

Digital "Reality"

CSE 120 Winter 2019

Some Inspiration: INFO 270

Calling Bullshit: Data Reasoning in a Digital World

<https://callingbullshit.org>

Instructor:

Justin Hsia

Teaching Assistants:

Ann Shan,

Eunia Lee,

Pei Lee Yap,

Sam Wolfson,

Travis McGaha

ThisPersonDoesNotExist.com uses AI to generate endless fake faces

“The ability of AI to generate fake visuals is not yet mainstream knowledge, but a new website — ThisPersonDoesNotExist.com — offers a quick and persuasive education.

“The site is the creation of Philip Wang, a software engineer at Uber, and uses research released last year by chip designer Nvidia to create an endless stream of fake portraits. The algorithm behind it is trained on a huge dataset of real images, then uses a type of neural network known as a generative adversarial network (or GAN) to fabricate new examples.”

- <https://www.theverge.com/tldr/2019/2/15/18226005/ai-generated-fake-people-portraits-thispersondoesnotexist-stylegan>



Administrivia

- ❖ Assignments:
 - Reading Check 9 due Thursday @ 3:30 pm (3/7)
 - Project Update in section (3/7)
 - Innovation Exploration Comments due Friday (3/8)

- ❖ "Big Ideas" lecture: Security

Digital Information

- ❖ All digital information is stored in binary
 - Online text is just ASCII or Unicode data
 - In most cases, it is very easy to manipulate!
 - Can change data in your RAM or stored on your hard drive
- ❖ Example: add a new word to the English language
 - **Printed dictionary**: Get noticed by publishers, come to agreement over new definition, wait for next edition
 - **Online**: Edit your website HTML, share it. Or add to repository like urbandictionary.com or knowyourmeme.com

Digital Information

- ❖ Anyone can publish anything they want online!
 - Freedom of speech was a central tenet of the creation of the Internet
- ❖ **The Bullshit Asymmetry Principle:** “The amount of energy needed to refute bullshit is an order of magnitude bigger than to produce it.”
 - Alberto Brandolini
- ❖ Ultimately, dealing with online information boils down to a matter of *trust*

Why This Matters

- ❖ “[T]he United States government should teach the public to tell when they are being manipulated. Via schools and nongovernmental organizations and public service campaigns, Americans should be taught the basic skills necessary to be savvy media consumers, from how to fact-check news articles to how pictures can lie.”

– Mark Galotti, (Dec. 2016) *NY Times*.

Outline

- ❖ **Exposure to Information**
- ❖ Spread of Information
- ❖ Digital Media Manipulation

Audience News Consumption

- ❖ Where do you get your news (and opinions on the news) from?
 - Facebook Newsfeed
 - Twitter
 - Google News
 - CNN News (app, TV)
 - iPhone New app
 - Daily email digests
 - BuzzFeed
 - Printed text (newspaper, magazines)

The Internet Forms Our Opinions

- ❖ Having an enormous amount of information available to us creates a *poverty of attention*
 - Compounded by the massive new problem of *fake news*
- ❖ How should we allocate our attention now that we have so many options to choose from?
 - Not only do we have the ability to choose what to read and pay attention to, but we also have the ability to choose *what we believe in*.

Example: Climate Change



Hellenic Shipping...

Antarctic sea ice hit 35-year record high Saturday

Washington Post - 19 hours ago

Antarctic sea ice has grown to a record large extent for a second straight year, baffling scientists seeking to understand why this ice is ...

Polar Code: a new regulation for polar shipping

Hellenic Shipping News Worldwide - Oct 20, 2015

Explore in depth (2 more articles)

2015 is fourth lowest year on record for minimum Arctic sea ice levels



Tracy Sinclair, Weekend Meteorologist, tsinclare@ktuu.com

POSTED: 02:06 PM AKDT Oct 12, 2015 | UPDATED: 05:32 PM AKDT Oct 12, 2015

Example: Conspiracy Theories

- ❖ Unfounded, deeply held alternative explanations for how things are
 - **Not just for the crazies!**
 - Aided by abundance of information and false memories
- ❖ Now an almost automatic response to current events:
 - 2016 Pizzagate: Hillary Clinton's leaked emails linked her to an alleged child sex ring at the restaurant Comet Ping Pong
 - 2017 Las Vegas shooting: questioning the shooter's identity and motive
 - 2018 Stoneman Douglas High School (Parkland, FL) shooting: staged by "crisis actors"

Example: Conspiracy Theories

- ❖ Easy to find corroborating or persuasive data/information for almost any position
 - **A lot of data is misrepresented**
 - Sometimes misinformation is purposely spread to support an agenda
 - Sometimes unintentionally spread: *"Parkland Conspiracies Overwhelm the Internet's Broken Trending Tools"*
 - <https://www.wired.com/story/youtube-facebook-trending-tools-parkland-conspiracy/>

(+) Choose a Location...

DATE POSTED

Any date

2018



David Hogg A Crisis Actor? You Decide - (Spread This Folks!)

Populist Wire

5 hours ago · 7,927 Views

Content Moderation

- ❖ Content moderators monitor and apply site rules and guidelines (“community standards”)
 - AI algorithms aren’t good enough yet
 - These rules and guidelines are often “fuzzy” and nuanced to apply
- ❖ This exposes people to the worst of the Internet 😞
 - *The Trauma Floor*: “The job also changed the way he saw the world. After he saw so many videos saying that 9/11 was not a terrorist attack, he came to believe them. Conspiracy videos about the Las Vegas massacre were also very persuasive, he says, and he now believes that multiple shooters were responsible for the attack.”

Filter Bubbles

- ❖ Eli Pariser warns that technology tends towards exposure to information that confirms preexisting beliefs
 - https://www.ted.com/talks/eli_pariser_beware_online_filter_bubbles
- ❖ People (myself included) tend to look to people who they think have the right answers
 - Often people who *act* and *look* like me or *share similar opinions*
 - This is a **bias** (natural filter bubble)

Polarization and Technology

- ❖ Pablo Barberá argues that technology has the opposite effect
 - *“How Social Media Reduces Mass Political Polarization. Evidence from Germany, Spain, and the U.S.”*
 - <http://smapp.nyu.edu/papers/SocialMediaReduces.pdf>
 - “Weak social ties tend to be more ideologically heterogeneous than strong social ties.”
 - “Citizens are now exposed not only to their close friends’ opinions, but also to political content shared by their co-workers, childhood friends, distant relatives, and other people with whom they form weak ties.”

Polarization and Technology

- ❖ Diana Mutz: *“Cross-cutting Social Networks: Testing Democratic Theory in Practice”*
 - http://repository.upenn.edu/cgi/viewcontent.cgi?article=1124&context=asc_papers
 - “Exposure to conflicting political viewpoints is widely assumed to benefit the citizens of a democratic polity.”
 - “... Utilizing a laboratory experiment manipulating exposure to dissonant and consonant political views, I further substantiate the causal role of cross-cutting exposure in fostering political tolerance.”

Facebook Friends

- ❖ More recently, there's an interesting fad of unfriending people on social media sites like Facebook
 - This past presidential election, in particular, has made many people post their personal political beliefs on Facebook, which has ruined many a friendship
 - This results in a tighter filter bubble

Discussion

Social Media:
Humanizing or
Polarizing?

Outline

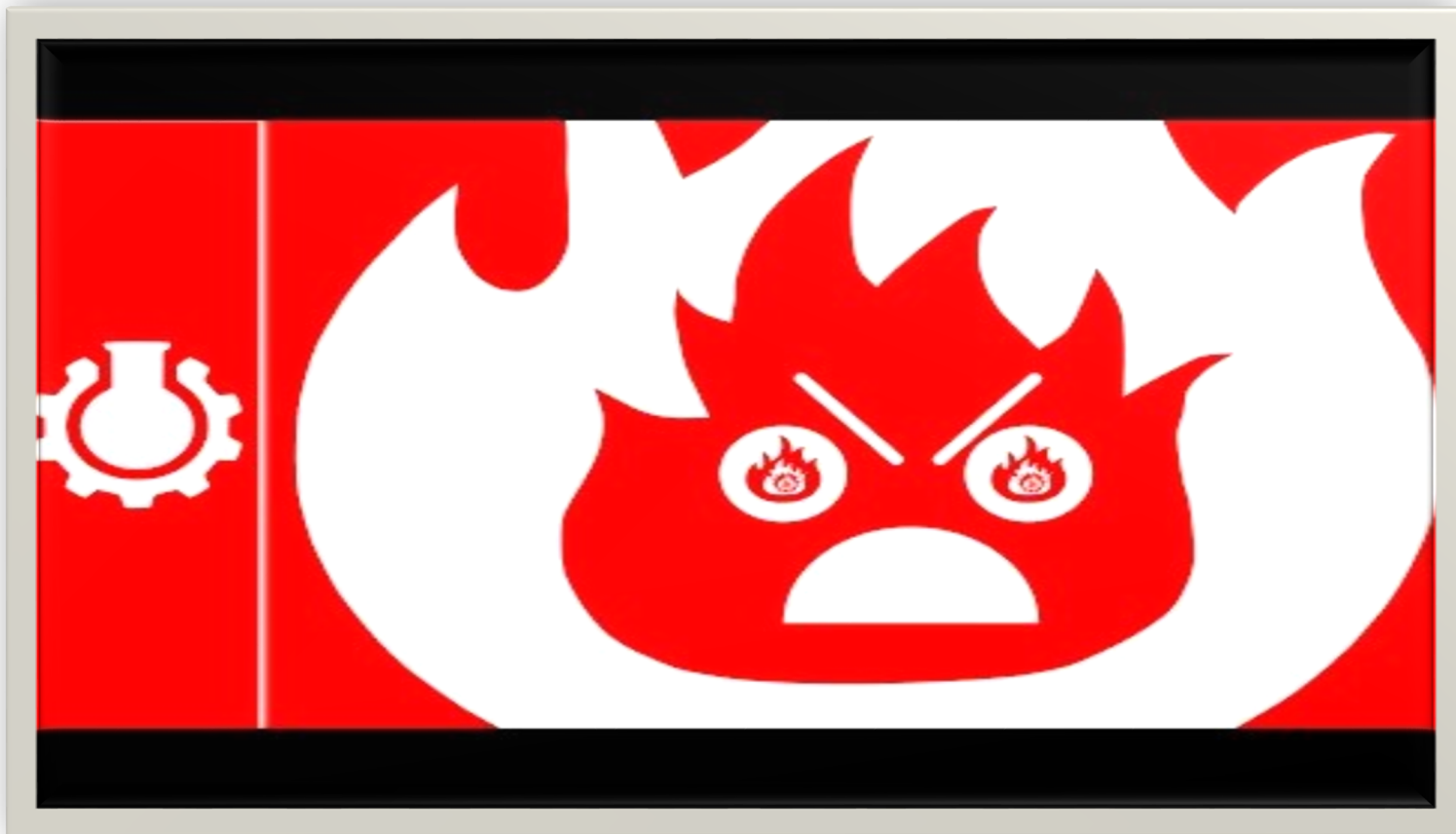
- ❖ Exposure to Information
- ❖ **Spread of Information**
- ❖ Digital Media Manipulation

Virality

- ❖ What generates \$\$ on the Internet?
 - Advertising, clicks/views, sponsorships

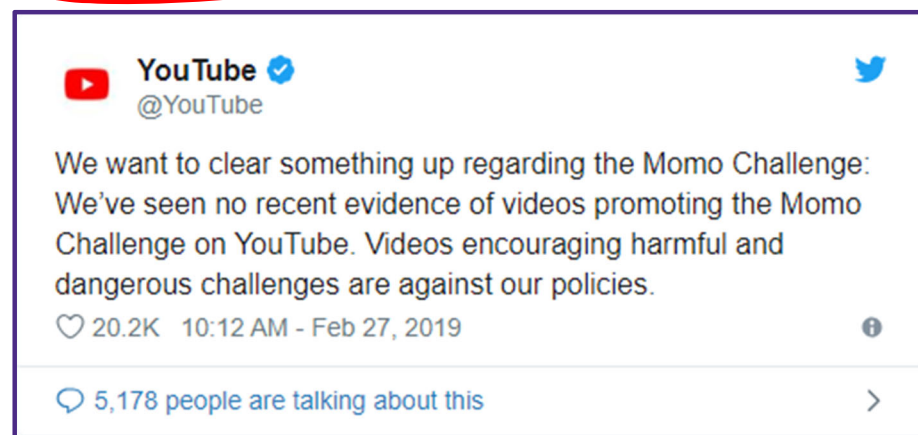
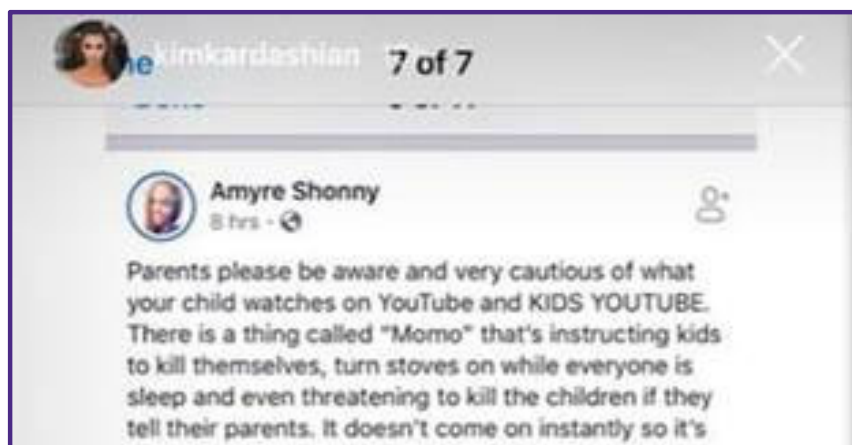
Virality

- ❖ What generates \$\$ on the Internet?
 - Advertising, clicks/views, sponsorships
 - Not the truth:
 - https://www.youtube.com/watch?v=rE3j_RHkqJc&t=12



Example: Momo Challenge

- ❖ Images of a demonic chicken lady spread with a warning of a dangerous “suicide” game that targets children on social media
 - <https://www.vox.com/2019/3/3/18248783/momo-challenge-hoax-explained>
 - Hoax fueled by media reports and parents’ fears about their children’s online activity
 - Original photo is of a sculpture called “Mother Bird” made by a Japanese artist
 - **Twitter** → schools → police → **Kim Kardashian** → TV reports



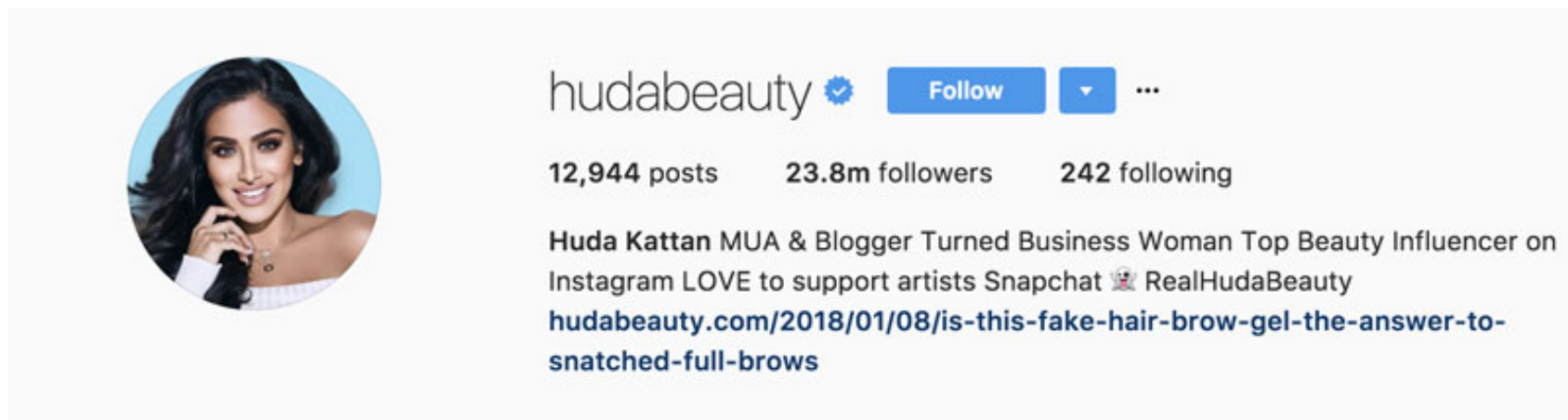
Social Media "Influencers"

❖ Definition?

- "A **Social Media Influencer** is a user on social media who has established credibility in a specific industry. A social media influencer has access to a large audience and can persuade others by virtue of their authenticity and reach."

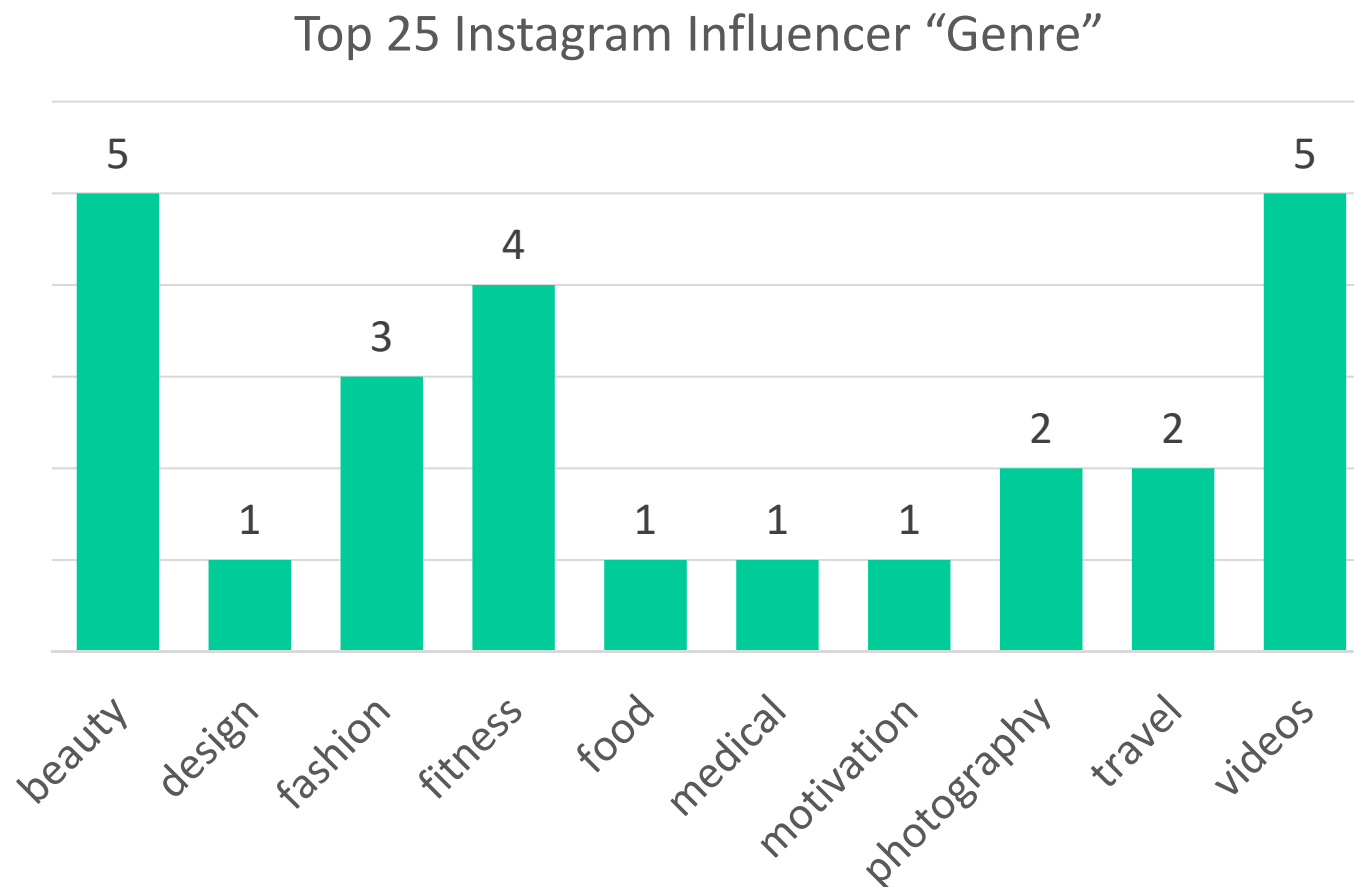
– <https://www.pixlee.com/definitions/definition-social-media-influencer>

is this reputable?



Social Media "Influencers"

- ❖ What do they do?
 - Using <https://influencermarketinghub.com/top-25-instagram-influencers/> just as an example



Social Media “Influencers”

- ❖ Would you rather take advice from...
 - a beauty blogger OR a make-up artist
 - a food blogger OR a food critic
 - a fashionista OR a movie star
 - a fitness guru OR a professional athlete

- ❖ Why do we trust influencers?
 - More relatable, can see whole process
 - “Children report viewing influencers to be more trustworthy than traditional celebrities, possibly because of increased feelings of familiarity.” <https://www.marketwatch.com/story/how-social-media-influencers-are-making-your-kids-fat-2019-03-05>

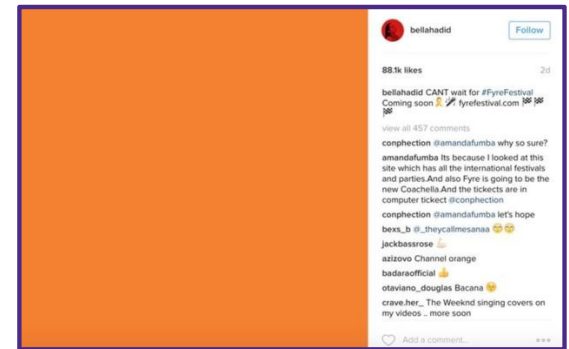
Social Media “Influencers”

- ❖ ... but who is more *qualified*?
 - Social media influencers are often just a form of *testimonial advertising*
 - Celebrities → “endorsement”, Ordinary citizens → “testimonial”
 - Anecdotal evidence is not definitive proof

- ❖ Influencers are often PAID to advertise certain products!

Example: Fyre Festival

- ❖ Failed “luxury music festival” founded by Billy McFarland and Ja Rule
 - Gained traction because of influencer sponsored posts:



Expectations



Reality



VS

Images from: <https://www.bbc.com/news/46945662>

Sponsored Content

- ❖ These are a common source of revenue and platforms are encouraged to get you to click on them
 - Often look just like other items (*e.g.* Google search results, Facebook newsfeed)
 - Targeted advertising!
- ❖ Open up your favorite social media platform and look at the first 10 items – count how many of them are sponsored content
 - Look for a little “Sponsored” tag – these were not always required!

Discussion

Social Media Sharing:
What content do you
share? Where is your
line to NOT share?

Outline

- ❖ Exposure to Information
- ❖ Spread of Information
- ❖ **Digital Media Manipulation**

Image Editing

- ❖ Photo editing is no longer just for the art professionals!
 - Built-in editing tools in apps like SnapChat, Instagram, Messenger, FaceTune
 - The user interfaces *encourage* image editing
 - e.g. suggested edits by Google Assistant in Google Photos
- ❖ Audience photo editing
 - <audience responses>



Social Media Curation

- ❖ What are some uses for social media?
 - Stay connected with those who are physically far
 - Meet others with shared interests regardless of location
 - Broadcast notable events and thoughts
 - Project a certain image or persona

Social Media Curation

- ❖ What are some uses for social media?
 - Stay connected with those who are physically far
 - Meet others with shared interests regardless of location
 - Broadcast notable events and thoughts
 - Project a certain image or persona



Selfie scene of the character Bethany in "Jumanji 2."

Social Media Curation

- ❖ What are some uses for social media?
 - Stay connected with those who are physically far
 - Meet others with shared interests regardless of location
 - Broadcast notable events and thoughts
 - Project a certain image or persona

- ❖ Effects:
 - No statistically significant link between social media usage and depression
 - Arms races between online personas
 - Fear of missing out (FOMO)
 - Not spending as much time connecting in real life

Image Generation

- ❖ Billions of images already exist on the internet – we can easily train algorithms to generate more from scratch
- ❖ Let's play a game!
 - <http://whichfaceisreal.com/>

Audio Generation

- ❖ We can synthesize audio/speech
 - Siri, Alexa, Cortana, GPS voices
 - With enough audio training data, can train a neural net to produce new audio that approximates someone's voice
- ❖ Learning Lip Sync from Audio (UW!)
 - Graft synthetic mouth shapes onto existing video to match audio

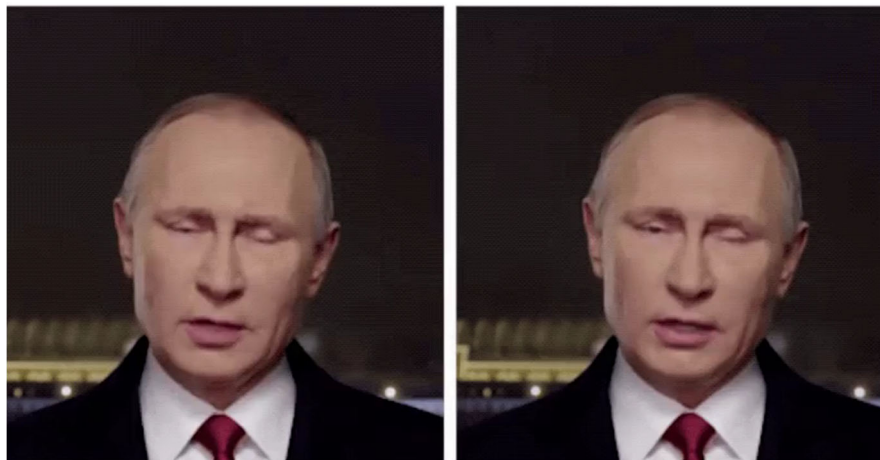


Video Generation

- ❖ Videos are collections of sequential images
 - Faking motion and lighting is a lot harder for videos
- ❖ DeepFake
 - An open source machine-learning-powered human image synthesis technique
 - Most common usage is to superimpose one person's face onto another person's body in a video
 - Still pretty easy to tell apart from authentic video

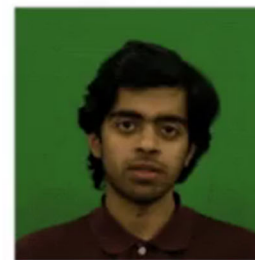
Video Generation

- ❖ Videos are collections of sequential images
 - Faking motion and lighting is a lot harder for videos
- ❖ Deep Video Portraits
 - Create photorealistic re-animations of portrait videos on top of a source actor

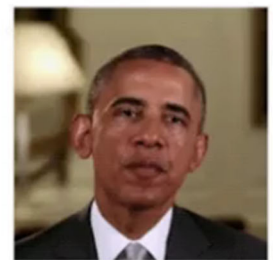


Reference

Our Result



Source Sequence

Our Reenactment
(Full Head)

Averbuch-Elor et al. 2017

Discussion

What will we use to
verify the truth
once video can be
easily faked?

What Can Be Done?

- ❖ It's not all doom and gloom
 - Synthesized versions can still be detected
 - Detection tools will continue to improve
 - Laws and policies will eventually catch up
- ❖ Be aware of where you are getting your information from and what you choose to share
 - Fact-checking is exhausting, but important
 - Make sure your trusted sources are trustworthy