

Understanding and Managing Image Credibility for Image Editors



(That means all of us!)

Eric Kessels “24 Hours of Flickr” Used in accordance with ‘fair use’ provisions of copyright law.

*COMP1710/6780 – Web Development and Design
Image Credibility and Creative Commons, 15 March 2022*

Dr Sabrina Caldwell
Human Centred Computing
Research School of Computer Science
The Australian National University



Class Representatives

Our class representatives are:

COMP1710 - Brinda Murlikrishna and Ishi Patel

COMP6780 - ???

Agenda

Introduction

Image credibility

Image interference and its implications

Creative Commons

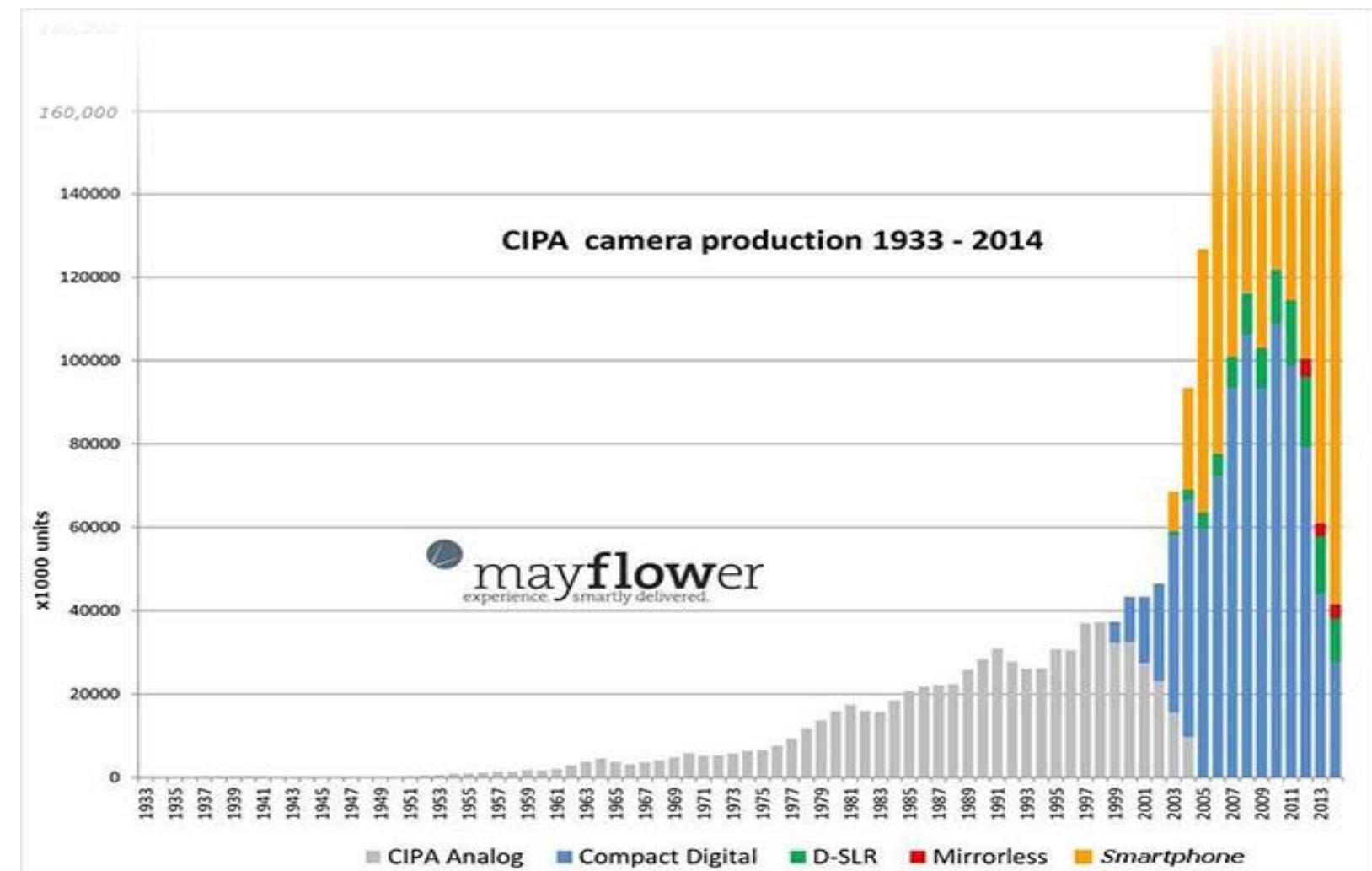


Log into Socrative! <http://www.socrative.com> CALDWELL8573

Q1-4



Over 160 million cameras
produced every year
(includes smartphones)
[2]





24 Hours of Flickr, 2013, Erik Kessels, Foam, Amsterdam

A few other sites

Daily:

Snapchat - 210 million 'snaps' [3]

Facebook – 350 million [4]

Instagram – 95 million [5]

Flickr now – 4 million [6]



Real or Fake?





Ford ‘doctors’ photos of
Shelby 1000 lifting off
ground 



Real or Fake?

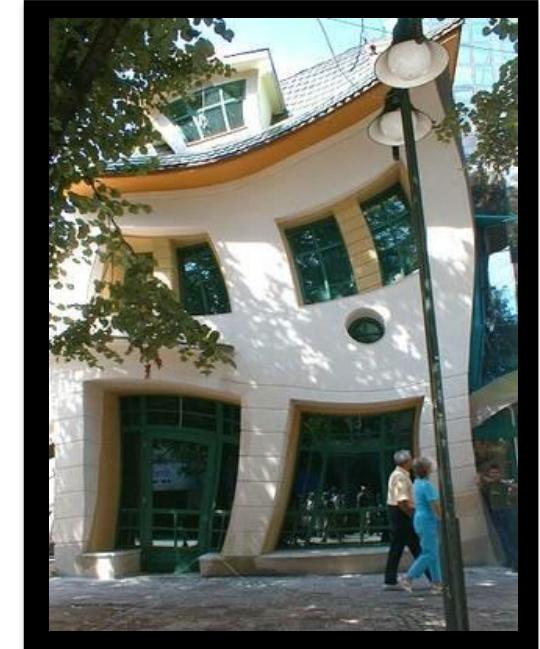




Ford 'doctors' photos of
Shelby 1000 lifting off
ground X



Real or Fake?



Brookesia micra, Madagascar

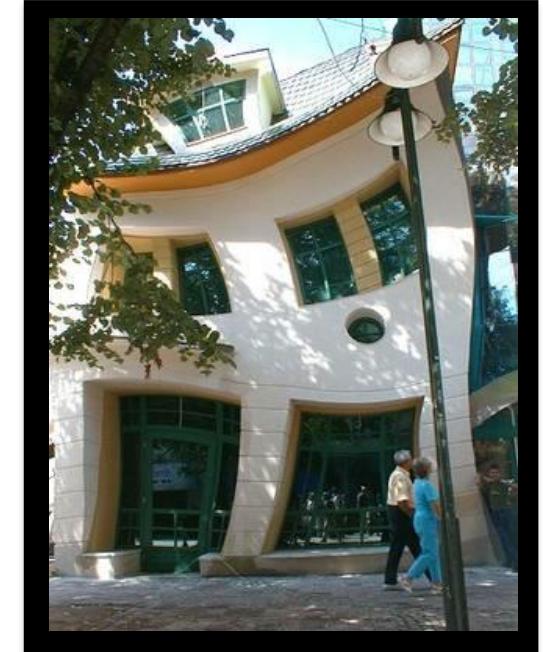




Ford 'doctors' photos of
Shelby 1000 lifting off
ground X



✓ White shark and kayak,
photo by Thomas Peschak





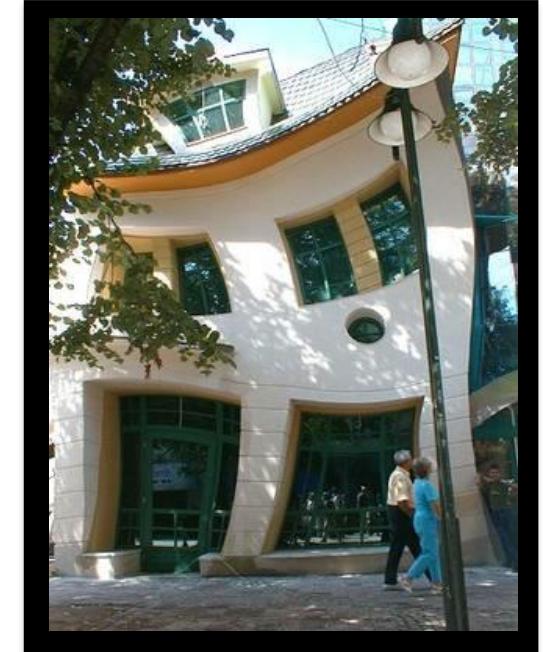
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✗
Photoart
by
Erik Johansson,
Sweden





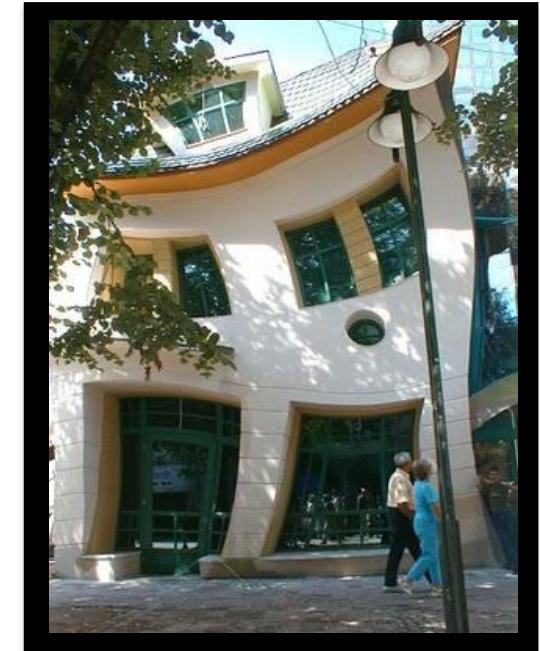
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Photoart
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Erik Johansson,
Sweden



Kryzywka Domek,
Poland ✓

Real or Fake?



A note on Knowledge Credibility



Climate Change
Denial

Brexit

Anti-vaccine
propaganda

International 'hacking'
of domestic affairs

In his presidency, Donald Trump made over 13,000 false public claims.

- Washington Post, 21 Jan 2019 [1]







Image manipulation available to anyone with image editing software...

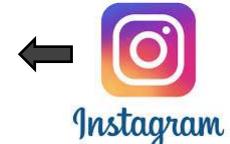
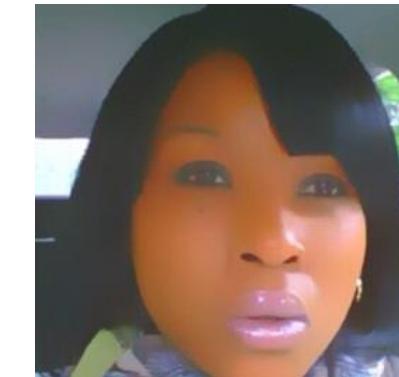


Photoshop
Elements



MS Windows
Paint

Or even just a modern digital camera or smartphone ...





Fading Away by Henry Peach Robinson (1869) – one of the earliest composite images made with 5 photographs

"Photos have always been manipulated. Look at Henry Peach Robinson's photo "Fading Away" or the posed American Civil War photos of Mathew Brady."

"Any photograph is subjective from the moment the photographer frames it up in her viewfinder."

"Come on Sabrina, what is reality, anyway?"



Manipulating images is fun, but photographs have an important role to play in society too...



Young man on motorbike, 1951, Shanghai



Moonwalk 1967

History



9/11 terrorist attack on US world trade center



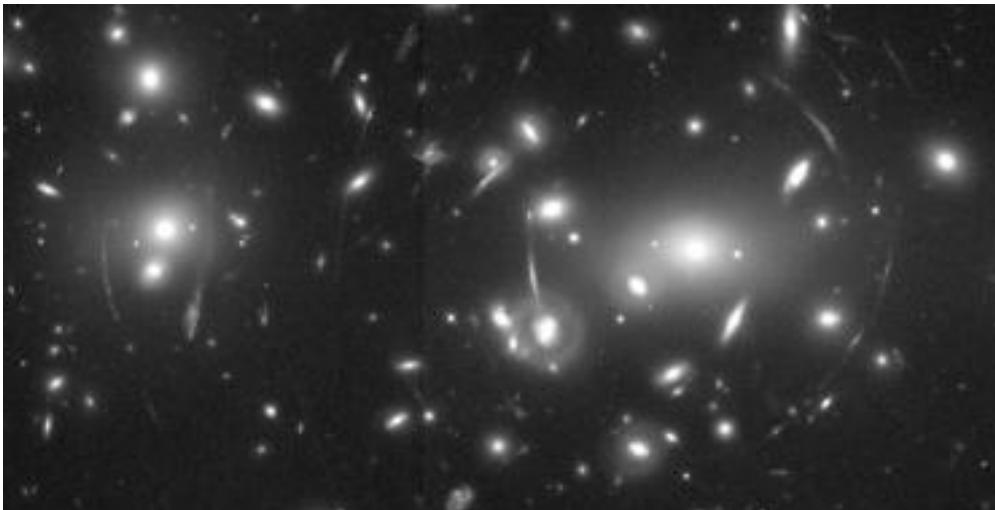
1985 'Feed the World' concert



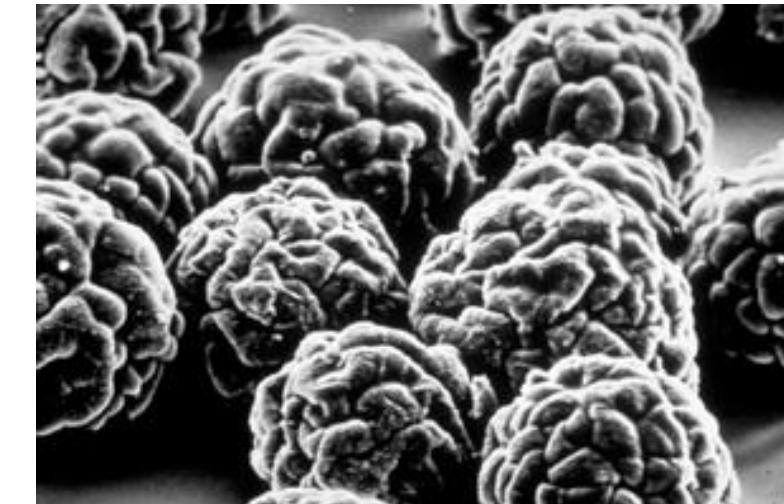
Ancient Xi'an terracotta soldiers

Manipulating images is fun, but photographs have an important role to play in society too...

Science and medicine



Abell 2218, Hubble telescope ([Couch, 1995](#))



Wild poliovirus photographed through microscope
([Global Polio Eradication Initiative, 2010](#))



April 2012 – Russian Patriarch from the Moscow Patriarchate - case of the disappearing watch. Watch may have been an expensive, \$30,000 Breuget watch

Sometimes people manipulate photos to influence our opinions, feelings and thoughts. That is acceptable when we know we are viewing art, but...



Arrest mug shot of O.J. Simpson 6/94 used 'as is' on Newsweek cover, altered on Time cover.



"Smoke billows from burning buildings destroyed during an overnight Israeli air raid on Beirut's suburbs August 5, 2006. Many buildings were flattened during the attack. REUTERS/Adnan Hajj"

"Qinghai-Tibet Railway opening green passageway for wild animals" Liu Weiqing
Photograph manipulated to imply antelopes living in harmony with the new rail system.

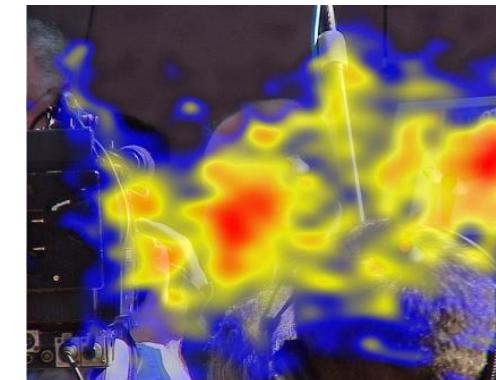
Imperfect understandings: a grounded theory and eye gaze investigation of human perceptions of manipulated and unmanipulated digital images



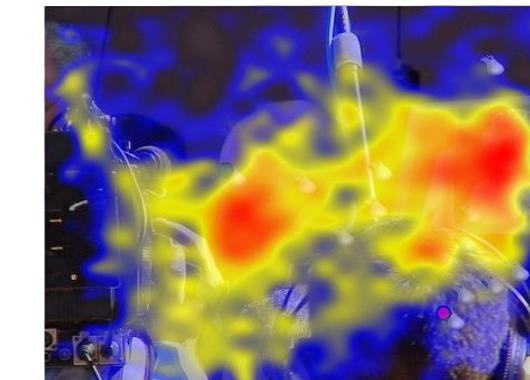
- We focus on salient features of an image to discern its meaning⁵, and
- Some characteristics of images, especially luminance attract our eye gaze.⁶
- But can we tell if the image we are looking at is manipulated or unmanipulated?



A



B



C

Key: Red - most viewed, yellow - less viewed, blue - least viewed.

A) Image 11 as presented in manipulated form B) Participants stating: unmanipulated C) Participants stating: manipulated.

Image	n	Stated: manipulated (correct)					Stated: unmanipulated (incorrect)					Sig (p<.05)	
		(total)	Mean Fixa-tion	SD	Mean Σ Duration (secs)	SD	n	Mean Fixa-tion	SD	Mean Σ Duration (secs)	SD	n	Fixa-tion
3	63	63.4	24.43	15.39	8.29	42	56.7	25.64	15.14	8.32	21	0.329	0.908
8	67	27.0	18.07	7.66	6.08	39	28.6	23.10	8.11	6.43	28	0.765	0.772
9	67	30.2	20.72	9.60	7.56	54	29.0	17.42	8.76	6.45	13	0.837	0.689
10	20	9.3	4.35	7.75	6.68	7	3.1	2.42	2.32	2.49	13	0.009	0.002
→ 11	37	38.5	19.09	8.34	4.77	21	25.1	12.03	5.45	3.67	16	0.014	0.045
12	35	54.5	18.82	13.02	6.65	25	32.1	15.21	6.91	5.11	10	0.001	0.008
13	34	30.1	19.32	8.24	5.97	13	30.6	18.17	8.69	5.92	21	0.941	0.836
14	36	17.0	9.40	7.54	7.93	12	12.3	6.64	4.28	2.79	24	0.143	0.192



Logic

Participants often used their pre-existing experience and beliefs about the subject matter of the image – sometimes the logic was good, sometimes not...



- ✗ There aren't any lizards that small
- ✗ The lizard couldn't have been on the match when it burnt or would have been killed
- ✗ Matches aren't black



- ✓ The girl in the front isn't smiling like the others
- ✓ The lighting on the girl in the front is wrong



- ✗ The cow must have been cold
- ✓ I'm from a farm; I know how much a cow weighs
- ✗ In Russia we can train them to do that

Lack of confidence often expressed as **overt guessing**, or the use of words like '**perhaps**,' '**maybe**' '**I think**,' '**I believe**,' '**not sure**,' '**doesn't look right**.' etc.

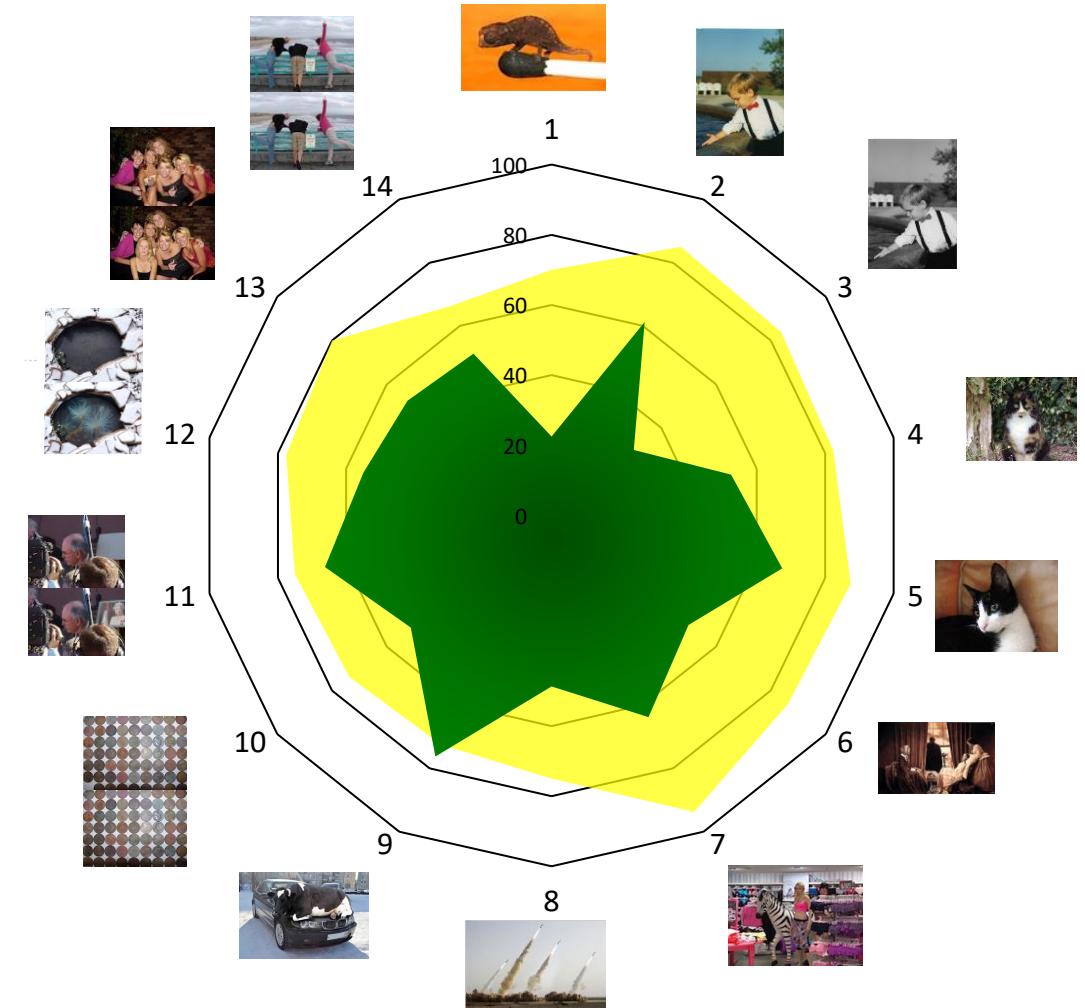


Can we tell if an image is real?

Are we confident in our decision?

Are we right?

Yellow area = confidence
Green area = accuracy





La edad oscura digital



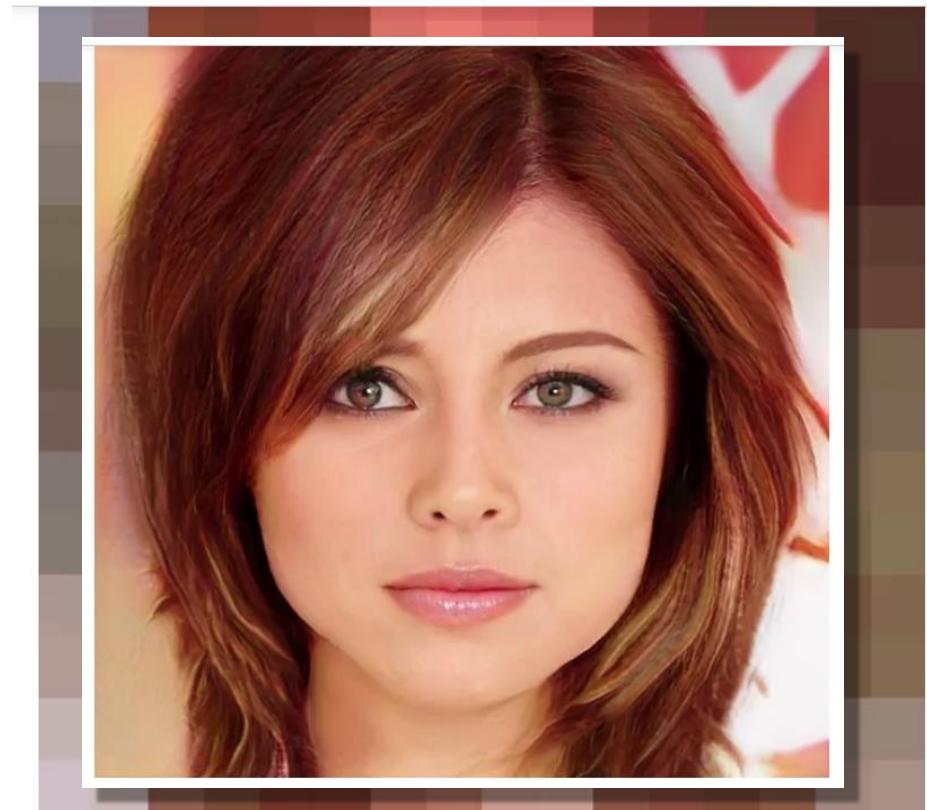
We don't have enough information to tell if the photos we are seeing are representative or created or somewhere in between.

"[dark ages...](#)" by [hans s](#) is licensed under CC BY-ND 2.0

<https://search.creativecommons.org/photos/9a7234d1-ffc3-43df-bd3e-c162b8611405>

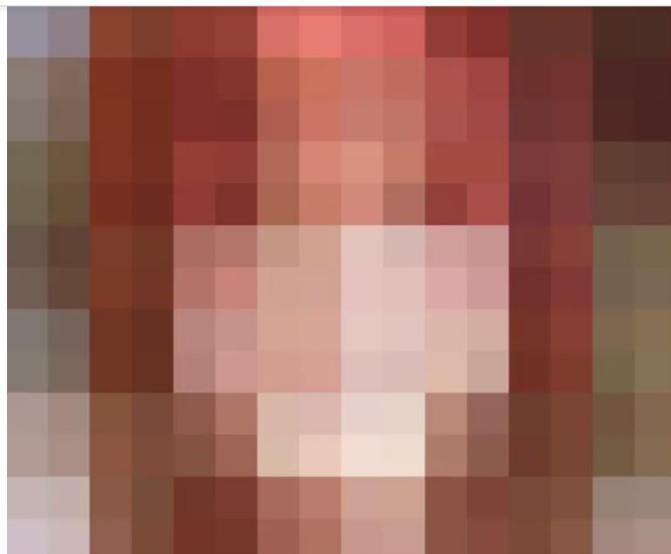


**At what point do we
have to start
proactively asserting
the veracity of our
images?**





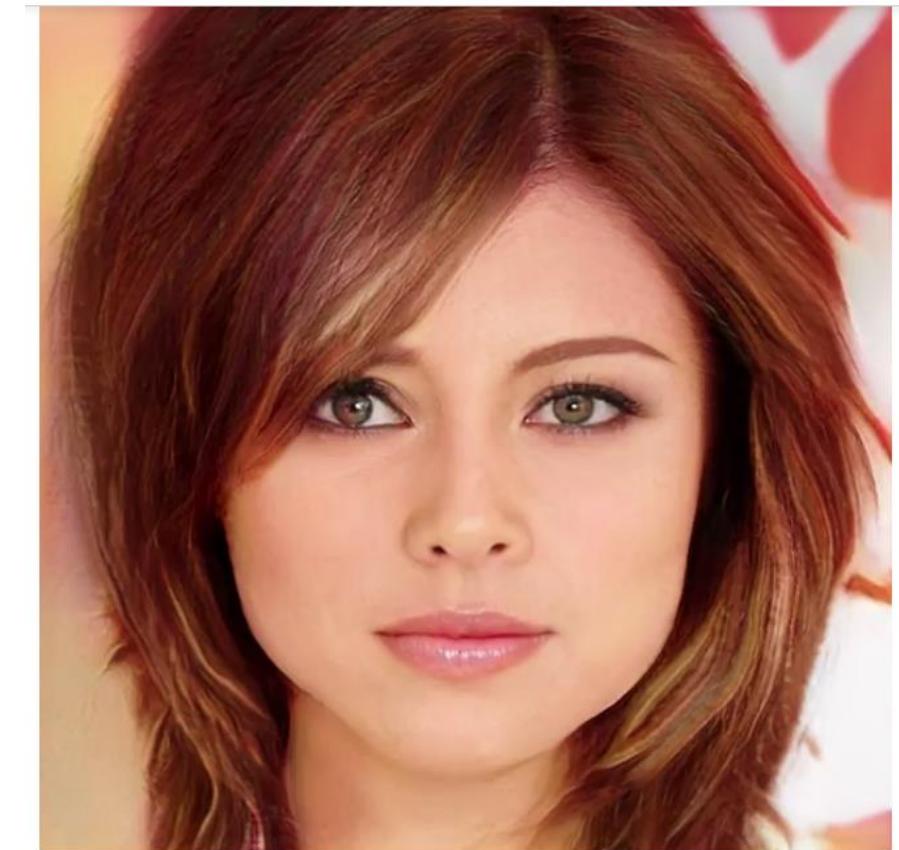
Artificial Intelligence and Fabricated Photos



To create the final image in this set, the system generated 10 million revisions over 18 days.

Nvidia
A large blue arrow pointing from left to right, indicating a process flow or transformation.

GANs
10 million revisions
18 days



To create the final image in this set, the system generated 10 million revisions over 18 days.



THE VOTE BUSINESS WORLD TECH & MEDIA THINK SPORTS

FIGHTING FAKES
VIDEOS MADE WITH ARTIFICIAL INTELLIGENCE EASY TO MAKE AND DIFFICULT TO SPOT

Artificial Intelligence and 'Deep Fake' videos

Hollywood Director Jordan Peele puppets Former US President Barack Obama

NBC NEWS SECTIONS NIGHTLY NEWS MSNBC MEET THE PRESS DATELINE TODAY

FIGHTING FAKES
"DEEP FAKE" APPS GIVE USERS ABILITY TO MATCH SOMEONE'S FACE WITH SOMEONE ELSE'S BODY

MSNBC



Assert the veracity of your images

What does it take to assert the veracity of our images?

At present there are no prominent tools / social media sites for this.

However, we can assert this in writing near our images.

But watch this space! This issue will be heating up in the near future.

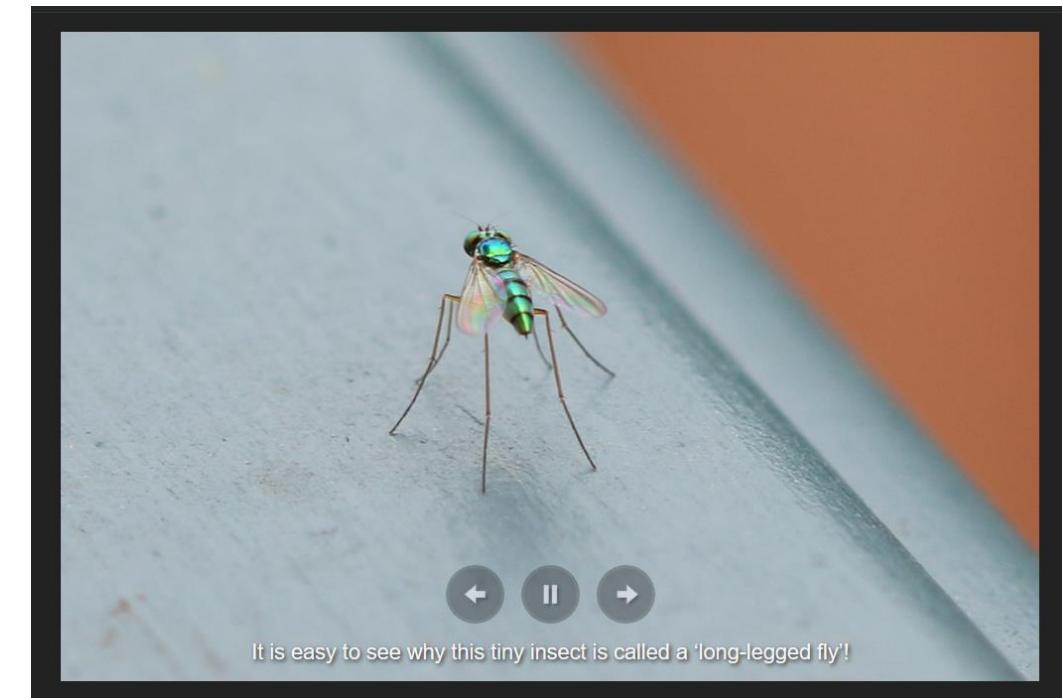
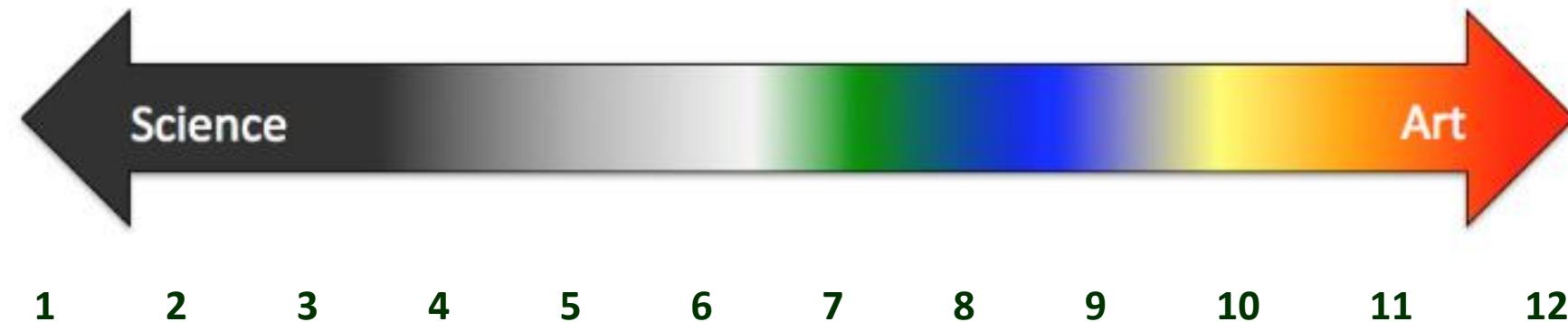


Photo by Sabrina Caldwell. Resized for web use; no other changes made.



An experiment with perspectives on the impact of editing techniques on image credibility



Re-sizing

Adding elements

Cropping

Deleting elements

Photo Montage

Brightness adjustment

Colour adjustment

Rotation

Red-eye reduction

'Airbrushing'



Australian
National
University

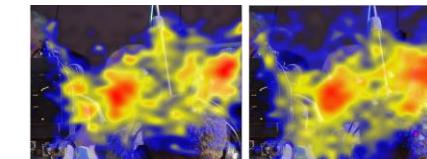
Finding solutions for the problem with images

Wow, this is a really big problem! Who is trying to solve it?

CBC Radio-Canada

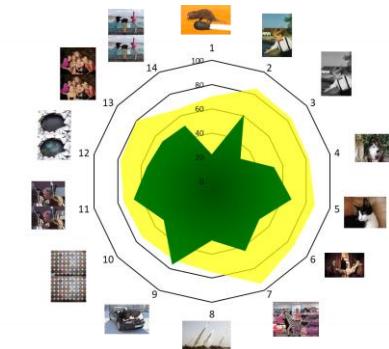


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Eye gaze of experiment participants who said the photo is not altered
Eye gaze of experiment participants who said the photo is altered

Researchers



FIRST
DRAFT

WITNESS
SEE IT FILM IT CHANGE IT

JPEG Stake in 'Fake Media'

The New York Times



Truepic

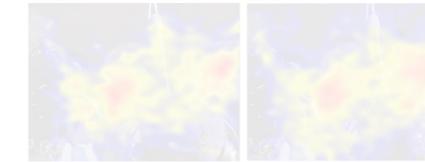
Content
Authenticity
Initiative



Wow, this is a really big problem! Who is trying to solve it?



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Eye gaze of experiment participants who said the photo is not altered

Eye gaze of experiment participants who said the photo is altered

Researchers



JPEG Stake in 'Fake Media'

The New York Times





During their 88th meeting (July 2020), the JPEG committee formed an Ad Hoc working group to begin creating a new JPEG format to deal with fake media.

The mission of the group is to:

Compile use cases and requirements in respect of fake media

Consult with industry and government

Engage with interested parties

Define a plan of action.

You can join the [JPEG Fake Media mailing list](#) and download the media release:

[“Fake Media: the JPEG Stake”](#).

Image Credibility, Sabrina Caldwell, ANU

Como historiador familiar

Quiero publicar mis fotos en la naturaleza con etiquetado y seguridad para que

Sé que las generaciones actuales y futuras pueden confiar y aprender de mi trabajo.

Como ornitólogo aficionado

Quiero que mis fotos se consideren auténticas, etiquetadas y conectadas conmigo para que

Puedo ser un colaborador de investigación de campo confiable.

Como institución de la memoria

Quiero que todos los detalles de nuestra organización, incluidas las licencias, viajen de manera visible con las imágenes que producimos para el público para que no se usan indebidamente ni se apropiaran.

Como artista fotográfico

Quiero que las declaraciones de mi artista y mi nombre se adjunten de manera segura y visible a mis imágenes para que mi público entienda mi arte en contexto.



Is metadata the answer? Partially

Blue-eyed-echidna_IMG_1336.jpg Properties

X

General Security Details Previous Versions

Property	Value
Authors	Sabrina Caldwell
Date taken	7/14/2020 4:19 PM
Program name	
Date acquired	
Copyright	CC-BY-NC-ND
Image	
Image ID	
Dimensions	6000 x 4000
Width	6000 pixels
Height	4000 pixels
Horizontal resolution	72 dpi
Vertical resolution	72 dpi
Bit depth	24
Compression	
Resolution unit	2
Color representation	sRGB
Compressed bits/pixel	

[Remove Properties and Personal Information](#)

OK Cancel Apply



Echidna, photo by Sabrina Caldwell
CC-BY-NC-ND

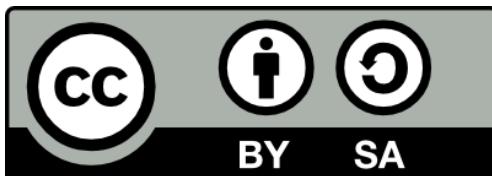
We also need

- Visible metadata
- New file formats
- Networks of trust
- Ways of doing things



CC-BY

Dominio público



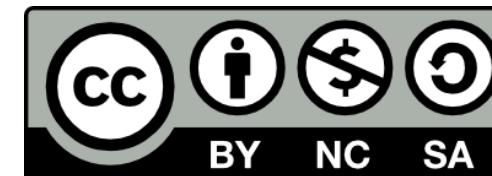
CC-BY-SA



CC-BY-ND



CC-BY-NC



CC-BY-NC-SA



CC-BY-NC-ND



CC0 - Dominio público



Not-for-profit organisation

Established by Lawrence Lessig and Aaron Swartz (who later founded Reddit)

The word ‘Commons’ is key

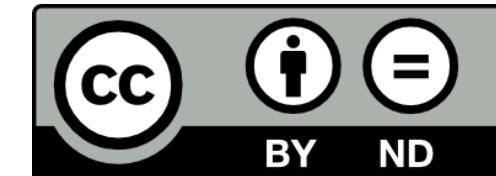
Creative Commons offers licenses that clarify what we can do with other people’s work

Internationally recognized

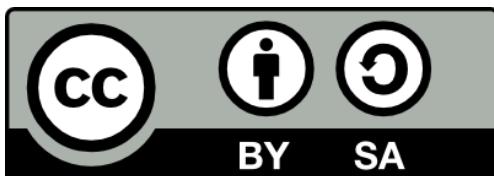
Licenses rest on 3 legs – ‘legalise’ , human-understandable descriptions, metadata



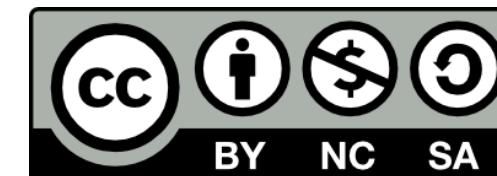
CC-BY



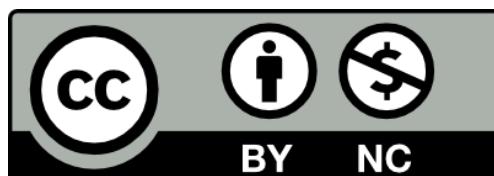
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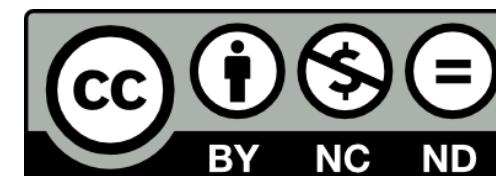
CC-BY-SA



CC-BY-NC-SA



CC-BY-NC



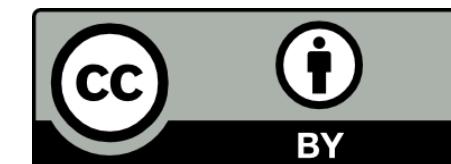
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CC0 - Public Domain – all rights waived



["Santiago Island Geology"](#) by [A.Davey](#) is licensed under [CC BY 2.0](#)



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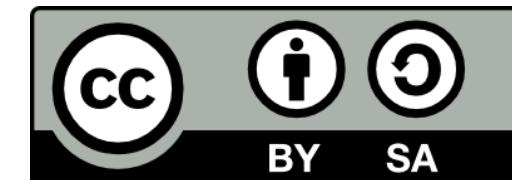
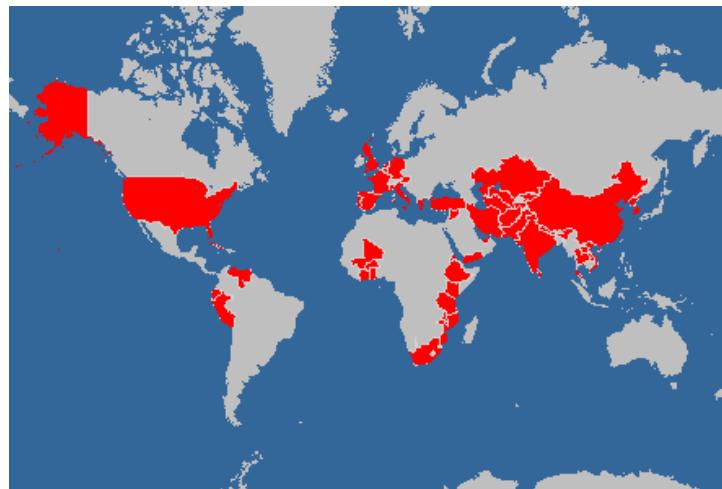
- Must attribute
- Can create derivatives
- Can use commercially
- Do not have to offer new image under a CC licence

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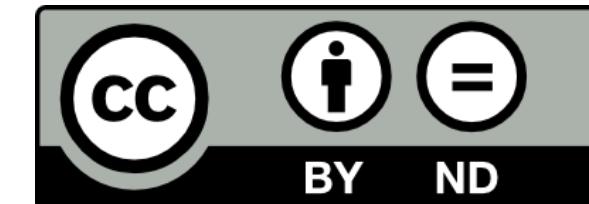
Can create derivatives

Can use commercially

Must offer new image
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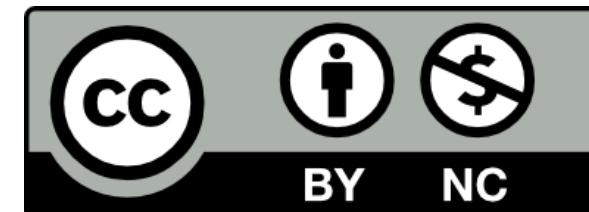
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["Le soleil de La Haye sur le sirop"](#) by [Roel Wijnants](#) is licensed under [CC BY-NC 2.0](#)



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Can create derivatives

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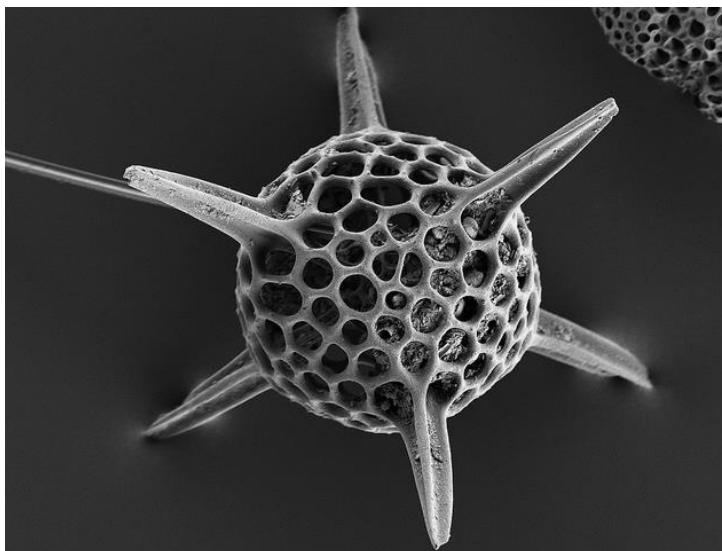
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["Sonatus zonatus Brailovsky"](#) by [Laurence Livermore](#) is licensed under [CC BY-NC 2.0](#)





"[Radiolaria](#)" by Zeiss Microscopy is licensed under [CC BY-NC-ND 2.0](#)



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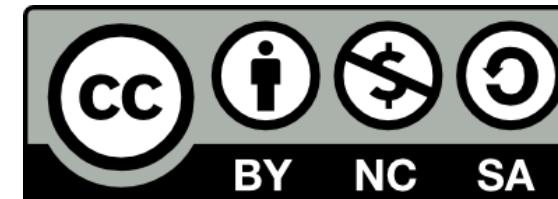
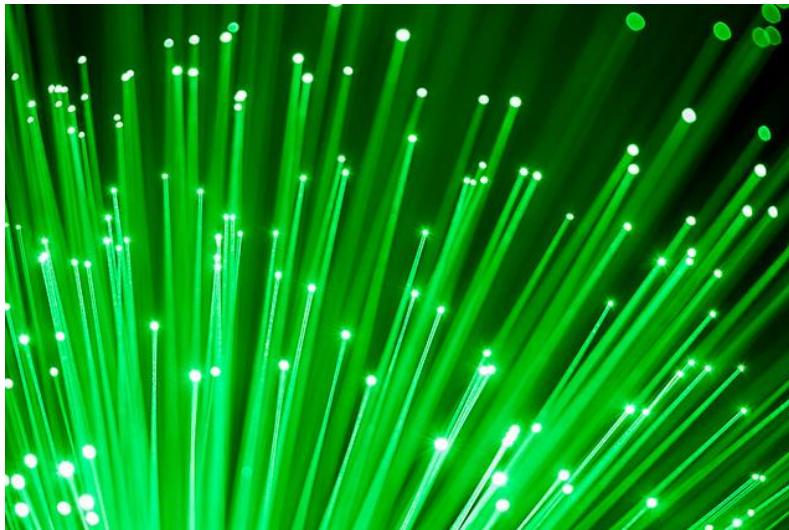
Do not have to offer new image under same CC licence

"[OH HAI FOLKZ, MAH NAYM IZ COCOA](#)" by [Stratman2\(2 Many Pics\)](#) is licensed under [CC BY-NC-ND 2.0](#)





"Green Fiber Explosion" by [Ben Felton](#) is licensed under
[CC BY-NC-SA 2.0](#)



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Must attribute

Can create derivatives

Can **NOT** use commercially

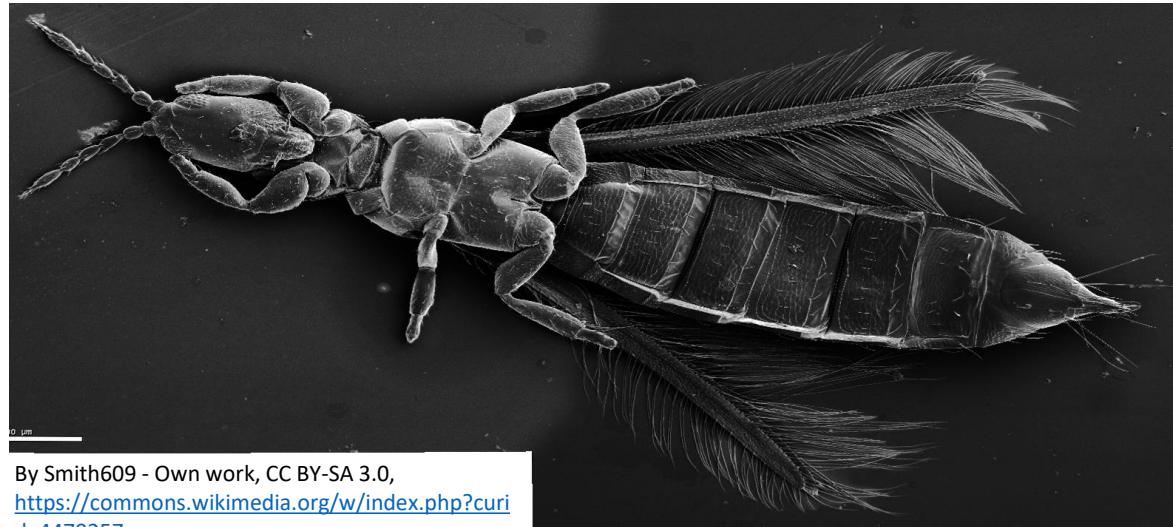
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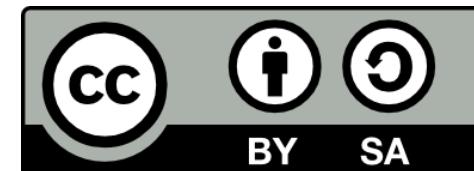
Perfectly legal, but perfectly right?



By Smith609 - Own work, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=4479257>



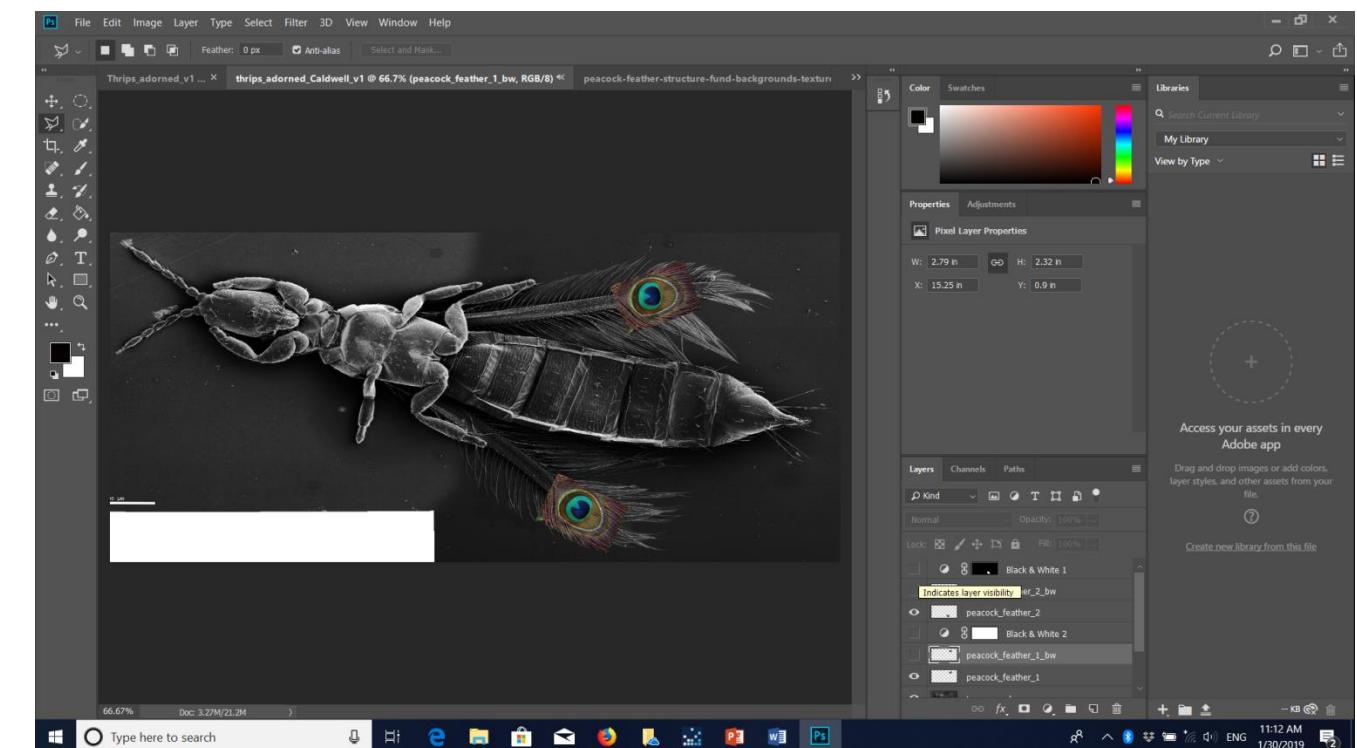
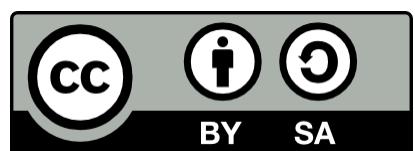
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<https://commons.wikimedia.org/w/index.php?curid=4479257> – Edited by Sabrina Caldwell





Australian
National
University

Perfectly legal, but perfectly right?



References

- [1] Washington Post Fact Checker (20 Jan 2019) https://www.washingtonpost.com/graphics/politics/trump-claims-database/?noredirect=on&utm_term=.f6860f0e5e8d
- [2] Michael Zhang, 2015 <http://petapixel.com/2015/04/09/this-is-what-the-history-of-camera-sales-looks-like-with-smartphones-included/>
- [3] <https://expandedramblings.com/index.php/snapchat-statistics/>
- [4] <https://zephoria.com/top-15-valuable-facebook-statistics/>
- [5] <https://www.wordstream.com/blog/ws/2017/04/20/instagram-statistics>
- [6] <https://expandedramblings.com/index.php/flickr-stats/>

Additional resource

Differences in Creative Commons license versions - [https://wiki.creativecommons.org/wiki/License Versions](https://wiki.creativecommons.org/wiki/License_Versions)



Any questions about image credibility or Creative Commons?

Sabrina.Caldwell@anu.edu.au.

Research

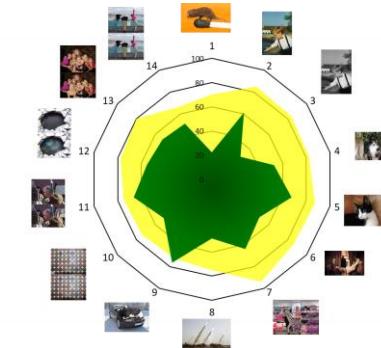
Introduction

Image credibility

Image interference and its implications

Creative Commons

**Creative Commons
and
JPEG Stake in ‘Fake Media’**



Tomorrow

Experiments and Reports
Perspective-Taking