

THE DANGEROUS OUTCOMES OF HOLOGRAMS

Aaron Paczak (aap77@pitt.edu)

INTRODUCTION

Innovation in holography (the studying and developing of holograms) is the answer to controlling the spread of disease now and in the future [1]. Not only do holograms have the ability to provide medical professionals with long distance medical consulting so that they do not have to put themselves in danger by visiting places of highly concentrated disease, but they also have the potential to flip the industry of communications technology upside-down. Holograms possess the ability to change the way we communicate as much as the invention of telephones did, and many companies are heading toward the development of, while other companies at the top of the communications technology industry fight to keep their stronghold in the market.

My current employer, Holographicine Inc., sees the gains to be had in holography in general for the future in technological communication as well as in the field of medical consultation. I am the lead engineer in the development of our proprietary hologram that combines the horizontal film method and the traditional method to make the most accurate version of the three-dimensional light image that can be viewed from 360 degrees [1]. All of the collaborating engineers at Holographicine envision our product to be the first step in slowing the spread of infectious diseases and created our company with the intentions of providing a safer way for our doctors and nurses to consult patients in areas of highly concentrated disease. This would, in turn, isolate the infected population. Holograms have to potential not only to control the spread of plague, but to develop a real-time method of face-to-face communication for the future as well.

THE OPPOSITION TO HOLOGRAMS

When new and innovative businesses innovate and reform certain industries, the current powerhouses in the industries try to stomp them down in order to hold their presence in the market. In Holographicine's situation, smart phone producers see the potential that our holograms have in the field of communications technology, and they are scared losing their power in the industry. Another group that is threatened by Holographicine is the nonprofit organization Doctors without Borders. Because Holographicine has such a safer way of doing their job (helping the poor and sick across the world), Doctors without Borders is afraid that more doctors will leave their organization for the safety of consulting via hologram.

To make a stand against holograms, smartphone producer banded with Doctors without Borders to produce a statement to devaluating the work of Holographicine and giving no light

to the possible outcomes holograms. In their statement, the organizations claimed that the primary intentions of Holographicine, to make a safer way to stop the spread of disease, were ridiculous, and that they would never work. Doctors without Borders claimed that possible holographic medical consultation was a mockery of their work, and that it would never be a prevalent way of handling the stopping of the spread of disease. They asserted that the mere thought of not having doctors physically visit areas of densely populated disease is unethical, that implementing holograms in the medical consulting would hurt many more people than it would help.

Along with the Doctors without Borders libel against our company's work, many smartphone companies made claims in the same article, saying that Holographicine's work and the development of holograms used for everyday communication will not only socially cripple the world in the future, but also provide the world with a wealth of terrifying issues. They claimed that, once holograms are attainable for everyday use, people will cease to participate in human-to-human interaction and only communicate through the media of holograms. They claimed that holograms would make people even lazier than they are today and more dependent on their technology than they are today, slowly shifting the world from its real, alive state, to a virtual, completely online state. They claimed that holographic communication will give people no reason to go out into the world to see others or do work, that holograms will change the world as we know it, and not for the best.

PRESENTING THE ETHICAL DILEMA

When the statement against holograms first came out, our CEO of Holographicine was very worried of the public's response. She wanted no part in having a respected organization such as the Doctors without Borders and successful smartphone companies bashing our work. At first, I thought little of the article—Doctors without Borders and the smartphone companies were just trying to keep hold of their industrial thrones by warning the public of the potential negative effects of Holographicine's work. However, after a few days, being the curious engineer that I am, I pondered whether or not my work at Holographicine was potentially going to lead to negative effects on the world, and whether or not my work and research was ethical or not.

These thoughts came and went until our CEO asked me if I could respond to the article by the Doctors without Borders and the smart phone industry by releasing a public statement. She wanted to justify the future of Holographicine and its hologram to the public, regardless of the potential harm the

product could do to the world's future social environment and the future of humanitarian medical efforts.

Even though Holographicine is extremely confident in the future of the traditional-horizontal film combined hologram, it understands that no one can predict the outcomes of their hologram in medical consultation and in communications technology with complete certainty. Yet, the CEO still was still going to force me to release a public statement reassuring the public that Holographicine's work would have no negative outcomes. She even hinted at the fact that position as the lead engineer at Holographicine was contingent on my writing this public statement.

Initially, releasing a statement in response to the article written by the Doctors without Borders and the smart phone industry would have been a no-brainer. However, after contemplating the outcomes of developing an attainable hologram that could be used for everyday communication, I was unsure of whether or not I could release a statement saying that everything in our work will result in nothing but good.

Not only was I unsure if releasing a statement claiming holograms will never ruin the social environment of the world as well as non-profit was ethical or not, but I even started to question whether my work on holograms in general was leading to unethical outcomes. I began to envision the damage that holograms could mark on human life in the future. If I were going to make the right decision about releasing the public statement or not—or even continue with my work on holograms—I needed to research ethics to make the right, well-educated, and ethical decision.

ENGINEERING CODES OF ETHICS

In order to make a good decision I decided to consult two codes of ethics specific to engineers: the National Society of Professional Engineers (NSPE) Code of Ethics and the Institute of Electrical and Electronics Engineers Code of Ethics [2] [3].

National Society of Professional Engineers (NSPE) Code of Ethics

The NSPE Code of Ethics values the honesty and integrity of engineers mainly because they believe that engineers "direct and vital impact on the quality of life for all people" [2]. Even though the NSPE code's preamble

The first note in the NSPE Code of Ethics that caught my eye was cannon #3. It clearly states that engineers should "issue public statements only in an objective and truthful manner" [2]. However, since I do not know exactly what the outcomes of holograms in mass communication or in medical consultation are, based on cannon #3, I cannot issue a public statement that totally denies any possible bad outcomes of holography. This leaves me in an ethical gray area, not knowing whether or not to release a statement that could potentially contain lies.

After reading cannon #3, I looked toward the NSPE professional obligation #5 which states that "engineers shall not be influenced in their professional duties by conflicting interests" [2]. Since my boss threatened to release me from my position at Holographicine, I had a conflict in interests: either I could keep my job or write an article that dismisses possible damages that our hologram could do in the future. If I were to make a decision solely based on the NSPE professional obligation #5, I would have to choose not to write the article in the name of ethical engineering, even though I could possibly lose my job. However, professional obligation #5 did not give me enough information to make a decision, so I had to consult more of the NSPE Code of Ethics to gain more insight on what I should do.

Next, cannon #4 of the NSPE Code of Ethics states that engineers should "act as faithful clients of their employers" [2]. If I were to follow this cannon in deciding whether or not to release the public statement, I would have to stick by my employer's side and act as his "faithful client" to her [2]. This means that I would have to write the public statement regardless of how I felt about it, because if I didn't, I would be breaking the fourth cannon of the code. This struck me as quite of a surprise, since, directly after review cannon #3 of the NSPE Code of Ethics, I was almost certain that my writing of the public statement would argue with the main principles of the code. In my particular situation, cannons #3 and #4 contradict each other, leaving me very confused after considering the full NSPE code of ethics.

This situation put me into quite the pickle—how could I make a decision with one outcome breaking cannon #3 of the NSPE Code of Ethics while the other decision would break cannon #4 of the same code of ethics?

Suggestions from the NSPE Code of Ethics

A lot of the NSPE Code of Ethics suggests that I should stick by my employer's side. I was slightly inclined to writing the public statement even though I would be making potentially false claims about the future that holograms could harm because the NSPE Code of Ethics so strongly recommends engineers to fulfill the obligations that they have to their employers.

However, solely basing my decision off the NSPE Code of Ethics was not ample, as I was still unsure of the most ethical decision I could make. I needed to consult another code to gain a better insight on what decision I should make.

The Institute of Electrical and Electronics Engineers Code of Ethics

The next code I decided to consult was the Institute of Electrical and Electronics Engineers Code of Ethics. Because the technology Holographicine relates more toward electrical engineering, I assumed that this code would be more specific and better in helping me make my decision.

The first code in the IEEE's code of ethics cautions engineers in their decision making by saying that they should "accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment" [3]. Unlike most of the rules associated with the NSPE Code of Ethics, this first code explicitly addresses that engineers should warn the public if they know anything at all about possibly "factors that endanger the public or the environment" [3]. Just as Doctors without Borders claimed in the statement against Holographicine, holograms in medical consultation have the ability to hold many doctors from going out to areas of a high concentration of disease, possibly harming many people in a specific area. Even though Holographicine believes that the holograms may prevent wide spreading of the disease, they cannot reject the statement made by Doctors without Borders with complete confidence. In addition, even though holograms may not directly harm people to a certain extent, they have the ability to harm the social environment of the world. Just as the smart phone companies warned the public the article they wrote against Holographicine, holograms have the ability to cripple human-to-human interactions not through the medium of the Internet.

The IEEE's first code of ethics made me more aware of the possibly negative results of my work at Holographicine than the codes from the NSPE did. Instead of suggesting reasons for trying to make an ethical decision about whether or not I should release the public statement for employment reasons, the IEEE code puts more emphasis on realizing the possible negative outcomes of the things I would be writing about. The first code really didn't make me think about whether or not I should write the public statement as my boss wanted it, but it made me consider writing a public statement that recognized the flaws that holograms could provide.

In addition, the second code of the IEEE Code of Ethics suggests that engineers should "avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist" [3]. This was the most powerful code I read in the entirety of my decision-making process. Since, in reality, all of the conflicts and problems that holograms could create are just "perceived" by the smart phone companies and Doctors without Borders, based on Code 2, I should "disclose" them as soon as I am aware of them [3]. After reading this code, I was almost sure that the correct and most ethical decision I could make would be to write a public statement that describing the problems that holograms could present.

Reading further into the IEEE Code of Ethics, I saw again, in code #3, another code that suggested I write a public statement with complete honesty in the damage that holograms have to potential to do in the future. Because the code stated that engineers should "be honest and realistic in stating claims," if I wrote the statement, there is no way I could only give the upsides of the future of holography at Holographicine without being unethical [3].

The fifth IEEE code in the code of ethics went on even further to exaggerate the fact that I should give the downsides of my work if I were to write the public statement. Since the code states that engineers should "improve the understanding of technology and its potential consequences," I was being pushed even further to write the public statement that my boss asked me to write, but including the potential consequences that could come from the use of holograms in medical consulting and in everyday use in communications technology [3].

Suggestions from the IEEE Code of Ethics

After reading the IEEE Code of Ethics, I concluded that, if I were to make a decision based solely off the IEEE code, I would have to publish a public statement, releasing any information about the future consequences that holograms would provoke. If I were to do this, I would be trash-talking Holographicine, and taking all of the merit away from the years of work I spent researching and developing Holographicine's proprietary hologram.

SEARCHING FOR A FINAL DECISION

Based on the NSPE Code of Ethics, I knew I had to write the public statement that my boss asked me to write, and based on the IEEE Code of Ethics, I knew I had to be completely honest in the statement, saying that our work at Holographicine could possibly lead to results predicted by the smart phone companies and Doctors without Borders. In light of my findings in the codes of ethics, I still felt uncomfortable bashing my company's name by writing a statement that describe all of the possible faults with holograms.

As I inched closer to a decision, I couldn't seem to find any better information through other codes of ethics and online articles, so I decided to call my father to ask him what he thought. My father has been a registered nurse for over twenty years, and when I asked him whether or not I should write the public statement that my boss asked me to write. He told me that I needed to do whatever my professional obligations at Holographicine entailed, but he also mentioned that he somewhat agreed with what the Doctors without Borders accused Holographicine of doing. He said that "nothing could ever replace real human-to-human interactions in the medical field, even if it means that some medical professionals would have to risk their health" by traveling to areas of highly concentrated disease [4].

Even after I discussed the situation with my father, I still felt uneasy and continued to ponder my decision. As I brainstormed, I recalled one of the most substantial ethical decisions ever made by any scientist: when Albert Einstein wrote to President Roosevelt to warn him about the potential dangers that his discoveries in mass and energy could have on the world. In his letter to the President of the United States, Einstein wrote about how his discoveries in physics may "lead to the construction of bombs" [5]. The bombs that Einstein

was referring to were the atomic bombs that the United States dropped on Japan, leveling two entire cities [6]. Einstein, even though he made a groundbreaking discovery in science, and even though he and many others thought of his discovery to be good, still understood the possible negative outcomes from his work [5]. He had enough integrity to advise the President that his discovery may lead to the destruction of human life.

Although Einstein's discoveries and their outcomes are on a different scale than mine, they are very similar. Einstein made an ethical decision to warn the President of the dangers of his discovery, even though he probably didn't want to think that his work could lead to something that bad. His integrity for science was overwhelming, and he would have never let information about his discoveries leading to unethical outcomes fly under the radar.

FINAL DECISION

I decided to write the public statement with complete honesty, just as the NSPE Code of Ethics, the IEEE Code of Ethics, my father, and Einstein all suggested. I will write in response to the article written by the Doctors without Borders and the smart phone companies in defense of Holographicine; I will state that our company stands for the development of technology for the use of good. However, I will not say that the outcomes of the development of holograms in the future will be all good; it's my duty as an ethical engineer to explain the possible consequences that my work could create.

RECOMMENDATION FOR OTHER ENGINEERS

Engineers in my shoes who have to make similar decisions should not take these decisions lightly. Making ethical decisions takes a lot of resources, time, and thought. No engineer can make the correct, ethical decision solely based on one code of ethics or by one similar decision made in the past—they have to consider many different codes and many different cases before deciding on what to do. Every ethical dilemma is different. There is no code of ethics that will provide the one perfectly correct answer to help an engineer make the right decision in his or her ethical dilemmas.

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