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AI Could Prevent Marital Arguments Before They Even Begin

Researchers use listening devices and algorithms to detect speech patterns that typically precede fights
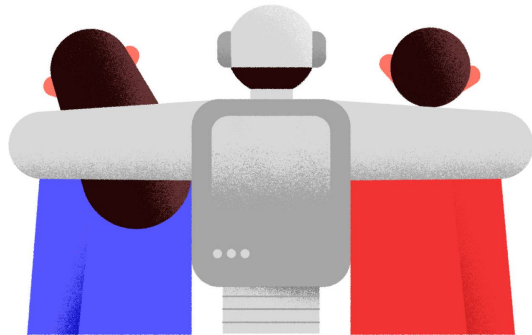
Researchers developed an algorithm that identified fights in progress and also patterns that would lead to an argument within minutes. **PHOTO:** GIACOMO BAGNARA

By Aili McConnon

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Couples often find themselves in familiar arguments that escalate and repeat. Artificial intelligence may be able to help.

A group of four engineers and psychologists are trying to develop AI systems that use speech patterns and physiological, acoustic and linguistic data from wearable devices and smartphones to detect conflict between couples.

The researchers believe that algorithms trained to work with such data could eventually predict conflict and offer an intervention before a situation escalates. Someone who is highly stressed, for example, might receive a text message saying a fight is imminent so he or she should pause the conversation and take 10 minutes to meditate, says Theodora Chaspari, an assistant professor in computer science and engineering at Texas A&M University.

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In a 2017 study, six researchers, all originally at the University of Southern California but now at USC, Texas A&M and Florida International University, tracked 19 couples from the Los Angeles area who experienced conflict during the course of one day. The couples wore monitors that tracked variables such as heart rate, perspiration and activity levels. Their smartphones prompted them hourly to report how they were feeling and recorded audio that was then analyzed for acoustic features such as pitch and frequency and linguistic features such as the number of verbs and pronouns. Three-minute audio recordings were taken every 12 minutes from 10 a.m. until the couples went to bed.

"The more couples use second-person pronouns such as, 'You didn't do the dishes,' the more likely that expression includes anger than saying, 'I felt frustrated when I saw the dishes in the sink,'" says Dr. Chaspari.

Using the data gathered, the researchers were able to train the algorithms to detect conflict with 79.6% accuracy. The algorithm identified fights in progress and also patterns that would lead to an argument within minutes.

"Detecting and monitoring these sequences as they occur in real time could make it possible to interrupt, alter or even prevent conflict behaviors," says Dr. Chaspari.

Avoiding defensiveness

Fjola Helgadottir, a clinical psychologist in Iceland, says the results of these efforts are promising despite the limitations with self-reported data. She says she would like to see more couples tracked for longer periods. Dr. Helgadottir is the director of AI Therapy, an organization that develops automated AI programs to help people with social anxiety.

Dr. Helgadottir, who wasn't involved in the couples research, says involving computers in a therapeutic process between couples could be helpful. An impartial prompt might be better received and more calming than having a partner tell you to calm down, she says, as the latter can cause a defensive reaction.

"When your partner says 'Calm down, you are getting too upset,' that is received one way," she says. "But having that kind of prompt coming from an impartial computer might have a different impact on the argument."

Dr. Chaspari cautions that monitoring personal data in uncontrolled, real-life settings is more difficult than in lab settings, for reasons such as background noise. "Moreover, different people can exhibit a range of behavioral, emotional and physiological reactions in response to conflict, making it difficult to create one system that works well for all individuals," she says.

A new study conducted by many of the same original researchers and presented at the International Conference on Multimodal Interaction in October 2018 tracked 87 couples to understand how they experienced conflict based on their marital satisfaction and attachment styles. The study also considered feelings of security and anxiety and how those affect relationships.

Overall, the researchers found that in anxious and avoidant couples, speed of speech and intonation were most important in detecting conflict. The group was able to detect conflict in these couples, which later was confirmed by talking to them, with 86.9% accuracy. For securely attached couples (those who reported low levels of anxiety and high marital satisfaction), acoustic, physiological and linguistic variables were all equally important. Such distinctions could help tailor interventions for specific types of couples.

A pioneer sees potential

Using artificial intelligence to detect conflict in couples is part of a larger field using AI to detect emotions. Current studies are building on pioneering work in the 1990s by John Gottman, now a professor emeritus of psychology at the University of Washington, who showed it was possible to predict in the first three minutes of fights which newlywed couples would divorce within a certain period. Telling indications included starting off discussions with displays of negative emotion, criticism, contempt and defensiveness.

Dr. Gottman and his wife, Dr. Julie Gottman, co-founders of the Gottman Institute, which uses scientific studies to help couples improve their relationships, say they see potential in emerging technologies such as AI for helping couples.

"Technology can help measure what's going on in the body while the couple is having a conversation," says Julie Gottman. A couple with a habit of expressing contempt and criticism,

for instance, may attend a therapy session to learn and practice new communication styles, she says. An AI tool that is trained to recognize certain patterns and tracks heart rate and other physiological measures then could reveal, for example, that one partner's heart rate has skyrocketed, which signals "emotional flooding." This occurs if someone is physiologically overwhelmed and unable to access their new learning.

"Without this information, a therapist might think the person is being stubborn and simply falling back on old patterns," says John Gottman.

Going forward, Dr. Chaspari's group plans to use less self-reported data and rely more on sensors in smartphones and fitness monitors.

"Although preliminary, the goal with our work is to create interventions that provide feedback and prompts to improve couples' relationships and quality of life more generally. Ultimately," she says, "our method could be expanded to other areas, too, such as the parent-child relationship."

Ms. McConnon is a writer in New York. She can be reached at reports@wsj.com.

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