Deutsche Bahn's customers embrace text-to-speech.

Vocalilzer TTS technology is as effective and flexible as voice talent for announcements.

Challenge
– Computer-generated speech used for connection announcements must sound close to natural human voice to be accepted by passengers
– Inform regional train passengers of changes in a clear automated voice; especially when trains are not staffed by conductors

Solution
– Vocalizer text-to-speech for delivery of written text in a natural-sounding voice
– Exclusive synthesized voice modeled after Deutsche Bahn's spokesperson Ingo Ruff
– Automated system speaks any desired text without the voice talent going back to the recording studio

Results
– No reliance on additional recordings, saving time and money
– TTS solution is experiencing an extremely high level of acceptance from a large majority of passengers
– Easy and understandable information delivery to passengers about connections

The company
Deutsche Bahn AG is one of the leading mobility and logistics enterprises in the world today. The core of the enterprise, which is active in 130 countries, is the railway system in Germany. About 239,000 employees, nearly 190,000 of them in Germany, work each day to ensure mobility and logistics for customers and efficiently control and operate the appurtenant transportation networks via rail, ground transport, and sea and air freight. In the 2009 fiscal year, the sales revenue of the DB group was about EUR 29.3 billion, and the operating result, adjusted to reflect special effects (EBIT), was about EUR 1.7 billion.

NUANCE

"As an innovative, service-oriented enterprise we regularly conduct passenger surveys, because our customers' opinions are important to us. This is particularly true when we introduce new technologies. In this case the feedback was highly positive right from the outset. We are pleased that the voice technology by Nuance is so well received by travelers and that we were consequently able to substantially improve our customer service. In the future we will continue to expand our offerings in this direction. We will utilize the optimization potential identified by our customers, in order to improve our customer service once again."

Christoph Rothfuss, Bid Planning Department, Respondible for Passenger Information
DB Regio AG, Mannheim

The challenge
People are sensitive to and often quick to criticize synthetic voices. Therefore, when Deutsche Bahn AG was planning to introduce computer-generated connection announcements in its trains, the primary requirement was to utilize a sophisticated voice technology that sounds close to the natural voice and is quickly accepted by passengers. After all, it was the goal of Deutsche Bahn to inform the regional train passengers of train-change possibilities and connecting trains comprehensively and in a clearly understandable manner, even when the trains are not staffed with conductors. The uniform voice of Deutsche Bahn was also intended to sharpen recognition among travelers.

A pilot project in this regard was started in twelve DB Regio trains in April 2010. A specially created "custom voice," i.e., a synthesized voice by Nuance created specifically for Deutsche Bahn, informs the passengers of their further travel options in "real time" before a train transfer stop is reached. In the future it will also be possible to handle stop announcements and other information

concerning the course of the trip via the voice computer. Thus, using the synthesized voice, the DB Regio is no longer dependent on making additional recordings in the recording studio and saves time as well as money.

In July 2010, the Bahn [German Railway System] had DIMA Marktforschung [DIMA Market Research] find out though a passenger survey whether the new technology is well received by passengers. The result: The digital passenger announcements enjoy an extremely high level of acceptance among all of the persons who were surveyed. They have a contemporary feel and distinguish themselves through their high level of understandability.

The solution
In its new announcements, Deutsche Bahn is relying on the innovative "Vocalizer Text-to-Speech" (TTS) technology by Nuance Communications for the conversion of written text to a natural-sounding voice. The leading provider of voice and image-processing solutions developed an exclusive synthesized voice for Deutsche Bahn on the basis of this method.

Nuance invited Deutsche Bahn spokesman Ingo Ruff into a recording studio to make recordings for the purpose of developing and implementing the custom voice. With the help of the Nuance Vocalizer, a synthetic voice was reconstructed from these recordings that sounds exactly like Ingo Ruff. This synthetic voice can speak any desired text without the speaker having to go back into the recording studio. The TTS voice has been optimized for announcements in such a manner that passengers no longer recognize a substantial difference between it and the human voice. As a result of the continuous use of the known voice, Deutsche Bahn simultaneously strengthens its brand image and increases customer loyalty.

Michael-Maria Bommer, General Manager DACH at Nuance: "A few years ago text-to-speech was still less fluent, but an enormous amount has been done in development in the interim. Our technology makes it possible for Deutsche Bahn to have an optimal solution for the announcements in its trains today; the results of the current passenger survey have shown this. As a result of further optimization of the synthetic voices, listeners are now scarcely able to detect a difference between the original and text-to-speech. Thus, speech technology is usable everywhere and, above all, in a flexible manner."

The advantages at a glance:

– As a result of TTS technology, Deutsche Bahn is not reliant on additional recordings in the recording studio. That saves time and money.
– The difference between the original and text-to-speech is hardly noticeable.
– The market survey shows: The digital passenger announcement is experiencing an extremely high level of acceptance from a large majority of passengers.
– Travelers receive relevant and easily understandable information concerning connecting trains and connections.

Passenger survey shows high customer satisfaction
In order to test the acceptance of the new text-to-speech solution among customers, Deutsche Bahn had the passenger survey conducted with the help of a partial-ly-structured questionnaire in 295 personal interviews directly on the Monsheim - Neustadt/Weinstrasse and Eiswoog - Frankenthal pilot lines. A distinction was made between the "passengers changing trains" and "passen-gers not changing trains" test groups. Questions were asked concerning the quality of the announcement with respect to understandability, volume and voice quality, acceptance with respect to likeability, first impression and naturalness and the general benefit that the persons surveyed perceived as a result of the announcement (information, timing, length).
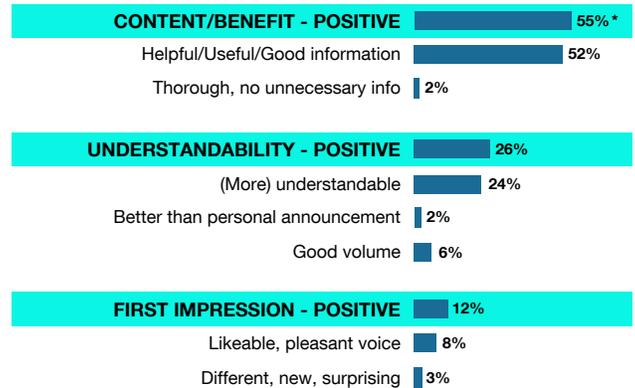
Deutsche Bahn AG is satisfied with the result.

TTS Announcement Survey Results (1)

DIMA
Marktforschung

"What is your spontaneous impression of this announcement? What goes through your head spontaneously?"

- unprompted query; multiple responses possible -

CONTENT/BENEFIT - POSITIVE	55% *
Helpful/Useful/Good information	52%
Thorough, no unnecessary info	2%
UNDERSTANDABILITY - POSITIVE	26%
(More) understandable	24%
Better than personal announcement	2%
Good volume	6%
FIRST IMPRESSION - POSITIVE	12%
Likeable, pleasant voice	8%
Different, new, surprising	3%

→High overall satisfaction with the announcement

→Already spontaneously named: Many positive statements concerning the aspect of **Benefit and Information**

n=295

* Only responses over 2% are listed

When questioned about the announcements, most travelers had a positive assessment of the announcements, particularly with respect to the aspects of content, benefit, understandability and impression of the voice. Attentiveness to the announcements is considerable; only a small portion of travelers attribute no relevance to the announcements or had no spontaneous associations.

Overall, 52% of the responses are attributable to helpful, useful or good information. "I find that the announcement is totally practical for fast train-changing," one respon-dent stated, for example. "The announcement delivered helpful information for my ongoing trip" and "This loudspeaker announcement is more understandable than the announcements that are personally given." The latter, in particular, is the best proof that Deutsche Bahn has pinned its hopes on the right technology supplier in Nuance. Twenty-four percent of the positive responders appreciated the clear voice of the announcement.

In the more in-depth evaluation, the TTS announcement achieved thoroughly positive values, particularly in the area of quality. Volume and speaking tempo stand out with particularly good evaluations, i.e., on average over 4 of 5 possible points on the scale. But the synthetic voice also enjoys the positive response of travelers in the areas of first impression and benefit.

Only few travelers feel that the TTS announcement is annoying or irritating. This even includes passengers that are not changing trains and are thus not dependent upon the information that is being given. Incidentally, frequent travelers who are already familiar with the announcements and have used them evaluate the announcements more positively than infrequent travelers – evidence that the strategy of a uniform and recognizable Bahn [German Railway System] voice is working.

Questioned about potential for improvement, the persons surveyed answered with concrete and constructive suggestions, proof that the train announcements are important to travelers. Most of the suggestions relate to the content. For example, the announcements should be given earlier or that less important information should be omitted due to the length of the announcements. The travelers also expressed the desire for a louder announcement in the face of loud external noises.

The benefits for the customer
The DIMA study has shown that Deutsche Bahn is on the right track with digital passenger announcements via TTS technology by Nuance. As a result of its innovative character, the announcements have a contemporary feel and clearly distinguish themselves from existing train announcements, which creates a strong interest for passengers to listen. Most of the persons surveyed indicated that they were already familiar with the announcement prior to the survey. In this way, passengers that are changing trains receive relevant information concerning connecting trains and connections that is, above all, easily understandable. And passengers that are not changing trains do not feel annoyed by the passenger announcement. Last but not least, the voice, which has been characterized as "pleasant" and "natural," has a likeable feel and thus contributes to Deutsche Bahn customer loyalty.

About Nuance Communications, Inc.
Nuance Communications is reinventing the relationship between people and technology. Through its voice and language offerings, the company is creating a more human conversation with the many systems, devices, electronics, apps and services around us. Every day, millions of people and thousands of businesses experience Nuance through intelligent systems that can listen, understand, learn and adapt to your life and your work. For more information, please visit nuance.com.

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