

Week 7&8: Summer Internship

7 July 2021- 20 July 2021

Tasks

The main tasks in week 7 were as follows:

- Modify the code to incorporate the feature level similarity scoring.
- We have to establish relevance of morphing/photoshopping.
- Create morph images using photoshop/other tools available
- Test our algorithm on the outputs of those images.

Morphing in profile cloning

This paper talks about using morphing techniques to create fake documents like passport.

It also compares the detection ability of humans and computers.

Clean photoshopped images are very difficult to detect and is widely used in creating fake profiles and documents.

Link: <https://cognitiveresearchjournal.springeropen.com/articles/10.1186/s41235-019-0181-4>

Image morphing survey

These papers talk about various morphing techniques and use/misuse of the technique.

Link: https://www.researchgate.net/publication/2801109_Image_Morphing_A_Survey

Link: https://www.researchgate.net/publication/2855203_Recent_Advances_in_Image_Morphing

Fraudulent ID using face morphs and their detection. Link: <https://bit.ly/3hOvc3b>

Created morphed images

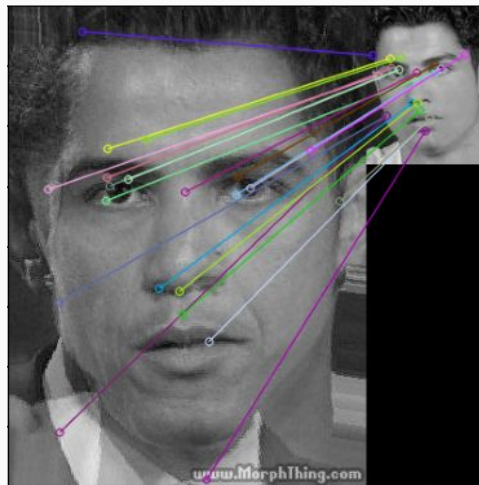
I used <https://www.morphthing.com/morph> currently for creating morphs for the testing.

Some morphs are as good as natural while others have some distortions that could be removed using photoshop techniques.

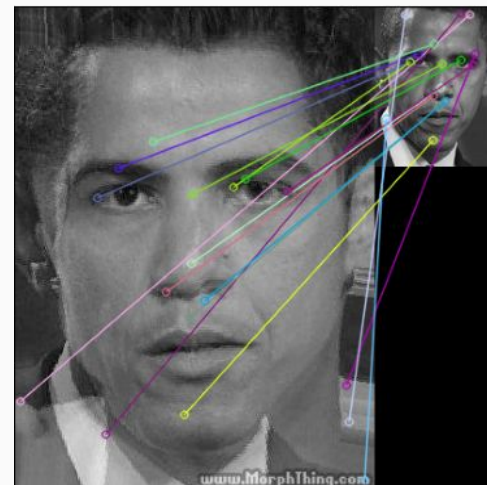
Morphing testing - 1



Test image

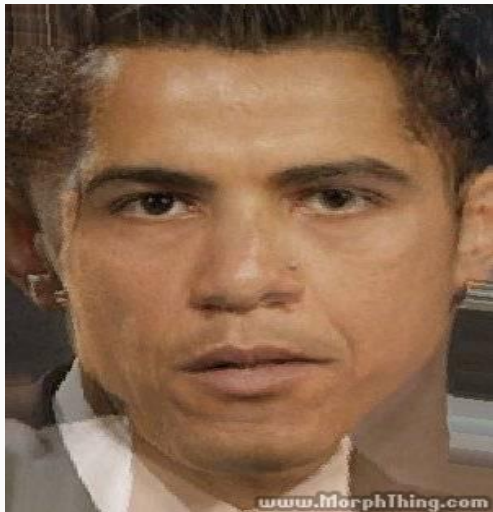


Original-1 (correct)



Original-2 (correct)

Morphing testing on google search



Tested at:
<https://images.google.com/>

About 178 results (1.07 seconds)



Image size:
300 × 400

No other sizes of this image found.

Possible related search: *harry styles and obama combined*

<https://www.eonline.com> > News

Harry Styles Supposedly Had an Affair With This Man - E! Online

12-Dec-2014 — The hoax National Examiner cover features **Obama** with a line of text that reads, "[**Obama**] had sex with THIS MAN," with an arrow that points to ...

<https://www.wattpad.com> > stories > hobama

Hobama Stories - Wattpad

Harry styles and his "friend" Barack **Obama** have been photographed together at the local Starbucks, read this magical love story about harry+**Obama**=❤️.

Pages that include matching images

<https://www.morphthing.com> > celebrity > 46089605-B...

- MorphThing.com



300 × 400 — Barack **Obama** 50%; Harry Styles 50%. Name Combinations. 1st Name. Bararry; Barry; Bary; Hack; Harack; Harrack. 2st Name. Morph parents. Barack **Obama** ...

<https://in.linkedin.com> > shanvaan-ls

Morphing testing on search engines

Google images showed output of “Harry Styles and Obama combined”. Though it was able to guess that **it is a combination of two images**. But the originals were guessed incorrectly.

Pimeyes showed Barack Obama images as output.

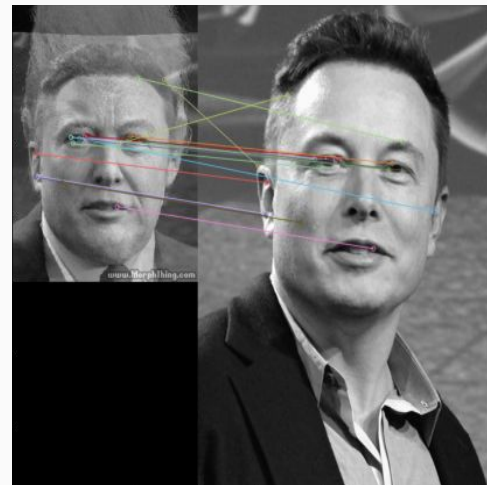
Morphing testing - 2



Test image



Original-1 (correct)

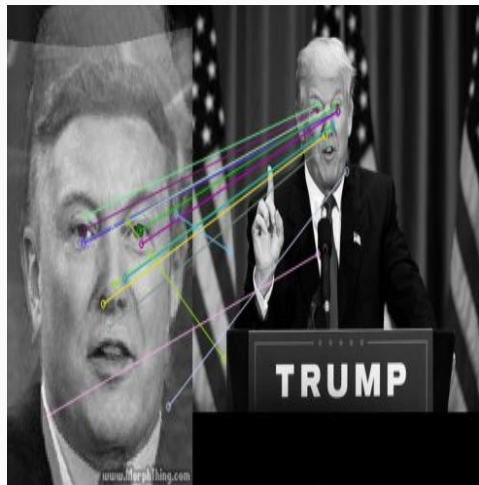


Original-2 (correct)

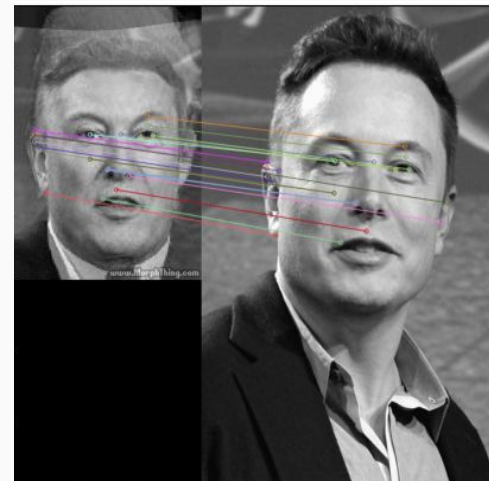
Morphing testing - 3



Test image



Original-1 (correct)



Original-2 (correct)

Getting feature-wise score

By simply sorting the features array in method -1 and taking distance array in method-2 and method-3, we are able to quantify similarity for every feature separately.

Power law technique is to be implemented.

Week 8: Summer Internship

12 June 2021- 18 July 2021



Tasks

The main tasks in this week are as follows:

- Testing google images into detecting morphing.
- Presentation/summary of the work done so far.
- Advanced morphed images.
- Testing google search engines against advanced morphed images.

Morphing testing on google search




Tested at:
<https://images.google.com/>

Google

Barack-Obama.png × ashton hilton dermatology ×

Q All Images Maps Shopping More Tools

About 152 results (0.69 seconds)

 Image size: 100 × 133
No other sizes of this image found.

Possible related search: **ashton hilton dermatology**

<https://hiltondermatology.com> › board-certified-dermat...
Our Dermatologists | Hilton Dermatology + Aesthetics
A **dermatologist** who has been "board certified" has undergone the strict training required by the American Board of **Dermatology**. ... Dr. Ashton Taylor Hilton, MD.

<https://health.usnews.com> › Doctors
Dr. Ashton T. Hilton, MD | Slidell, LA | Dermatologist | US ...
Dr. Ashton T. Hilton is a **dermatologist** in Slidell, Louisiana and is affiliated with Slidell Memorial Hospital. He received his medical degree from Louisiana State ...

Pages that include matching images

<https://www.doximity.com> › States › Louisiana › Slidell
Dr. Ashton Hilton, MD – Slidell, LA | Dermatology - Dximity
320 × 320 — Dr. Ashton Hilton, MD is a board certified **dermatologist** in Slidell, Louisiana. He is affiliated with Slidell Memorial Hospital.

Morphing testing on google search



Tested at:
<https://images.google.com/>

Google search results for "full hd narendra modi hd".

Search bar: unnamed.png x full hd narendra modi hd

Navigation: All Images Maps Shopping More Tools

About 841 results (1.16 seconds)

Image size: 900 x 900

No other sizes of this image found.

Possible related search: **full hd narendra modi hd**

<https://www.pmindia.gov.in> > image-gallery

Photo Gallery | Prime Minister of India

PM chairs a review meeting on Medical Oxygen related issues, through VC, in New Delhi ... The Prime Minister, Shri **Narendra Modi** interacting with the Directors ...

<https://www.gettyimages.in> > photos > narendra-modi

69,941 Narendra Modi Photos and Premium High Res ...

Find the perfect **Narendra Modi** stock photos and editorial news pictures from Getty ... Showing Editorial results for **narendra modi**. Search instead in Creative?

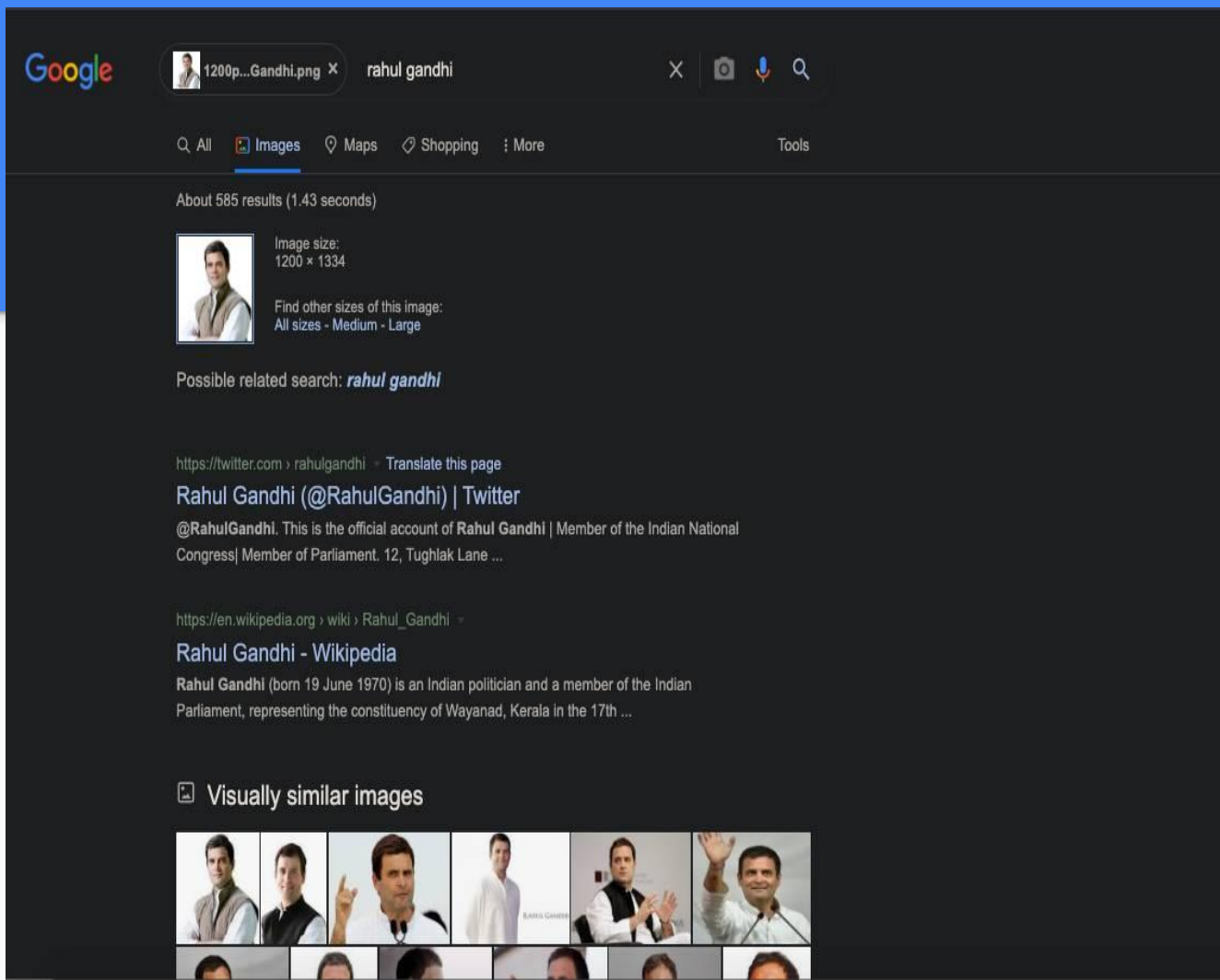
Visually similar images

Grid of visually similar images showing various portraits of Narendra Modi.

Morphing testing on google search



Tested at:
<https://images.google.com/>

A screenshot of a Google Images search results page for the query "rahul gandhi". The page has a dark theme. At the top, the Google logo is on the left, and the search bar contains "rahul gandhi" with a file named "1200p...Gandhi.png" uploaded. Navigation tabs for "All", "Images", "Maps", "Shopping", and "More" are visible, with "Images" selected. Below the tabs, it says "About 585 results (1.43 seconds)". A large image of Rahul Gandhi is shown with its dimensions "1200 x 1334" and a link to "Find other sizes of this image". Below this, it says "Possible related search: rahul gandhi". Further down, there are links to his Twitter profile (@RahulGandhi) and his Wikipedia page. At the bottom, there is a section titled "Visually similar images" showing a grid of images that are visually similar to the main image of Rahul Gandhi.

Getting advanced morphed images.

Source: <https://pin.it/69XTlgb>

Got advanced morphed images created using <https://morphthing.com>


These include images that are morphed using more than 2 originals.

Google search engine was then tested against these morphes.

Advanced morph-1

1. Gerard Butler &
2. Josh Duhamel.

Gerard Butler, Josh Duhamel



Gerard Butler & Josh Duhamel

Morph
a new image

Remove Favorite Morph this image

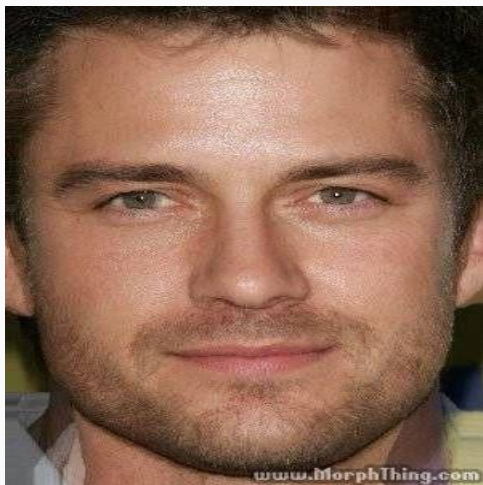
Like Share 63K people like this. Sign Up to see what your friends like.

Tweet





Save





www.MorphThing.com

Advanced testing (1)




Tested at:
<https://images.google.com/>

Google  × for adult X   

 All  Images  Maps  Shopping : More Tools

About 229 results (1.10 seconds)

 Image size:
300 × 400

Find other sizes of this image:
All sizes - Small - Medium

Possible related search: *for adult*

<https://www.merriam-webster.com/dictionary/adult>


Adult | Definition of Adult by Merriam-Webster


English Language Learners Definition of **adult** · fully grown and developed · mature and sensible · not childish · of or intended **for** adults.

<https://www.cdc.gov/vaccines/adults>

Adult Vaccination | CDC

You are also at risk **for** different diseases as an **adult**. Vaccination is one of the most convenient and safest preventive care measures available.


 Visually similar images



Advanced morph-2

1. Gerard Butler &
2. Matthew McConaughey.

Gerard Butler, Matthew McConaughey



Gerard Butler & Matthew McConaughey

[Gerard Butler](#) [Matthew McConaughey](#)

Morph
a new image

[Remove Favorite](#) [Morph this image](#)

[Like](#) [Share](#) 63K people like this. Sign Up to see what your friends like.

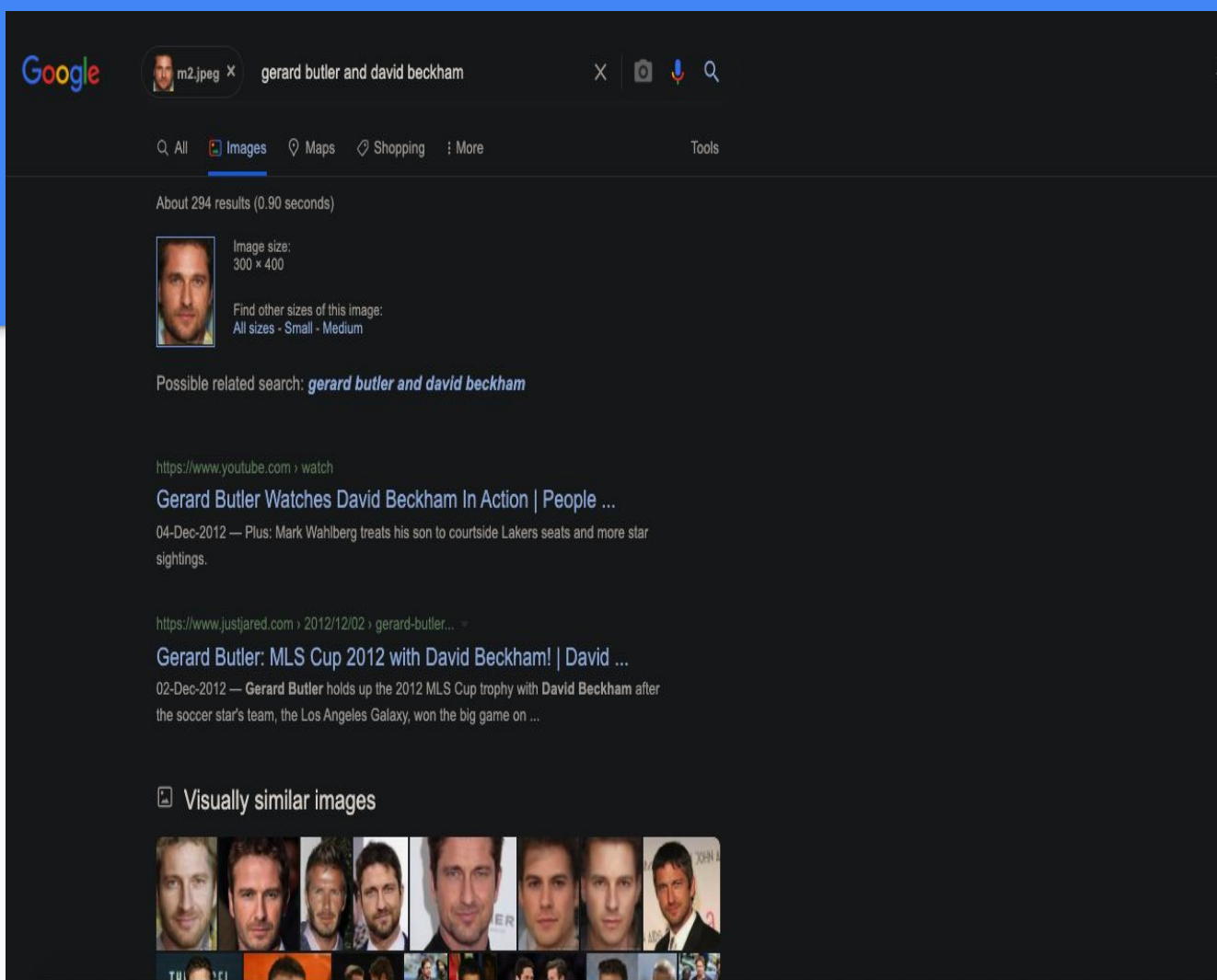
[Tweet](#) [Save](#)

www.MorphThing.com

Advanced testing (2)



Tested at:
<https://images.google.com/>



Note


In advanced testing 2, google was able to detect that it is a morph and also gave correct name for one of the originals but other one was not detected correctly.

This was similar to what happened in the case of Barack Obama and Cristiano Ronaldo.

Advanced morph-3

1. Hugh Jackman &
2. Nathan Fillion.

Hugh Jackman, Nathan Fillion



[Hugh Jackman](#) & [Nathan Fillion](#)


Morph
a new image

[Remove Favorite](#) [Morph this image](#)

[Like](#) [Share](#) 63K people like this. Sign Up to see what your friends like.

[Tweet](#)

[Save](#)












www.MorphThing.com

Advanced testing (3)




Tested at:
<https://images.google.com/>

Google  × for adult ×   

 All  Images  Maps  Shopping  More Tools

About 3 results (1.05 seconds)

 Image size:
300 × 400

Find other sizes of this image:
All sizes - Small - Medium

Possible related search: **for adult**

<https://www.merriam-webster.com/dictionary/adult>


Adult | Definition of Adult by Merriam-Webster


English Language Learners Definition of **adult** · fully grown and developed · mature and sensible · not childish · of or intended **for** adults.

<https://www.cdc.gov/vaccines/adults>

Adult Vaccination | CDC

You are also at risk **for** different diseases as an **adult**. Vaccination is one of the most convenient and safest preventive care measures available.

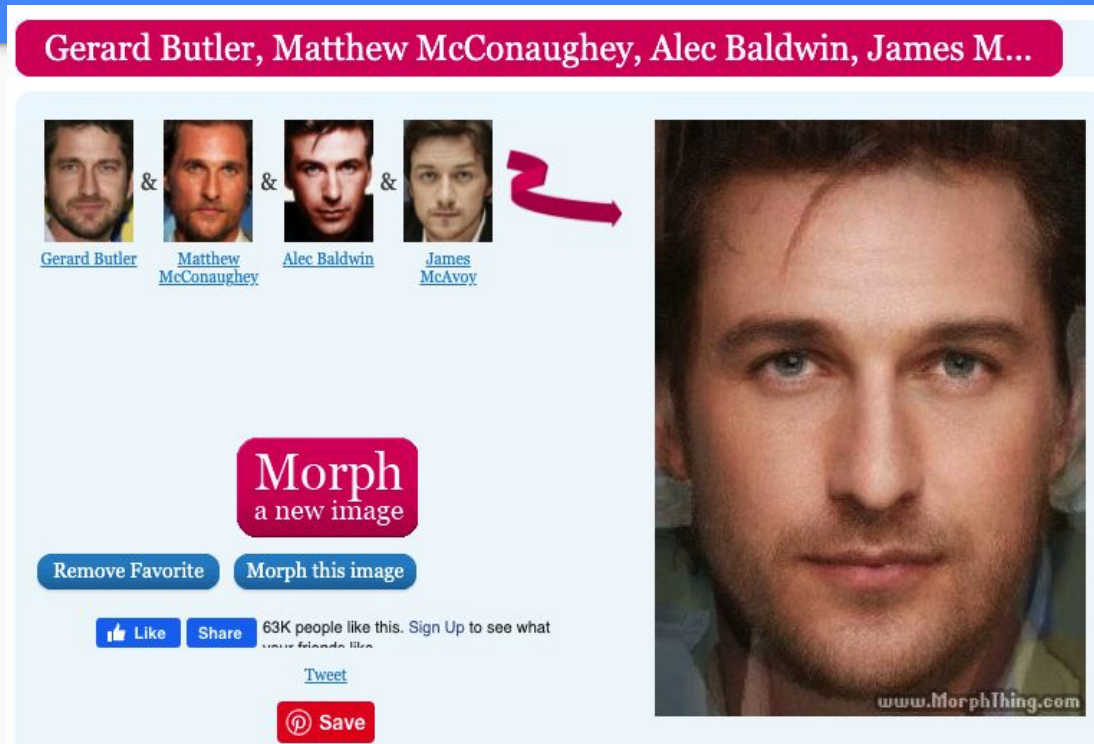
 Visually similar images



Advanced morph-4

1. Gerard Butler,
2. Matthew McConaughey,
3. Alec Baldwin &
4. James McAvoy

Gerard Butler, Matthew McConaughey, Alec Baldwin, James M...



Gerard Butler & Matthew McConaughey & Alec Baldwin & James McAvoy

Morph
a new image

Remove Favorite Morph this image

Like Share 63K people like this. Sign Up to see what your friends like. Tweet

Save

www.MorphThing.com

Advanced testing (4)



Tested at:
<https://images.google.com/>

The screenshot shows a Google Images search interface. At the top, the Google logo is on the left, and a search bar contains the text 'jim english actor' with a small thumbnail of a man's face and a close button. To the right of the search bar are icons for camera, voice search, and a magnifying glass. Below the search bar, there are tabs for 'All', 'Images', 'Maps', 'Shopping', and 'More'. The 'Images' tab is selected. Below the tabs, it says 'About 271 results (1.45 seconds)'. A large image of a man's face is displayed on the left, with the text 'Image size: 300 x 400' and 'No other sizes of this image found.' to its right. Below this, it says 'Possible related search: *jim english actor*'. There are two identical search results for 'Jim English - IMDb' listed below. Each result includes a URL 'https://www.imdb.com > name', the title 'Jim English - IMDb', and a description: 'Jim English, Actor: New Blood. Jim English is an actor, known for New Blood (2016), Coronation Street (1960) and Peterloo (2018).' and 'Jim English, Actor: Expert Weapon. Jim English is an actor, known for Expert Weapon (1993).' At the bottom, there is a section titled 'Visually similar images' with a grid of 16 small thumbnail images of various actors.

Note

In advanced testing 4, google did not throw common nouns like adult, man or boy.

It gave a specific answer Jim and that too specifically with the occupation English actor.

But the image was a morph of 4 different people.

Advanced testing (5)




Tested at:
<https://images.google.com/>

The screenshot shows a Google Images search interface. At the top, the Google logo is on the left, and a search bar contains the text 'happy' next to a small thumbnail of the reference image. To the right of the search bar are icons for a close button (X), a camera (image search), a microphone (voice search), and a magnifying glass (search). Below the search bar, navigation links for 'All', 'Images' (which is highlighted with a blue underline), 'Maps', 'Shopping', and 'More' are visible. On the right side of this navigation bar is a 'Tools' link. The main search results area shows 'About 234 results (2.42 seconds)'. A large thumbnail of the reference image is displayed on the left. To its right, the text 'Image size: 300 x 400' and 'No other sizes of this image found.' are shown. Below this, a section titled 'Possible related search: **happy**' is visible. Two search results are listed: 1. 'HAPPY - Pharrell Williams (feat. Minions) - YouTube' with a link to 'https://www.youtube.com > watch =', a date of '28-Jun-2013', and a description 'Pharrell Williams - Happy Music Video with Minions | Abonnieren >'. 2. 'Pharrell Williams - Happy (Video) - YouTube' with a link to 'https://www.youtube.com > watch =', a date of '08-Jan-2014', and a description 'Official Music Video for "Happy" by Pharrell Williams Listen to Pharrell: https://PharrellWilliams.lnk.to/listenYD Subscribe to the official ...'. At the bottom, a section titled 'Visually similar images' shows a grid of 14 small image thumbnails that are visually similar to the reference image.

Advanced morph-6

1. Penn Badgley &
2. James Marsden

Penn Badgley, James Marsden



[Penn Badgley](#) & [James Marsden](#)


Morph
a new image

[Remove Favorite](#) [Morph this image](#)

[Like](#) [Share](#) 63K people like this. Sign Up to see what your friends like

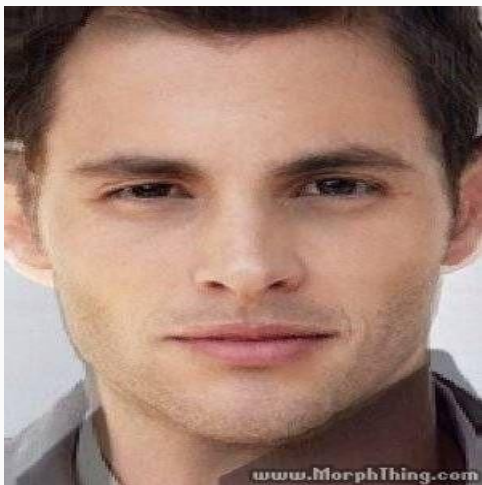
[Tweet](#)

[Save](#)

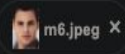










www.MorphThing.com

Advanced testing (6)




Tested at:
<https://images.google.com/>

Google  x james marsden penn badgley X   

 All  Images  Maps  Shopping  More Tools

About 218 results (1.13 seconds)

 Image size:
300 × 400

Find other sizes of this image:
All sizes - Small - Medium

Possible related search: **james marsden penn badgley**

<https://www.pinterest.com> > pin

Penn Badgley and James Marsden | Hugh laurie, Robert ...

Aug 21, 2013 - This Pin was discovered by Erica Jesse. Discover (and save!) your own Pins on Pinterest.

<https://www.thecut.com> > 2019/01 > penn-badgley-calls-o...

Penn Badgley Calls Out Fans Who Love Joe From 'You'

10-Jan-2019 — ... the wrong message from the show. Penn Badgley is trying to set them straight. ... Related. **James Marsden** Deserved Better in The Notebook ...

Pages that include matching images

<https://www.pinterest.com> > ericajesse7 > morphed-ima...

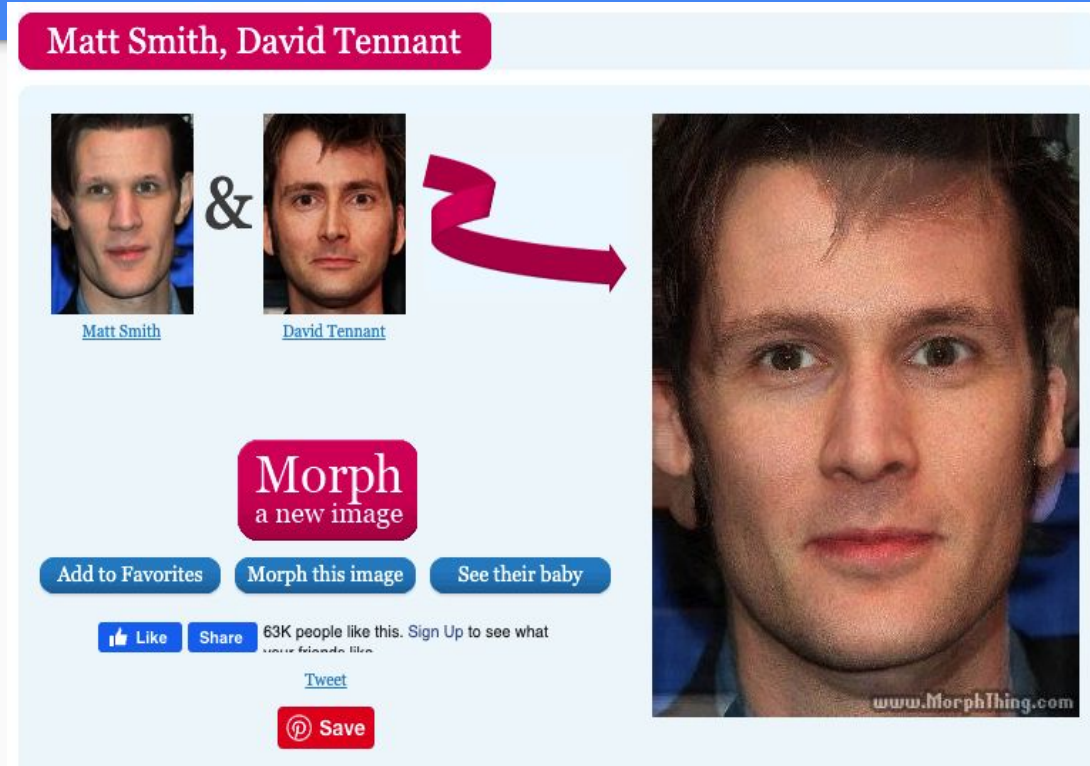
9 Morphed Images ideas | gerard butler, celebrities, george ...

300 × 400 — Gerard Butler, Matthew McConaughey, Alec Baldwin, and James McAvoy Andy Lau, Joseph ... **Penn Badgley and James Marsden**. Addy, Gracie, Lydia and I Image.

Advanced morph-7

1. Matt Smith &
2. David Tennant

Matt Smith, David Tennant



The screenshot shows the MorphThing website interface. At the top, a pink header bar contains the text "Matt Smith, David Tennant". Below this, two portrait photos of Matt Smith and David Tennant are displayed side-by-side, separated by an ampersand. A large, thick, pink arrow points from the two input photos towards a large portrait on the right, which is a morphed image of the two faces. Below the input photos, the word "Morph" is written in a large, pink, serif font, with "a new image" in a smaller, pink, sans-serif font underneath it. Below this, there are three blue buttons: "Add to Favorites", "Morph this image", and "See their baby". At the bottom of the interface, there are social media sharing options: a blue "Like" button with a thumbs-up icon, a blue "Share" button, and a red "Save" button with a pin icon. To the right of the "Share" button, there is text that says "63K people like this. Sign Up to see what your friends like." and a blue "Tweet" button. The large morphed image on the right has the website URL "www.MorphThing.com" in the bottom right corner.

Matt Smith & David Tennant

Morph
a new image

Add to Favorites Morph this image See their baby






Like Share 63K people like this. Sign Up to see what your friends like. Tweet Save






www.MorphThing.com

Advanced testing (7)



Tested at:
<https://images.google.com/>

Google  **matt smith david tennant morph**    

 All  **Images**  Maps  Shopping  More Tools

About 229 results (1.20 seconds)





Image size:
300 × 400


No other sizes of this image found.

Possible related search: ***matt smith david tennant morph***

<https://www.pinterest.com> › pin 

David tennant, Matt smith, John barrowman - Pinterest


Aug 31, 2014 - Morphthing morphs faces together! This is an image of Matt Smith, David Tennant.

<https://www.pinterest.com> › pin 


Watch Matt Smith's Face Morph Into Peter Capaldi ... - Pinterest

Aug 11, 2013 - I found a pretty cool GIF online of Matt Smith's face turning ... Baby girl joins Doctor Who dynasty as David Tennant and Georgia Moffett ...

Pages that include matching images

<https://www.pinterest.com> › zaya97 

isaiah crishom (zaya97) - Profile | Pinterest



236 × 314 — Matt Smith, David Tennant. Morphthing morphs faces together! This is an image of Matt Smith, David Tennant. Isaiah crishom.

Note

In advanced testing 6 & 7, google detected that it is a morph and also correctly gave the name of two originals.

Interestingly, the primary links that google showed were the links that contained these 9 morphes at the first place.

Advanced morph-8

1. Ryan Gosling,
2. Ryan Seacrest &
3. Ryan Reynolds

Ryan Seacrest, Ryan Gosling, Ryan Reynolds



[Ryan Seacrest](#) & [Ryan Gosling](#) & [Ryan Reynolds](#)

Morph
a new image

Remove Favorite Morph this image

Like Share 63K people like this. Sign Up to see what your friends like

[Tweet](#)






[Save](#)






[www.MorphThing.com](#)

Advanced testing (8)



Tested at:
<https://images.google.com/>

Google  colton haynes    

 All  Images  Maps  Shopping  More Tools

About 284 results (0.95 seconds)




Image size:
300 × 400

Find other sizes of this image:
[All sizes](#) - [Small](#) - [Medium](#)

Possible related search: **colton haynes**

<https://www.instagram.com/coltonhaynes>


Colton Haynes (@coltonhaynes) • Instagram photos and videos


6.5m Followers, 637 Following, 1290 Posts - See Instagram photos and videos from Colton Haynes (@coltonhaynes)

https://en.wikipedia.org/wiki/Colton_Haynes

Colton Haynes - Wikipedia

Colton Lee Haynes (born July 13, 1988) is an American actor and model. He is known for his starring role as Jackson Whittemore in the MTV supernatural drama ...

 Visually similar images



Advanced morph-9

1. Gerard Butler,
2. Josh Duhamel,
3. Jude Law &
4. Adam Levine

Gerard Butler, Josh Duhamel, Jude Law, Adam Levine



Morph
a new image

Remove Favorite

Morph this image



Like



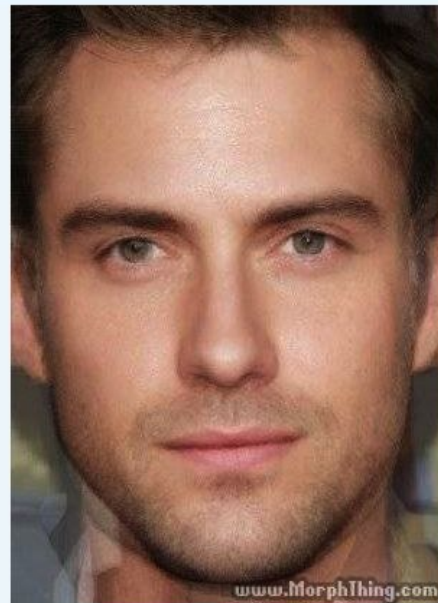
Share

63K people like this. Sign Up to see what your friends like

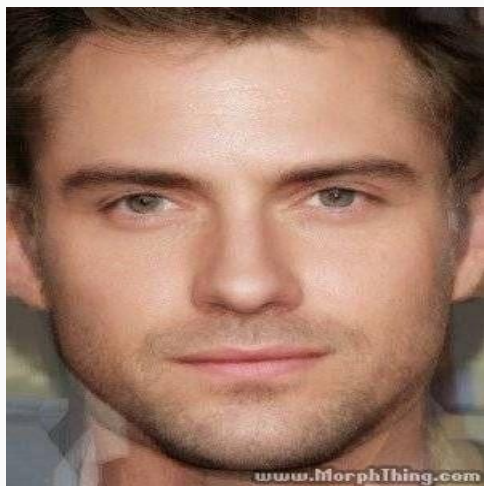
[Tweet](#)




Save



Advanced testing (9)




Tested at:
<https://images.google.com/>

Google  x henry cavill vs gerard butler

Q All Images Maps Shopping More Tools

About 320 results (1.16 seconds)


 Image size:
300 × 400
Find other sizes of this image:
All sizes - Small - Medium


Possible related search: *henry cavill vs gerard butler*

<https://www.pinterest.com> › pin =

[resize output image] | Henry cavill, Henry cavill eyes ...

[resize output image] Superman Cavill, Henry Superman, Gerard Butler, The Remnant.
Choose board ... The blog also provides fans with various gifs and edits.

 Visually similar images



Note

In advanced testing 9 again, google was able to detect that it is a morph and also gave correct name for one of the originals but other one was not detected correctly.

This time the morph was created using 4 originals and not just two. This behaviour might be because that google considers morphing of max 2 faces and not more than that.

Also it gave “vs” instead of “and” in testing 9.