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Angaben zur Veröffentlichung / Publication details:

Schuller, Björn. 2015. "Do computers have personality?" *Computer* 48 (3): 6–7.
<https://doi.org/10.1109/mc.2015.69>.

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Do Computers Have Personality?

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This installment of Computer's series highlighting the work published in IEEE Computer Society journals comes from IEEE Transactions on Affective Computing.

We all have specific personality traits that are reflected in our behavior (or at least those we pretend or appear to have), and we often have strong opinions about the personalities of those surrounding us. But what about computers? Do computers have a personality, or can they at least model different types of personalities? Can they perceive or understand the personalities of their human users?

the possibility of collecting behavioral evidence through smartphones, and the idea of providing machines with social and affective intelligence so they can interact with humans. As such, “personality is relevant to any computing area involving understanding, prediction, or synthesis of human behavior.”

The paper introduces *personality computing*, explaining that “several works [in the literature] investigate

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Alessandro Vinciarelli and Gelareh Mohammadi pose this question in “A Survey of Personality Computing” (*IEEE Transactions on Affective Computing*, vol. 5, no. 3, 2014, pp. 273–291), which explains that the computing industry’s interest in personality has risen steadily since the mid-2000s due to the increasing amount of personal information available through social networks,

the interplay between personality and computing by measuring the link between [personality] traits and use of technology.” Thus, users externalize their personality through the way they use technology, and personality traits can be indicative of users’ behavior. For example, certain traits can predict whether a user will activate a blog or will use a mobile phone in public spaces.

According to the authors, computing domains concerned with personality consider three main problems: automatic personality recognition (APR; inferring the actual personality based on the individual’s observed behavior), automatic personality perception (APP; predicting a personality attributed to an individual by others), and automatic personality synthesis (APS; generating artificial personalities through embodied virtual agents). The distinction between APR and APP is worth noting in terms of terminology, as affective computing often grapples with differentiating between what’s true and what’s perceived, especially where emotion is concerned.

APR and APP use personality analysis methods rooted in pattern recognition. Depending on the analysis modality—such as video, speech, or social media behavior data—features like acoustic vocal cues or facial expression parameters are extracted. Then, statistical machine-learning methods such as the support vector machine model can be used to train a recognition or prediction model. New, previously unseen behavior can then be analyzed for personality cues based on the extracted features.

Two approaches prevail in APS. In machine learning, labeled data is collected from human behavior to train a machine to produce behavior fitting the current situation that induces the target personality in the human observer. In rule-based systems, specific parameters such as pitch, intensity, speaking rate, length and frequency of pauses, hesitations, and word choice are fitted by rules to the modeled personality. For virtual agents, parameters also

include body movements, gestures, and facial behavior including eye contact and expression.

The authors show that reasonable APR results can be obtained by analyzing text and nonverbal and spoken communication, as well as through computer gaming, social media, and wearable device data, and by considering the user's speaking activity, proximity to others, and movements. Similar findings were reported for APP through nonverbal behavior and social media exploration. With APS, certain personality traits can be successfully simulated through speech or facial expression synthesis. Accordingly, virtual agents and robots might already have a perceivable personality.

So it seems that computers *can* understand and show personality, without actually having one.

technology to better predict users' needs and preferences, helping machines interact with humans more realistically. □

With the increasing flow of data from social media and elsewhere, personality computing will help mine the digital traces people leave online, make sense of social media users, target advertisement campaigns to the right potential customers, or tune retrieval technologies to users' personality. Personality computing is also likely to play an important role in technologies aimed at detecting personality disorders. Finally, human-computer interaction (HCI) can adopt personality computing

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