

WALL STREET JOURNAL ARTICLE

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What Your Voice Reveals About You

Banks, doctors, and investigators are analyzing the human voice for help in tracking down criminals, diagnosing diseases. The sound of your voice can now communicate in even more ways thanks to new technology.

Article by *Sarah Krouse* Aug. 13, 2019 1:40 pm ET

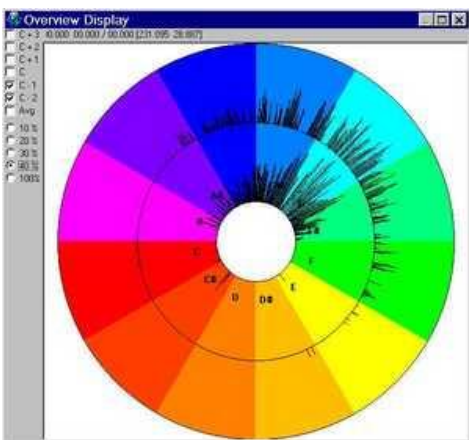
The sound of your voice is becoming a new type of fingerprint!

Increasingly sophisticated technology that detects nuances in sound inaudible to humans is capturing clues about people's likely locations, medical conditions and even physical features.

Law-enforcement agencies are turning to those clues from the human voice to help sketch the faces of suspects. Banks are using them to catch scammers trying to imitate their customers on the phone, and doctors are using such data to detect the onset of dementia or depression.

That has created new possibilities for health care, finance and criminal justice organizations while also raising fresh privacy concerns, as consumers' biometric data is harnessed in novel ways.

“People have known that voice carries information for centuries,” said Rita Singh, a voice and machine-



learning researcher at Carnegie Mellon University who receives funding from the Department of Homeland Security. **“It’s not new, but there wasn’t a way to get it out.”**

Ms. Singh measures dozens of voice-quality features—such as raspiness or tremor—that relate to the inside of a person's vocal tract and how an individual voice is produced. She detects so-called microvolumes of air that help create the sound waves that make up the human voice. The way they resonate in the vocal tract, along with other voice characteristics, provides clues on a person's skull structure, height, weight and physical surroundings, she said.

Her work points to a future of surveillance and investigation in which law-enforcement officials can rely on audio as well as video content. Some financial firms already use the human voice to catch fraudsters.

Discover Financial Services Inc. receives so-called **voiceprints** of callers—not recordings of their voice—and flags known fraudsters. If a scammer is detected, a customer-service agent can ask the caller for a code sent to a device owned by the actual customer. Losses from fraud, which are counted as operating expenses, have declined by 10% since Discover began using Pindrop's voice-analytics system in 2015, said Daniel Capozzi, president of credit operations and decision management at Discover.

Some financial firms match audio recordings with other biometric and behavioral information they have about their customers to prevent fraud because bad actors often answer security questions about a victim's life faster than real customers.



Nuance Communications Inc., a Burlington, Mass., software technology company whose customers include HSBC and Kennebunk Savings in Maine, examines factors like the pitch, rhythm, and dialect of speech as well as vocabulary, grammar, and sentence structure. Nuance's voice-biometric and recognition software is designed to detect the gender, age, and linguistic background of callers and whether a voice is synthetic or recorded.

In medicine, measuring slight changes in voice is starting to help doctors detect the onset of diseases like Parkinson's or more quickly measure the efficacy of treatments for illnesses like depression, researchers say.

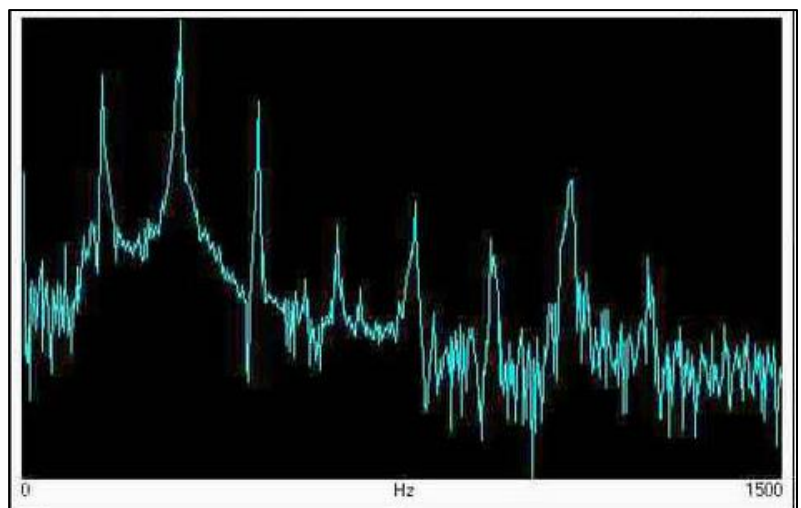
Boston-based Sonde Health asked more than 4,000 people to download a smartphone app and answer prompts designed to make them generate many different sounds. From those audio samples researchers identified and grouped features like rhythm, melody and how precisely the person articulates words.

Slower speech, for example, could indicate fatigue or sorrow at one point in time, but over longer periods could signal something more severe, co-founder Jim Harper said.

That voice-based data isn't yet robust enough to base medical decisions on alone, but is being used alongside clinical trials for drugs to treat depression, Mr. Harper said.

Toronto-based Winterlight Labs Inc. parses features in speech such as syntax, grammar, complexity of vocabulary, pitch and rate of speech to monitor mental health and dementia.

Winterlight works with Janssen Pharmaceuticals Inc. to try to detect Alzheimer's in elderly patients. Some of those patients, for example, tend to use words they acquired earlier in life as their recent memories deteriorate.



More information on Voice Spectrum Analysis at <https://aniwilliams.com/voice-spectrum-analysis/>