Artificial Intelligence:

The Dark Side of Deep Learning

Nina Squicciarini

Marist College

Technology can be seen as a blessing and a curse. It's essential to recognize that any technological advancement always comes with the risk of being misused. This has become evident in the use of artificial intelligence systems. Artificial intelligence has helped in health care, creates jobs, and efficiently solves problems in a way the humans never could. Technology is powerful and the more it develops, the more dangers it presents. The new artificial intelligence system, "deepfakes," is the newest form of technology people are terrified of. This system puts politicians, celebrities, and average people at risk. Deepfakes have been discussed as a threat and the newest version of fake news, but is there more to this program?

Many people think of robots when they think of artificial intelligence, but there are various forms of artificial intelligence. The system deepfakes is the name of a program that scans images of one person, and then places that face onto a different person to create a video. This means that someone can scan a significant amount of photos of President Trump's face, place it on their own face, and create a video of "President Trump" saying whatever he wants. The continuous advancements in this program that are happening each and every day lead to the, ultimate question: Is technology the "the next wave of misinformation warfare?" (Schwartz, 2018).

These popular videos are named deepfakes because they incorporate deep learning. Deep learning is a form of artificial intelligence that follows an algorithm. This algorithm acts as instructions for the artificial intelligence as it scans mass amounts of images and audio (Riechmann, 2018). Once, the artificial intelligence system "learns" all of this information it is capable of generating a fake video with fake audio. This is not a concerning fear to have right now because the deepfake technology is not that advanced yet. A significant amount of expertise is required from a person to create a believable video (Riechmann, 2018). Deepfakes today are

being used mostly to imitate celebrities. This includes creating fake porn videos with celebrity faces, and also creating funny videos with celebrity faces for comedic reasons on YouTube. The deepfake technology and algorithms will eventually become more realistic and it's evident that these videos could be used for malicious purposes.

Before Deepfakes became popular, many people were using the program Face Swap. In 2016, Face Swap became very popular on the social media platform, Snapchat. This program required two people to be on the camera, then scanned the two faces live, and finally switched the two peoples faces. People really enjoyed seeing what they looked like with their siblings or friends faces on them. Now, you even put animals on your face to make a short entertaining video. Since the Snapchat filter works in real time, this means they are valuing speed over accuracy, which results in a low quality video (Beres & Gilmer, 2018). An unknown person took this idea and ran with it, creating the powerful program known as deepfakes. Deepfakes are created differently than the Face Swap program. The desktop program called "FakeApp" was established, and utilizes artificial intelligence with three required steps for success—"alignment, training, and merging" (Beres & Gilmer, 2018). The artificial intelligence scans hundreds of still photos to create an individual's digital face. These still-framed pictures are scanned from videos and other sources to analyze different angles and expressions. Then, the program layers these images over one another and puts them together to create a video of the digital person to share (Beres & Gilmer, 2018).

Deepfakes were created on a website called Reddit. This website is primarily used by millennials for social news and establishing connections. An unknown user on Reddit started posting videos of porn stars with celebrity's faces on them. This created uproar and celebrities were frantic trying to get these fake videos off the Internet. The fake porn videos created a

community on Reddit (Beres & Gilmer, 2018). In this community, people exchange videos and compare video creation techniques for improvement. Celebrities are not the only victims of fake porn videos; people are now using their friends and classmates faces on these porn stars (Beres & Gilmer, 2018). Nothing on the Internet can be completely removed, and these videos can horribly impact people's reputation. Especially, for students who are concerned about getting into college and getting jobs. These videos can ruin anyone's life. These fake porn videos have hundreds of thousands of views on several websites including, Reddit and Pornhub. Pornhub has agreed to take down all deepfake videos from their website. There is also an option for users to report these fake videos on Pornhub so they can be taken down. None of these people gave consent to their face to be stolen to create a disturbed fantasy for disturbed individuals.

Andrew Grotto had his first exposure to deepfakes in September of 2017. He became aware of this through a colleague in computer science at Stanford University. This colleague showed him a deepfake video and told Grotto, "We should write about this!" This was the beginning of Grotto's exploration in the world of deepfakes.

Andrew Grotto is an expert in various forms of technological developments. He currently works at Stanford University, at the Center for International Security as a Security Fellow and a Research Fellow at the Hoover Institution. Prior to this Grotto worked at the White House as the Senior Director for Cybersecurity Policy (Stanford University, 2017). He worked under the Obama administration and the Trump administration. Grotto has a wide range of experience in all different kinds of cyber policy concerns: "defense of financial services, energy, communications, transportation, health care, electoral infrastructure, and other vital critical infrastructure sectors, cybersecurity risk management policies for federal networks, consumer cybersecurity, and cyber incident response policy and incident management" (Stanford

University, 2017). This experience involving technology makes Andrew Grotto the ideal person to analyze the impact the expansion of artificial intelligence and what its capabilities are.

There is a fear that deepfakes could interfere with elections and cause issues involving national security (Riechmann, 2018). This has not become a problem yet, but it will become an issue as more people become aware of how to use these programs. Hany Farid is an expert in digital forensics at Dartmouth College located in New Hampshire, and he is studying deepfakes (Riechmann, 2018). Once the average person is capable of creating a deepfake video, they can create a video of anyone saying anything and this is very dangerous power to have. When this fear becomes reality, Farid said, "we have entered a new world where it is going to be difficult to know how to believe what we see" (Riechmann, 2018). There is the possibility of political parties using deepfakes as misinformation to damage the competing candidates chances of winning. The United States is aware of the potential threat approaching and U.S. Defense Advanced Research Projects Agency, also known as DARPA, is developing technologies meant to identify deepfake videos (Riechmann, 2018). This agency is two years into the four-year program that will have technologies capable of identifying fake images and videos (Riechmann, 2018). Extensive analysis is required to identify fake videos, and there is no guarantee that new technologies will be able to keep up with the developments of deepfake technology.

As deepfakes become a greater concern, legislators in Congress having been proposing laws against the creation and spread of deep fakes (Kerr, 2019). Senator Ben Sasse has a proposal called the Malicious Deep Fake Prohibition Act, and this would make it a federal felony to create or distribute any type of deepfakes (Kerr, 2019). It quickly became clear that this bill would be a very difficult bill to pass without invading the people's freedom of speech.

United States Senator Marco Rubio is a representative in Florida, and he has expressed his concern about deepfakes. Several other members belonging to the Senate's intelligence committee have been voicing their worries as well. According to Senator Rubio, there is the potential threat that "a foreign intelligence agency could use the technology to produce a fake video of an American politician using a racial epithet or taking a bribe" (Riechmann, 2018). There are endless horrid deepfake possibilities—U.S. soldier killing innocent civilians overseas, U.S. official revealing they are involved in a conspiracy, or any government official announcing nuclear war (Riechmann, 2018). This program will eventually be capable of creating life threatening videos that could impact everyone in the world. This technology can be used as a weapon in the future that can effect any election or important decision (Riechmann, 2018). There are improvements that are necessary in order to make the videos appear more realistic and natural. In some deepfake videos the person's blinking in the video appears unnatural, and this is a sign that the video is not authentic. Andrew Grotto emphasized how as this technology becomes more advanced and realistic, it'll become close to impossible to distinguish with the naked eye. Grotto believes this technology will be used to influence the public's opinion with disinformation. Disinformation campaigns will be enhanced, as deepfakes become the new fake news.

In 2009, the U.S. Embassy in Moscow made a complaint because a sex video was fabricated to negatively impact a U.S. diplomat's reputation. During this time period, John Beyrle was the U.S. ambassador in Moscow. Beyrle blames the Russian government because the video was clearly fabricated. The video showed a man and a woman in a hotel room, and there was absolutely no indication that this man was a U.S. diplomat. The fake videos in Russia didn't stop here. The American ambassador in Russia was Michael McFaul during the years 2012

through 2014, and he has also been a target for fake videos. In Russia, his face was put on photographs and his speech was digitally altered to make him say horrible things. He said that Russia has been involved in disinformation for years (Riechmann, 2018). This demonstrates how this is only the beginning for Russia and their political attacks. Deepfakes will become an important factor for Russia's goal to spread misinformation about other countries for their advantage.

Deepfakes are a potential danger to national security. A good quality deepfake video that is released at the right time can cause a lot of panic (Chesney & Citron, 2018). The growing popularity of deepfakes will tear apart the public's trust in democracy (Chesney & Citron, 2018). The worst-case scenario would be if we had no technology at all to completely expose deepfakes and no legal help available to the victims.

In May 2018, a Belgian political party called Socialistische Partij Anders (sp.a) created a deepfake video of Donald Trump and released it on the Internet. In this deepfake video "Donald Trump" was looking into the camera saying, "As you know I had the balls to withdraw from the Paris climate agreement and so should you" (Schwartz, 2018). This was "Trump" advising Belgium people on the climate change issue. The public was very upset about this video and outraged that the U.S. president was making suggestions for the Belgium policy on climate change (Schwartz, 2018). The citizens of Belgium had a negative view of the president and were calling Americans dumb. This shows the power that deepfakes have to influence the public's opinion. The sp.a later revealed that the video was not real and was a computer-generated image of Trump. They clarified how Trump did not say any of those things and the purpose of the video was to gain the public's attention (Schwartz, 2018). Once the group got people watching the deepfake video, they redirected the public's attention to their petition urging the government in

Belgium to do more for the climate change (Schwartz, 2018). The leader of the group said this video was supposed to be a joke and the group assumed the poor quality of the video made it obvious that the video was not authentic. The group specifically said the lip movements made the video look fake, but this joke was not obvious to the public. This demonstrates the political impact that deepfakes can have on countries.

There are many threats that need to be considered when thinking about the future of deepfakes. Deepfakes can become a threat to the average person. Once this machine-learning algorithm becomes more accurate and easier to use, it will be a prime tool for stealing someone's identity. These fake videos are created without a person's consent, and these creators will have the power to make the digital person doing or say anything they want (Chesney & Citron, 2018). That's a scary thought. This is the problem we are seeing now with the fake porn videos. Right now celebrities are the victims of these videos, but it's not too far from reality to consider the harm this could do to an everyday person. This can ruin a person's career and reputation. People can also use these videos as "evidence" of an affair or they can end an enemy's career with "evidence" of them saying derogatory comments (Chesney & Citron, 2018). People could use fake videos to blackmail people into revealing confidential information or giving them money (Chesney & Citron, 2018). As deepfakes become more dependent on the algorithm and less on the programmer, it will become easier to use, and this is a reality that isn't too far into the future.

Andrew Grotto emphasized that the real issue of deepfakes in today's society is how deepfakes are going to contribute to cyberbullying. Teenagers already have a hard time going through puberty, and bullying has an extreme impact on the victims' mental health. Technology has many benefits, but it can always be misused. Cyberbullying is the newest form of bullying, and this is bullying that takes place on any digital device. Grotto stated, "Cyberbullying is

already a major problem for young people. Deepfakes are another way for young people to engage in cyberbullying." Students can create fake videos of their classmates to embarrass them and this is a form of bullying. Even if the video isn't completely believable, it will still have a heavy impact on the student with the purpose of damaging their reputation. This brings cyberbullying to an entire new level of horrible. Many teenagers use social media frequently and this means their posts are available to other classmates that follow them on these platforms. Bullying online means that this information can be spread among classmates and this is nearly impossible to prevent. This makes creating deepfakes a realistic issue for bullying because their photos and videos are available online for others to see. It's important for students to be aware of their privacy settings on social media and who is following them because there are now several methods to cyberbully. Cyberbullying is dangerous because once something is posted online; it's there forever. Deepfakes provide a danger for young people in school due to the growing impact of cyberbullying.

It's evident that deepfakes are a threat to individuals and their reputation. There is not a lot of legal help available for those that are victims of fake videos because deepfakes are such a new problem. This is becoming an issue for public figures, as well has private citizens. Jonathan Masur, professor at the University of Chicago Law School, believes it would be difficult to make a case claiming the fake video is an act of defamation (Beres & Gilmer, 2018). This is because the digital attacker is not showing a pornographic picture of the person being used; therefore, it's not by definition technically defamation. These videos feature the person's face being used on a different body. Most of these fake videos state they are fake and this makes the defamation case not applicable. It'll be difficult to make any laws against the creation of deepfakes because they

would interfere with the first amendment. Jonathan Masur also added, “It would be a bad idea, and likely unconstitutional, for example, to criminalize the technology” (Beres & Gilmer, 2018).

There is very little help available to those that are victims of deepfakes. Fortunately, Harvard Law School has a Cyberlaw Clinic that specializes in pro-bono legal assistance for people suffering with issues involving: “the Internet, technology, and intellectual property” (Harvard Law School). The students participating in the program receive credit for school while working to help real clients. The purpose of this program is for students to help clients with their online activity and to inform them about the existing cyber laws. The Cyberlaw Clinic advocates for certain policies to help shape law developments (Harvard Law School). This clinic also works with law students, accompanied by expert lawyers to provide clients with legal advice. This type of clinic is the first to exist and Harvard Law School is hoping this tradition continues (Harvard Law School). This help will go a long way as deepfakes become more relevant.

The possibility of a world full of deepfakes could lead to a new business. This new service would be meant for people that may be targets of deepfake videos (Chesney & Citron, 2018). This service would consist of tracking a person’s online presence and face-to-face interactions so if any fake video were to be posted about them; the victim could easily prove otherwise. This type of service could provide long-term employment and would be the potential end to privacy. This could be a possible method to counter deepfakes and may be more of a reality for people constantly in the public eye.

Deepfakes are becoming more of a threat and many people are working there hardest to identify the fake videos. The United States Defense Department has been developing programs using forensic tools to catch deepfakes involving fake news and “revenge porn” (Knight, 2018). These experts have been rushing to find new ways to identify these fake videos as they continue

to become more realistic. The program called Media Forensics was developed by DARPA and their recent focus has been turned to deepfakes (Knight, 2018). Siwei Lyu and his research students established a simple, yet effective, technique for identifying fake videos. Lyu is a professor at the State University of New York at Albany and created 50 deepfakes with his students (Knight, 2018). They tried to use the common forensic methods, but this didn't consistently work well. Lyu and his students realized that in order to spot a deepfake video, it is essential to look at the eyes. In a deepfake video you will notice the eyes look different and appearing as a glitch. The current technology used to create deepfakes shows a digitized individual blinking unnaturally (Schwartz, 2018). When the artificial intelligence system scans the images to create the digital image of a person's face, their eyes are always open. When a video shows the "person" blinking, the system doesn't have a clear image of what the person looks like with their eyes closed, therefore, causing a noticeably odd moment. At the University of Albany, researches published a paper explaining how it's essential to analyze the person in the video blinking (Schwartz, 2018). This discovery was the start of establishing a reliable method to detect deepfakes.

This discovery inspired DARPA to start using a similar technique and this includes looking for unusual movements, eye color, and other physiological signs that deepfakes do not perfectly replicate (Knight, 2018). The deepfake learning systems can easily be trained and reprogrammed in ways that can't be identified for forensic tools. Lyu stated that an experienced programmer could collect images that demonstrate a person blinking, and then this makes the main method for identifying deepfakes ineffective. Lyu and his research students have created a more effective method that is being kept secret. Lyu stated, "I'd rather hold off at least for a bit. We have a little advantage over the forgers right now, and we want to keep that advantage."

Andrew Grotto emphasized that right now the primary method used to detect deepfakes is anomalies, which includes: eye blinking, shadows, lighting, etc. Once the author of the video is aware of this, they can retrain the algorithms to avoid detection. Grotto states, “The machines will get better at programming, resulting in less detective blinking. The blinking will not be an obvious telling sign anymore as these programs become more developed. It’s very difficult for the government and researchers to develop methods to counteract deepfakes when their algorithms can be easily altered to avoid detection.

Hany Farid is a computer science professor at the University of California, Berkley. He’s been developing technology for the past 20 years on identifying fake videos. A method he is currently working on is specifically meant to stop the spread of deepfakes (Schwartz, 2018). Farid has discovered that there are small changes in the color of the digital face. He’s developing machine learning software that will eventually identify these subtle changes. The deepfakes artificial intelligence system is rapidly learning. This makes it very difficult for researchers who use forensic technology to identify fake videos. According to Farid, the programmer can easily update their algorithm so the color in the face is connected with the heartbeat (Schwartz, 2018). Farid emphasized the positive impact the developments in computer-generated images will have on the special effects industry in Hollywood. Although this is beneficial for the entertainment industry Farid expressed his concerns, “outside of Hollywood, it is not clear to me that the positive implications outweigh the negative.” People fear not knowing what is real or true anymore.

Many people wonder why someone would create a program with the purpose to impersonate other people. Grotto discussed how the main source driving these developments is

Hollywood. These programs create a market that enables a frame maker to reshoot a scene virtually. This is where CGI (Computer-Generated Imagery) comes into play. CGI is very popular in movies and in videos games. This program allows actors to be mixed with special effects to create an unforgettable realistic image. Putting faces on people isn't a completely new concept. In movies such as, Fast and Furious 7, Paul Walker died in a car accident and couldn't complete the movie series. To include him in the movie, Paul Walker's brother was used and a digital face of Paul Walker was edited onto him. The similar facial features in his brother made this edit more realistic and believable. This creation was made using Photoshop and it took a significant amount of time for a person to make. Deepfakes are very similar because they are a form of CGI, and require the same methods of using old footage to complete a digital image of someone. The AI system scans the images of the face you want to digitally create. One would assume that using AI is easier than manually creating an image, but that's not entirely true. Creating videos using AI is difficult because you need to know how to use complex computer programs. For the Fast and Furious movie, a skilled editor that was an expert in several computer programs was necessary to even consider creating that realistic image. Eventually, this will become much easier as AI systems continue to advance.

CGI really took off after its success in the movie Jurassic Park, released in 1993 (Neubeck, 2018). CGI has improved throughout the years, and this is displayed in the popular movie, Captain Marvel, released in 2019. This movie involves the character Nick Furry, who's been a significant figure in all the Avenger movies. Captain Marvel takes place during the year 1995, a time period before the Avengers. The movie creators used CGI to make the actor playing Nick Furry, Samuel L. Jackson, look 46 years old when in reality he is 70 years old. This digital alteration was successful. Creating a realistic and believable video of Samuel Jackson 26 years

younger is far from easy. These animators are experts and spend endless hours altering factors such as lighting, color, texture, and much more to make the scene as real as possible (Neubeck, 2018). Technology is continuing to advance, resulting in CGI becoming easier and requiring less time to create. This concept is very similar to deepfakes. They will both become easier as technology develops, but right now an expert is required to create any believable image or video.

According to Andrew Grotto, these advancements in CGI will eventually enable frame makers to virtually reshoot the scenes. This will require less film days and allow directors to achieve the exact image they want. He also discussed how movies would eventually be redubbed in different languages. They'll create a digital face that will enable the mouth to movie properly with any given language. This technology may take several years, but in time it will become a reality. Grotto also emphasized that deepfake programs will be used by publishers and retailers for clothing. They'll be programs that create a digital image of a customer who'll be able to virtually try on clothes. This will take shopping to a whole new level. Andrew Grotto emphasized the importance to recognize "there are legitimate and benign applications for deepfakes, but it can also be misused just like any applications in technology."

When asked if any could create a believable deepfake video, Andrew Grotto responded, "In theory yes, the problem is that they require skills and knowledge. As the technology becomes more user friendly, it will get easier to create. Grotto compared deepfakes to the Snapchat filters that are now put on videos, "Now we are very used to these filters and that five years ago was crazy. Five years in advance that will be heading in the same direction with deepfakes." Grotto further discussed how the news makes it seem like it's very accessible, but these videos involve incredible amounts of skill to create a believable image. Grotto believes that in five years the deepfakes programs will become more user friendly and easier to use. It's important to recognize

the rapid growth in technology and the impact these developments can have once the average person is capable of using this powerful program.

There's a YouTube channel called "Derpfakes" that solely consists of videos of deepfakes. This is a comedic channel meant to create parodies of celebrities and politicians. This channel currently has 12,000 subscribers and many people enjoy these videos. Many of the videos have hundreds of thousands of views with endless positive comments about the entertaining content (YouTube, 2018). "Derpfakes" was created in 2018, and since then the channel has 2,952,723 total views (YouTube, 2018). This demonstrates how deepfakes can be harmless when purposely used for comedic purposes and without the intention of damaging anyone's reputation.

Andrew Grotto was more interested than surprised when the creation of deepfakes came to light. Grotto had his research assistant try to create a deepfake video to see how "easy" or "difficult" it is. The research assistant couldn't successfully create a video, and he didn't know the programs necessary for this project. Grotto expressed how this illustrates that deepfakes are still very difficult to make. In order to make a good deepfake you need experience in very complex computer programs. Many websites were posted on Reddit saying they offered programs that are easy to use to create the video for you as long as you upload the pictures and audio—all these websites were disabled. There are many websites claiming to offer the Fake App program, but there is no guarantee these websites aren't viruses. As of right now, the average person is not capable of creating a believable deepfake.

Artificial intelligence is constantly growing and become more advanced then ever imaginable. New AI programs are now capable of digitally creating new faces using only an algorithm. By using two different photographs, the system will use features from both images to

create a completely new face (Zhang, 2018). This system has mastered creating realistic photographs, and it's only a matter of time before this technology creates realistic deepfake videos. This new technology can create fake interior design photos, fake cars, fake cats, and etc. (Zhang, 2018). Eventually, this technology can become a simple application on a computer that anyone can access to create deepfakes. This is the future of deepfakes and people should be aware of the risks that are involved with these rapid advancements in artificial intelligence.

When asked if stopping deepfakes was a priority right now, Grotto responded, "yes and no." He believes it depends on both the nature of the deepfake and the tools we have at our disposal. Grotto mentioned political satire's popularity, and said there is no reason to say it's not okay. Parodies are welcome in society and people enjoy them. Grotto discussed how, "It becomes tricky when they [deepfakes] become so indistinguishable from reality, less satirical and mistaken for reality." This will become dangerous when supporters make malicious deep fakes against political opponents to create problems, and this will be especially concerning when deepfakes are developed into extremely believable videos. Grotto further noted that these developments would create discourse from democracy and policy.

Deep learning is an artificial intelligence system capable of plenty of good, but people will always find a way to misuse technology. It's important to recognize the potential threat that deepfake video's present. The United States government has been very active trying to counteract the development of these videos. There are harmless applications of the deepfake program today, but as the videos become more realistic, that's when they pose the greatest threat. Artificial intelligence is capable of learning at a rate that is unimaginable, and it should be no surprise that the deepfake technology is capable of causing extreme amounts of damage.

References

Beres, D., & Gilmer, M. (2018, February 02). A guide to 'deepfakes,' the internet's latest moral crisis. Retrieved May 9, 2019, from https://mashable.com/2018/02/02/what-are-deepfakes/#CAJePUCgvqqU

Chesney, R., & Citron, D. (2018, February 26). Deep Fakes: A Looming Crisis for National Security, Democracy and Privacy? Retrieved May 9, 2019, from https://www.lawfareblog.com/deep-fakes-looming-crisis-national-security-democracy-and-privacy

Grotto, A. (2019, March 27). Phone interview.

Harvard Law School. (n.d.). Cyberlaw Clinic. Retrieved May 9, 2019, from http://clinic.cyber.harvard.edu/

Kerr, O. (2019, January 31). Should Congress Pass A "Deep Fakes" Law? Retrieved May 9, 2019, from https://reason.com/volokh/2019/01/31/should-congress-pass-a-deep-fakes-law

Knight, W. (2018, August 09). The Defense Department has produced the first tools for catching deepfakes. Retrieved May 9, 2019, from https://www.technologyreview.com/s/611726/the-defense-department-has-produced-the-first-tools-for-catching-deepfakes/

Neubeck, K. (2018, June 01). This Is How CGI Actually Works. Retrieved May 9, 2019, from https://www.complex.com/pop-culture/2015/05/this-is-how-cgi-actually-works/

Riechmann, D. (2018, July 02). I never said that! High-tech deception of 'deepfake' videos. Retrieved May 9, 2019, from https://www.boston.com/news/politics/2018/07/02/i-never-said-that-high-tech-deception-of-deepfake-videos

Stanford Universtity. (2017, July). Andrew Grotto. Retrieved May 9, 2019, from https://cisac.fsi.stanford.edu/people/andrew-j-grotto

Schwartz, O. (2018, November 12). You thought fake news was bad? Deep fakes are where truth goes to die. Retrieved May 9, 2019, from https://www.theguardian.com/technology/2018/nov/12/deep-fakes-fake-news-truth

YouTube. (2018, January 27). Derpfakes. Retrieved May 9, 2019, from https://www.youtube.com/channel/UCUix6Sk2MZkVOr5PWQrtH1g

Zhang, M. (2018, December 18). These Portraits Were Made by AI: None of These People Exist. Retrieved May 9, 2019, from https://petapixel.com/2018/12/17/these-portraits-were-made-by-ai-none-of-these-people-exist/