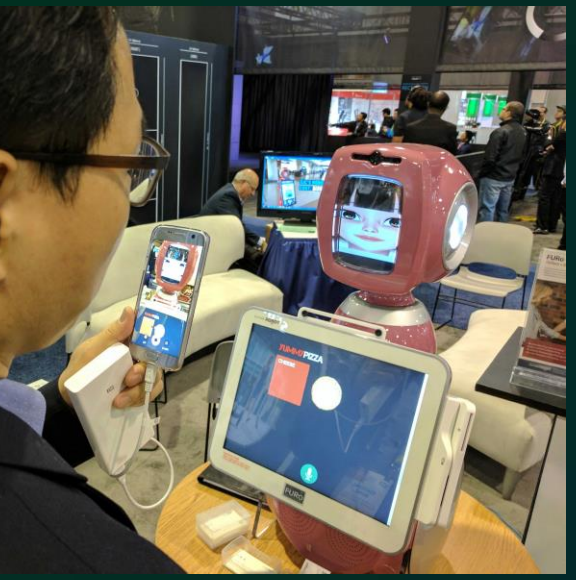
12 FACIAL MIRRORING



Future Robot - Furo

We often subconsciously change our facial expression to mirror the expression of the person that we are talking to. Mirroring has been shown to help waitresses gain higher tips [1], enable sales clerks to achieve higher sales numbers [2] and give women more favorable ratings in speed dating [3].

"The expressions we see in the faces of others engage a number of different cognitive processes. Emotional expressions elicit rapid responses, which often imitate the emotion in the observed face. These effects can even occur for faces presented in such a way that the observer is not aware of them. We are also very good at explicitly recognizing and describing the emotion being expressed." [4]

1. Van Barren et al., 2003
2. Jacob etc al, 2011
3. Gueguen, 2009
4. Chris Frith, "Role of facial expressions in social interactions"

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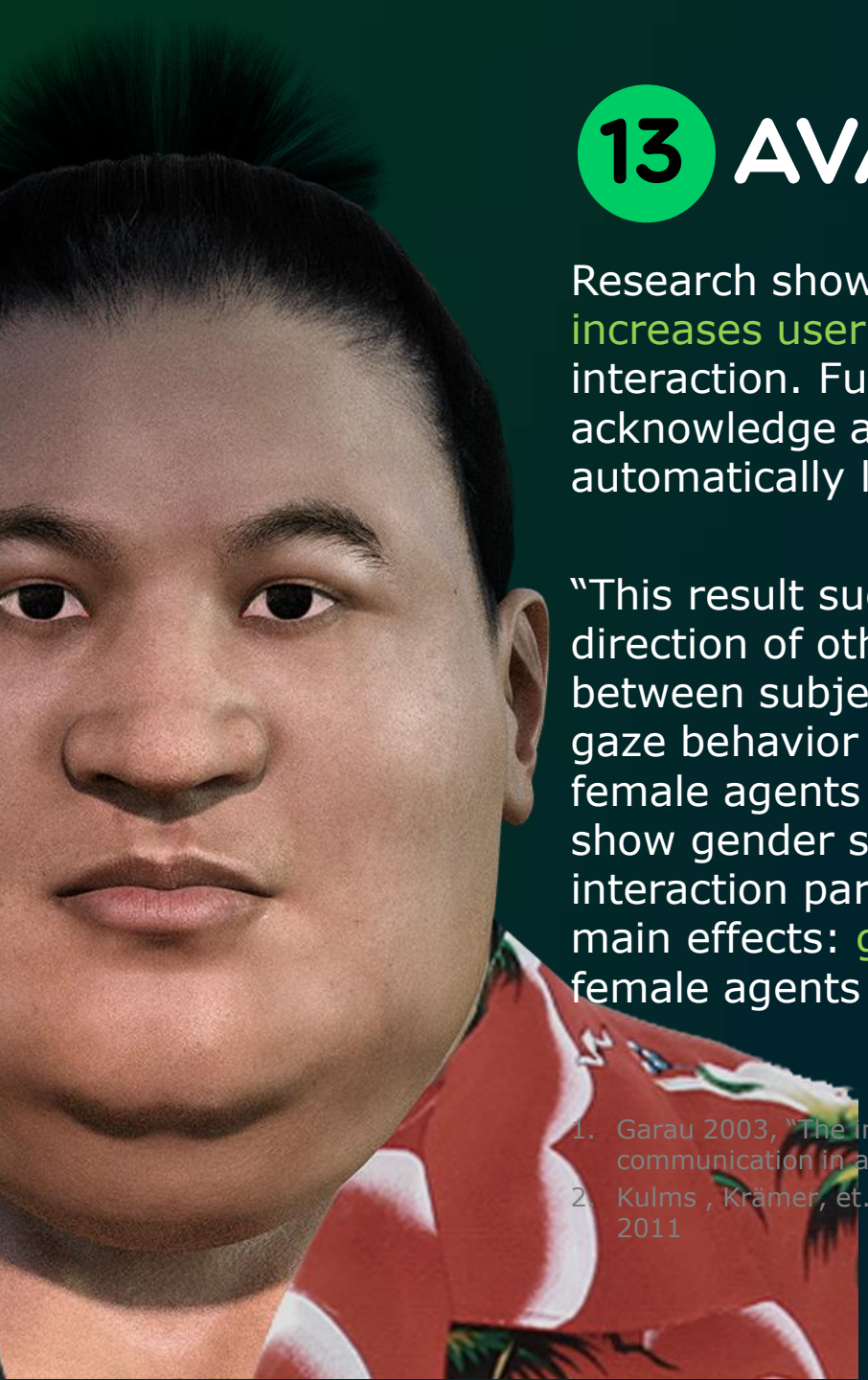

13 AVATAR GAZE

Research shows that an avatar, that occasionally looks away, increases user engagement and gives a context to social interaction. Further, an avatar that glances to the side, to acknowledge a new graphic being displayed in the user interface, automatically leads the viewer to glance at the new graphic. [1]

"This result suggests that our tendency to follow the gaze direction of others is automatic and difficult to suppress. In a 2x2 between subjects experiment we manipulated the Rapport Agent's gaze behavior and its gender in order to test whether especially female agents are evaluated more negatively when they do not show gender specific immediacy behavior and avoid gazing at the interaction partner. Instead of this interaction effect we found two main effects: gaze avoidance was evaluated negatively and female agents were rated more positively than male agents." [2]

1. Garau 2003, "The impact of avatar realism and eye gaze control on perceived quality of communication in a shared immersive virtual environment"
2. Kulms , Krämer, et. al. "It's in Their Eyes: A Study on Female and Male Virtual Humans' Gaze", 2011

Samsung Puchi

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14 TRUST

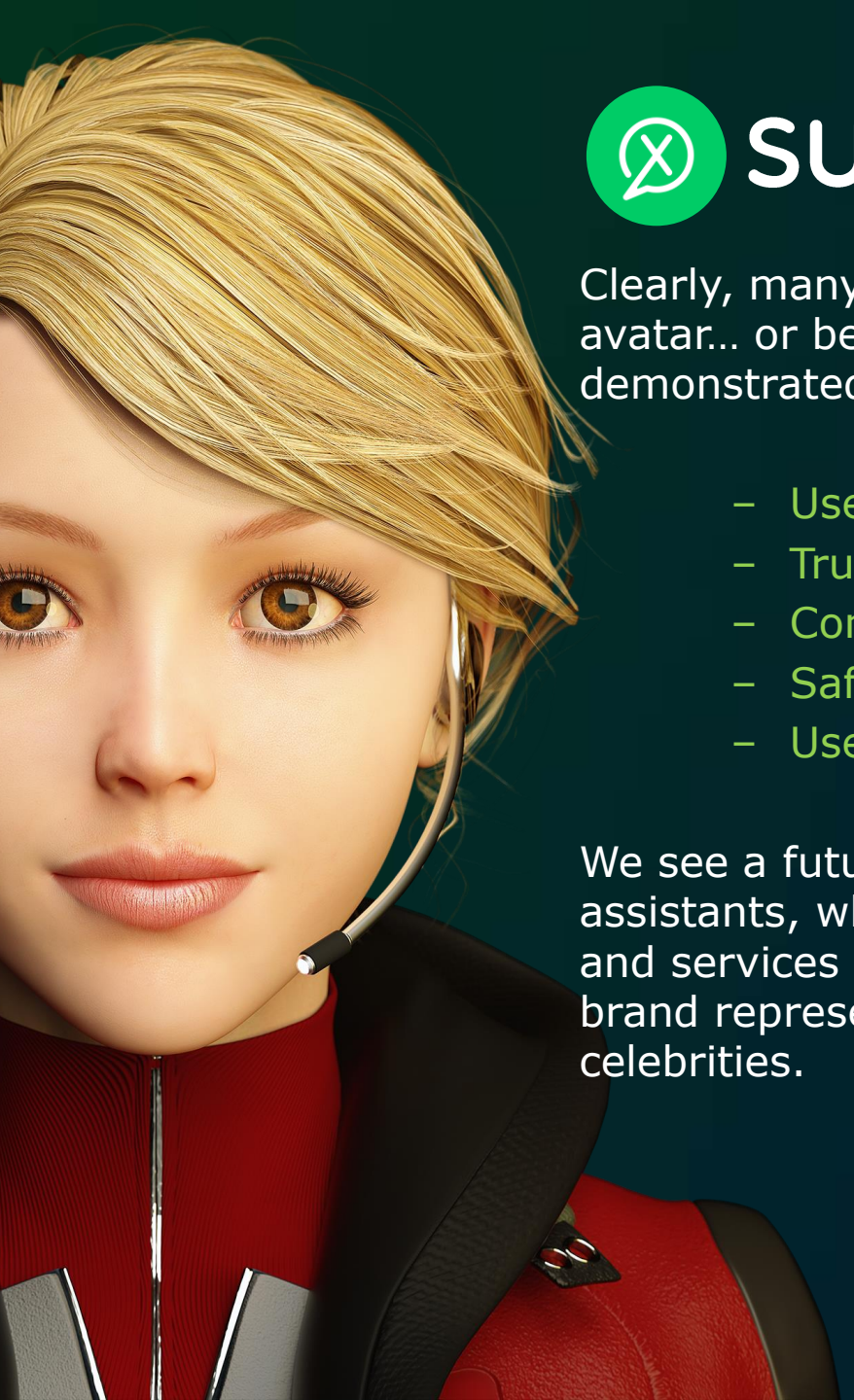
Voice systems that use an avatar generate more trust in users.
"They can exhibit greater trust of the agent's recommendations" 1

"The results from this study suggest that there may indeed be a benefit to endowing computer characters with nonverbal trusting behaviors, as long as those behaviors are accurately and appropriately portrayed." [2]

"Recently it was also shown that virtual humans can increase willingness to disclose by providing a "safe" environment where participants don't feel judged by another human interlocutor."
"The preliminary findings indicated that interactants revealed greater intimate information about themselves in interactions with virtual humans than with real humans." [3]

1. Cowell and Stanney, Embodiment and Interaction Guidelines for Designing Credible, Trustworthy Embodied Conversational Agents, 2003
2. "Self-disclosure on computer forms: Meta analysis and implications"
3. Kang and Gratch, "The effect of avatar realism of virtual humans on self-disclosure in anonymous social interactions", 2010

Hillary by Charlie Powell



SUMMARY

Clearly, many voice applications would benefit from the use of an avatar… or better yet a selection of avatars. Researched have now demonstrated significant improvements in:

- User Satisfaction
- Trust
- Communication
- Safety
- User Engagement

We see a future where users benefit from avatar-based assistants, where they bond with and learn to rely on their advice and services and companies will develop a strong and durable brand representative just as they currently do with highly paid celebrities.

Mitsubishi Mia

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CONTACT

David Colleen, CEO
m. (415) 254-2330
david@sapientx.com

SapientX – Sales Office
201 Spear St., Suite 1100
San Francisco, CA 94105

www.sapientx.com
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