NTT DATA

Concierge
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Digital Human

Related Industries: Tourism, Education, Retail, Healthcare, Facility Management, Human Resources

Executive Overview

Digital human technology combines a 3D-modeled avatar interface with AI-driven conversational capabilities, enabling human-like responses and interactions. The use of digital humans is increasing, especially in concierge services such as reception and consultation. This white paper explores the future enabled by digital humans and introduces NTT DATA's initiatives in this field.

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Chapter 1

Digital Transformation of Hospitality（Omotenashi）

Concierges provide a wide range of services, including tourist information, hotel and event reception, facility guidance, and general consultation, which require extensive knowledge and warm, personable interaction. In this "hospitality" field, IT support has been provided in the form of organizing Q&A information, dashboard-based bird's-eye views, smartphone app notifications, etc., but human-like interactions have remained reliant on actual humans. However, recent advancements in AI have led to the emergence of digital human technology, which can deliver concierge services with a human touch. The digital transformation of hospitality has begun, bringing about dramatic changes to customer experience

1.1. What is a Digital Human?

Broadly defined, a digital human is “a digital agent equipped with human characteristics, personality, knowledge, and way of thinking, interactively represented by AI”. Specific examples of digital humans include chatbots, digital avatars, and humanoid robots. Of these, this white paper focuses on digital humans that integrate a 3D-modeled avatar interface with AI-powered conversational capabilities, allowing for human-like responses and interactions. These avatars can reproduce human-like facial expressions and movement behavior, and simple avatars can be generated even from a few photographs. More complex and high-definition avatars can be created using professional photography equipment. With AI-based dialogue functions, digital humans can recognize and interpret emotions from conversations, adjust their way of speech and tone, and return responses. In addition, generative AI can be used to not only respond with predefined scripts, but also to play the role of an advisor, capable of presenting new ideas

1.2. Use Cases for Digital Humans

Conversational interfaces have already been introduced in many companies as text-based chatbots, improving business processes and work efficiency. For example, they are used in call center answering, help desk reception, and website inquiry response. In addition to these text-based chatbots, the emergence of digital humans is creating new customer experience use cases. See the following examples.

- ✓ In-house training and educational content for employees can be provided using digital human simulations of the intended customer, enabling communication training in sales, customer service, and complaint handling.
- ✓ A company president or chairman can be simulated using a digital human to convey a message to employees through a question-and-answer session about the company's philosophy, etc.
- ✓ A presenter or commentator can be simulated using a digital human for program promotions and entertainment such as live events.
- ✓ Digital humans can be provided as conversation partners in hospitals and senior care facilities to encourage exercise and ask questions about health conditions, thereby taking care of health management, especially mental health.

Market reports on digital humans (including chatbots, voice assistants, kiosk terminals, and web services) vary in scope and definition, but all indicate significant growth, and when evaluated comprehensively, including the results of interviews with vendors and experts, one prediction shows it may grow to $35 billion in 2025. However, significant progress is needed to fully realize the business use of digital humans in enterprises. Specifically, avatars must be improved to look and sound and respond in a way that feels natural to humans, and system integration and automatic input functions must be provided effectively. Once these technologies are put to practical use, they are expected to become tremendously popular. In improving the quality of digital humans, there is the "uncanny valley" problem in appearance, and the "generative AI hallucination" problem in response content, but we assume that both can be overcome by the evolution of realistic expression of the shape and movement of the avatar's body, eyes, and hands, and by devising prompts and output filters.

Chapter 2
The Future Realized by Digital Humans

There are two possible futures for digital humans. One is a future where automation of concierge services, especially in call centers and reception areas of facilities, will become widespread. The other is a future in which digital humans will change the way white collar workers work as digital agents and digital assistants. NTT DATA is building and providing systems to accommodate the expansion of concierge services, and is developing collaboration functions between AI centered on personal agents. We believe that this will not only automate customer service, but also help solve social issues such as labor shortages and a shrinking workforce.

2.1. Digital Humans Become Concierges

With the same quality as traditional concierge services, a 24 hours a day service can be provided anywhere, without concerns over experience or skill. Digital concierges will understand and speak multiple languages and will be able to change their appearance, voice, and behavior according to customer preferences, allowing the customers to enjoy personalized responses. Customer experience satisfaction will increase and companies will be able to compensate for labor shortages. Over time, digital concierges will improve their response system and acquire small talk and witty dialogue tailored to each customer. They will be able to judge situations based on multiple factors, including video and audio, and take actions such as calling out on their own to people who appear to be unwell.

2.2. Digital Humans Working as Agents and/or Assistants

White collar workers have a wide variety of jobs, many of which require specialized knowledge, such as accounting, legal, purchasing, general affairs, and research. In some cases, creative skills are required, such as designing materials and creating documents, and in other cases, coordination skills are important, such as setting meeting schedules and bringing together conflicting opinions. In the future, we believe that specialized AI supporting these various tasks will be linked with personal agents to enable general-purpose responses (*1) Digital humans will demonstrate their value by giving personal agents human-like expressions and actions, and will be used as friendly interfaces. By building and providing an environment that enables natural, human-like communication, the system will not only improve work efficiency, but also contribute to job satisfaction and motivation.

※1 https://www.nttdata.com/global/en/news/press-release/2025/january/012800

Chapter 3
NTT DATA's Initiatives

NTT DATA has been working on the enterprise use of digital humans from an early stage, mainly at innovation centers in North America and Denmark. Two representative examples are introduced below. In addition to these existing use cases, NTT DATA plans to actively consider using them as agents and assistants in the future.

3.1. Providing Guidance and Information at Event Venues

At The Open golf in 2023, digital humans were installed in the venue to provide guidance and information, providing a new customer experience using AI (*2). In order to realize high-quality dialogue with visitors, the following functions were provided.

- ✓ High-Definition Digital Avatars: Avatars reproduced human-like appearance and movements, including not only modeling but also motion.
- ✓ Natural Dialogue: Effective speech recognition technology for various languages and high comprehension by LLM enable AI to interpret user intentions and provide an appropriate and informative dialogue experience tailored to the event, in addition to general conversation. In addition, advanced speech synthesis technology allows digital humans to respond in natural voices and express emotions through tone of voice.
- ✓ Visual Response: Image recognition technology allows the camera to automatically detect when a person is standing nearby and proactively speak to them.
- ✓ Information Linkage with Other Systems: Linkage with back-end systems and services improves the accuracy and quality of answers. At The Open, information about the tournament, players, and golf was linked to related systems in real time to provide golf fans visiting the venue with an interactive communication experience.

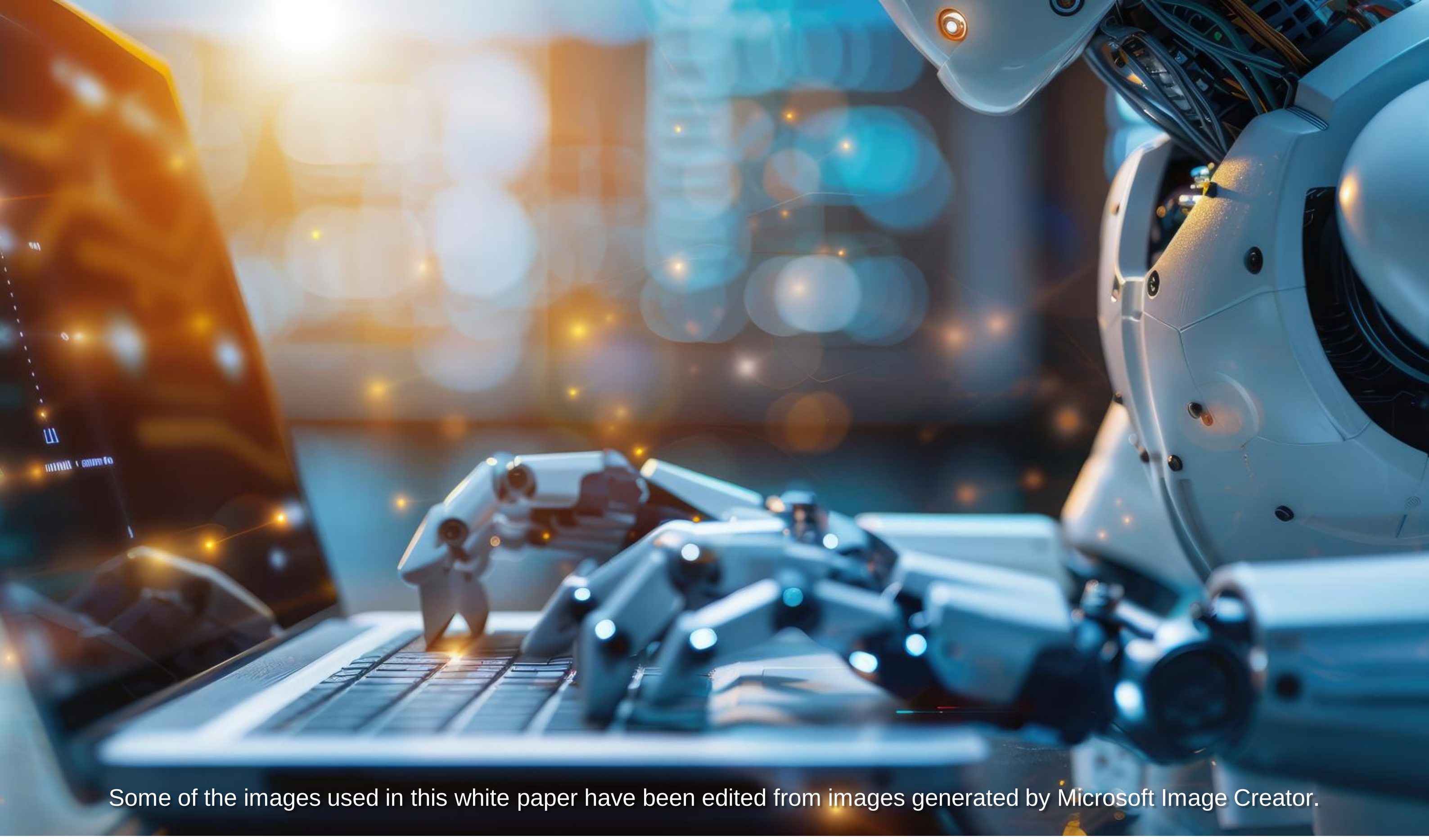
Similar guidance was also provided to visitors at the FIBA Basketball World Cup 2023 and the Tour de France. In Japan, NTT DATA hosted an exhibit at the “Foresight Day 2024” event, where visitors could experience interacting with digital humans. Through these events, many visitors were able to experience the potential of enterprise use of digital humans.

※2 https://www.nttdata.com/global/en/about-us/ntt-data-the-open

3.2. Recreating a Boss with a Digital Human to Stimulate Communication

A demonstration was conducted to simulate a boss using a digital human, enabling employees to interact with the virtual boss as if they were talking to their real boss (*3). An avatar with a face resembling that of the boss is created, and the avatar can respond with comments in line with the boss's intentions, making it possible to receive reports and/or consultation on behalf of the boss even when the boss is busy and doesn’t have time. In realizing this demonstration, we had given the digital human a personality and emotion recognition function, which was reflected in the communication. Specifically, we used the prompting technology to learn the persona and thinking habits of the boss, and emotion recognition technology to read the emotions of the conversation partner. With the increase in remote work and fewer face-to-face opportunities due to the COVID-19 pandemic, this initiative received a positive response to the challenge of improving internal communication. In the future, we are also considering using the system to transform the way work is done, for example, by obtaining comments from the digital boss before an actual review.

※3 https://www.nttdata.com/global/en/insights/focus/2024/insights-and-strategies-from-toyota-boshokus-digital-transformation-initiatives


Some of the images used in this white paper have been edited from images generated by Microsoft Image Creator.

More details:

For more information about NTT DATA's Digital Human, please visit the following page.

https://us.nttdata.com/en/engage/digital-human

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