
Video Conferencing Must Evolve

MICHAEL MATTIOLI



Michael leads the Hardware Engineering team within Goldman Sachs. He is responsible for the design and engineering of the firm's digital experiences and technologies. He is also responsible for the overall strategy and execution of hardware innovation both within the firm and within the broader technology industry. Michael.Mattioli@gs.com

The 2020 COVID-19 pandemic has forced hundreds of millions of people to use video conferencing tools to continue learning, educating, conducting business transactions and providing health care. These tools are poor conduits for true human-to-human communication. Posture, tone of voice, use of physical space, facial expressions, gestures, and more are all lost when communicating through these tools as we know them today. To replicate the in-person experiences we've all come to know, these tools need to evolve from what is possible today with simple sound and some pixels.

Zoom, Meet, Teams, Skype, Webex, FaceTime—take your pick. Whichever you choose, they all boil down to nothing more than one or two audio channels and a few hundred thousand pixels. That's all you get. Since March of 2020, the COVID-19 pandemic has forced hundreds of millions of people to communicate with each other using myriad video conferencing tools. Human-to-human communication is much more than just hearing what we say and seeing some pixels arranged to represent faces. These tools were designed in a world much different from the one we live in now. Don't get me wrong; they've been crucial in the continuity of health care, education, and business over the last few months. I am not trying to diminish or downplay their importance; quite the opposite. Because they are so important, they need to evolve in order to become more effective vehicles for human-to-human communication.

Health Care

There's a reason why bedside manner is so strongly emphasized in training health care professionals. Intimate conversations with patients transpire: conversations about their health, well-being—*their literal lives*. These conversations require connection and engagement. Patients need to establish trust with their physician or nurse [6]. They want to be certain that

they are receiving nothing less than the absolute best care to be offered. Simple things like sitting down or standing up to have these conversations can make a world of difference [8].

When explaining a course of treatment, the tone in a physician's voice can convey confidence or doubt. A patient's nonverbal reactions (e.g., facial expressions, posture) to information give the physician more clarity on how the information is received than the patient's verbal response. These aren't things that can be effectively conveyed with the digital tools we have today.

Education

Students, instructors, and parents all agree that remote learning is nowhere near as engaging as in-person instruction. Instructors cannot accurately determine how their material is being received. Do the students react by sitting up or slouching? Are they responding confidently or insecurely in their answers? Are they even paying attention? A Dallas middle-school Spanish teacher struggles to find ways to read her students' body language: "In the classroom, I can look around and see body language and know when some of my students not fluent in Spanish need me to switch to English. I can't do that online. We need the interaction with the kids, face-to-face" [3]. Students face similar challenges with parents claiming that remote instruction "lacks substance" and with some parents even considering having their children repeat this past year's coursework [4]. Even video games are more engaging; the physical feedback (haptics) and input (buttons, joysticks, etc.) using a controller provide an entirely different sensory experience. Video games stimulate three of the five human senses (sight, sound, and touch), whereas modern video conferencing tools only provide interfaces for two (sight and sound).

Businesses

Know Who You're Dealing With

It's commonplace for high-stakes business interactions to take place in-person. In a study by Great Business Schools, 82% of people say that in-person meetings are essential for important contracts [7]. Any decision involving large sums of money, contracts, careers, and anything in between can be devastating if made incorrectly. Negotiations typically take place in-person so that each party has an opportunity to better understand the other prior to transacting. Use of body language and the physical space in the meeting place are key [5]. Lack of eye contact could suggest deceit. Folding one's arms could suggest defensiveness. Short and curt answers could be indicative of disinterest. Sitting down suggests one is confident and relaxed, whereas pacing around the room suggests one is anxious. When deciding whether or not to close on a new home, extend an employment offer, or enter into a contract, it's fair to want as much information as possible to truly assess the situation before making a final, binding decision.

Build Relationships

Arguably the most important component of a business transaction is not just the transaction itself but the long-term relationships that are formed between parties. The same study by Great Business Schools also reported that 85% of people found that in-person meetings built strong, more meaningful business relationships. Meaningful relationships require connection and engagement on a human level—a difficult task if relying solely on an audio device's representation of someone's voice and a display's representation of someone's face. Also consider the level of effort it takes to communicate with someone via video conferencing (rather low) as opposed to an in-person meeting (potentially rather high depending on various factors). "Going the extra mile" (quite literally, in some cases) helps establish a foundation of trust between parties and suggests that the relationship is of high importance [1].

Conclusion

We've all been making do with what we have in this time of crisis. The current situation is far from ideal. We've been using tools that were designed as a convenience or a luxury, but it's clear now that they need to be classified as a necessity.

What separates video conferencing from a phone call? A few hundred thousand pixels and, if you're lucky, slightly higher fidelity audio—nothing more. Video conferencing excels in situations where the human aspect of communication is not critical, such as brief conversations and informal discussions. These tools need to make the generational leap that provides more natural human-to-human communication.

Of course, the concept of going to a physical location to learn, conduct business transactions, or consult with a physician may already seem archaic. Just ask the hundreds of millions of people who used to cram themselves into a bus or a train (or a combination of the two) for hours each day. In a study performed by Morning Consult, 32% of adults in the United States would prefer to never commute again and work remotely every day, and only 24% would want to continue to commute every day [2].

It's time to move on, but the tools we have are holding us back. The tone or volume of someone's voice, whether or not they make eye contact, use facial expressions, posture, etc. all need to be accurately conveyed through digital means in order to reproduce the in-person experiences we've all come to know. What is the underlying technology that will help us get there? How does this new level of communication affect how we will approach privacy and security? These are some of the questions we, as engineers, need to ask ourselves. No one has all the answers right now. Who knows—years from now, when we get there, we may not even refer to it as "video conferencing" anymore.

Video Conferencing Must Evolve

References

[1] Ashton College, “The Importance of Face-to-Face Communication”: <https://www.ashtoncollege.ca/the-importance-of-face-to-face-communication/>.

[2] Morning Consult, “The Future of Work—How the Pandemic Has Altered Expectations of Remote Work,” June 2020: <https://go.morningconsult.com/rs/850-TAA-511/images/Remote%20Work%20Report%20-%20Morning%20Consult%20-%20Final.pdf>.

[3] T. D. Hobbs, and L. Hawkins, “The Results Are in for Remote Learning: It Didn’t Work,” *Wall Street Journal*, June 5, 2020: <https://www.wsj.com/articles/schools-coronavirus-remote-learning-lockdown-tech-11591375078>.

[4] L. Brody, “Struggling with Remote Learning, Some Families Cut Class,” *Wall Street Journal*, May 1, 2020: <https://www.wsj.com/articles/struggling-with-remote-learning-some-families-cut-class-11588334403>.

[5] Benchmark Meetings, “5 Reasons Virtual Meetings Can’t Replace Face-to-Face Meetings,” April 2019: <https://www.benchmarkmeetings.com/face-to-face-meeting-advantages/>.

[6] UCLA David Geffen School of Medicine, “The Importance of Bedside Manner to Trust and Patient Engagement,” July 2016: <https://medschool.ucla.edu/body.cfm?id=1158&action=detail&ref=699>.

[7] Great Business Schools, “Face Squared—The Numbers Behind Face to Face Networking,” January 2014: <https://www.greatbusinessschools.org/networking/>.

[8] St. George’s University, “Developing Good Bedside Manner: 9 Tips for Doctors,” January 2019: <https://www.sgu.edu/blog/medical/how-to-develop-good-bedside-manner/>.

FAST[↑]'21

19th USENIX Conference on File and Storage Technologies

FEBRUARY 23–25, 2021 | VIRTUAL EVENT

The 19th USENIX Conference on File and Storage Technologies (FAST '21) brings together storage-system researchers and practitioners to explore new directions in the design, implementation, evaluation, and deployment of storage systems.

PROGRAM CO-CHAIRS



Marcos K. Aguilera
VMware Research



Gala Yadgar
Technion—Israel
Institute of Technology

www.usenix.org/fast21

