

When did De Gaulle and Eisenhower meet?

Automatic Face
Recognition in historical
videos



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ANTRACT



“Who is in this video?”

Large archives require face annotations

- Manual annotations?
 - Expensive and not scalable
- Automatic face recognition?
 - How to obtain the training images?



Just Google it!

- The web contains a huge amount of picture of well-known people (celebrities)
- For other research tasks, the web is already used as source of information
 - e.g. in computational linguistics, recommender systems, ...

The image shows a Google search interface for the query "eisenhower". The search bar at the top contains the text "eisenhower" and includes icons for image search, voice search, and a magnifying glass. Below the search bar, there are navigation tabs for "Tutti", "Immagini" (which is selected and underlined), "Notizie", "Video", "Maps", "Altro", "Impostazioni", "Strumenti", and "Ra".

Below the navigation tabs, there are several circular image thumbnails with labels: "mamie", "34th president", "dwight d", "matrice", and "mamie eisenhower".

The main content area displays a grid of image results. Each result consists of a thumbnail image and a caption below it:

- Thumbnail 1: A portrait of Dwight D. Eisenhower in a suit. Caption: "Dwight D. Eisenhower ... fr.wikipedia.org"
- Thumbnail 2: A portrait of Dwight D. Eisenhower in a suit, sitting in a chair. Caption: "Présidence de Dwight ... fr.wikipedia.org"
- Thumbnail 3: Dwight David Eisenhower in a military uniform, sitting at a desk. Caption: "Dwight David Eisenho... wikimanche.fr"
- Thumbnail 4: Dwight D. Eisenhower in a military uniform, standing. Caption: "Dwight D. Eisenhower ... fr.wikipedia.org"
- Thumbnail 5: A black and white photo of Dwight D. Eisenhower in a military uniform, sitting at a desk. Caption: "https://static.lexpress.fr/medias... lexpress.fr"
- Thumbnail 6: Dwight Eisenhower in a military uniform, sitting at a desk. Caption: "Dwight Eisenhower Photos et image... gettyimages.fr"
- Thumbnail 7: Dwight Eisenhower in a military uniform, sitting at a desk. Caption: "Fichier:General Dwight... fr.m.wikipedia.org"
- Thumbnail 8: Dwight Eisenhower in a military uniform, smiling. Caption: "Eisenhower : un Général po... perfony.com"
- Thumbnail 9: Dwight Eisenhower in a military uniform, sitting at a desk. Caption: "Comment prioriser vos tâches avec la Matric... esprit-dentreprendre.com"

At the bottom of the page, there are more image thumbnails, including a portrait of Dwight D. Eisenhower in a military uniform and a portrait of Dwight D. Eisenhower in a suit. A small number "3" is visible in the bottom right corner of the page.



images from the web

tuning by
human experts



FaceRec

MTCNN - FaceNet - SORT

face annotation

Eisenhower

FRAMES 18-29

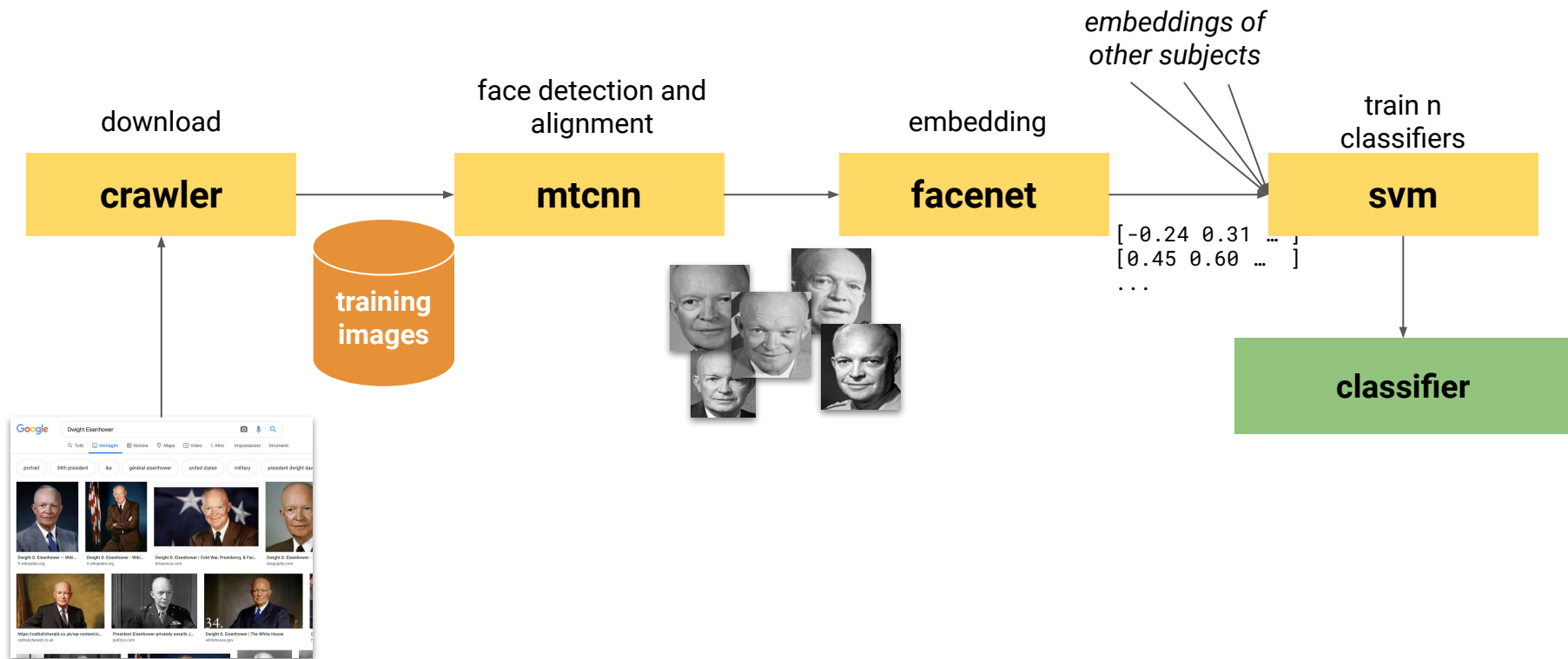
BOX [11,23, 200, 176]

CONFIDENCE 0.76

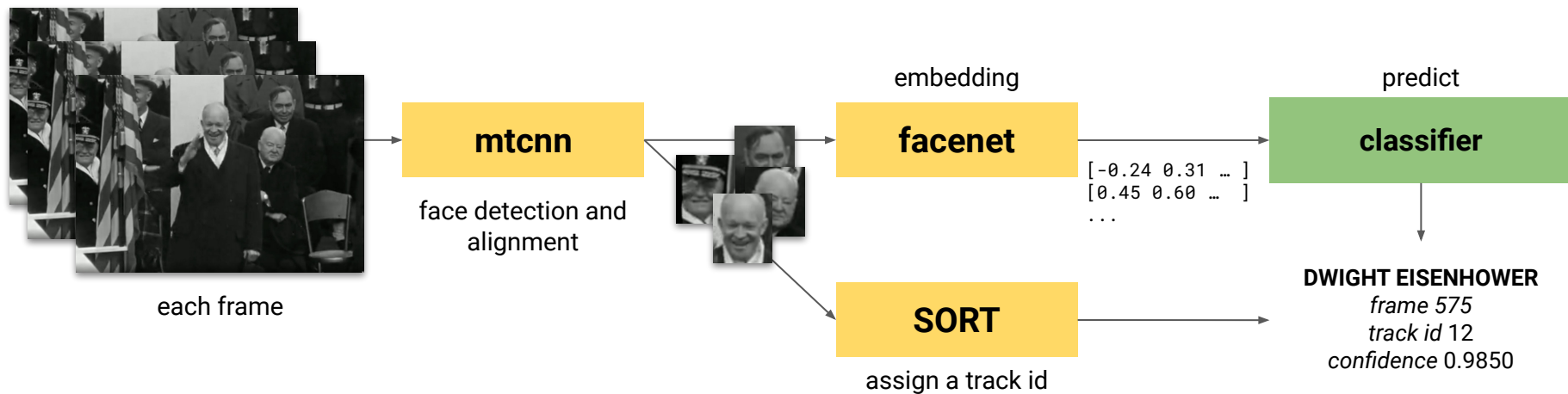


The Approach






Training Phase



Prediction Phase



Prediction Phase: Final Decision






FRAME	575	600	625	650	675
					
TRACK	12	12	12	12	12
PRED.	Khrushchev	Eisenhower	Eisenhower	Eisenhower	Khrushchev
CONF.	0.33	0.83	0.76	0.87	0.47



MODE: **Eisenhower** (3 vs 2)
WEIGHTED MODE: **Eisenhower** (2.46 vs 0.80)

RATIO: $3 / 5 = 0.6$ ≥ 0.6 ✓
WEIGHTED: $2.46 / 5 = 0.49$ ≥ 0.4 ✓

Decision: **Eisenhower**
avg. confidence: **0.82**

Prediction Phase: Final Decision

FRAME	575	600	625	650	675
					
TRACK	12	12	12	12	12
PRED.	Churchill	Churchill	Churchill	Khrushchev	Khrushchev
CONF.	0.23	0.43	0.36	0.11	0.13

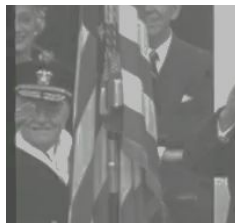
MODE:	Churchill (3 vs 2)	RATIO:	3 / 5 = 0.6	≥ 0.6 
WEIGHTED MODE:	Churchill (1.01 vs 0.24)	WEIGHTED:	1.01 / 5 = 0.20	≥ 0.4 

Decision: **Unknown**

Prediction Phase: Clustering



Unknown 1



Unknown 2



Unknown 3



Unknown 4

- Keep only the more *homogeneous* clusters
 - avg. distance from centroids < 1.3
- Discard clusters having side faces as centroid



Evaluation

Evaluation: Datasets



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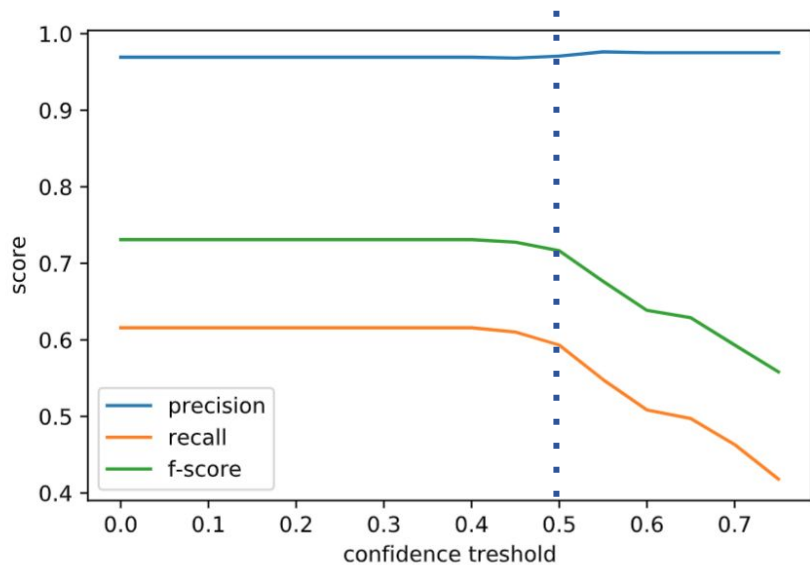
MeMAD

	ANTRACT	MeMAD
type	historical images (1945-1969)	TV news (2014)
resolution / colour	512 x 384 b/w	455 x 256 colour
list of celebrities to search	13 (chosen by experts)	6 (most present in KG)
represented fragment and length	shot 3 seconds in avg.	segment up to 2 minutes
records	216	100
distinct fragments	198	100
distinct media (videos)	129	30
fragments without known faces	39	43

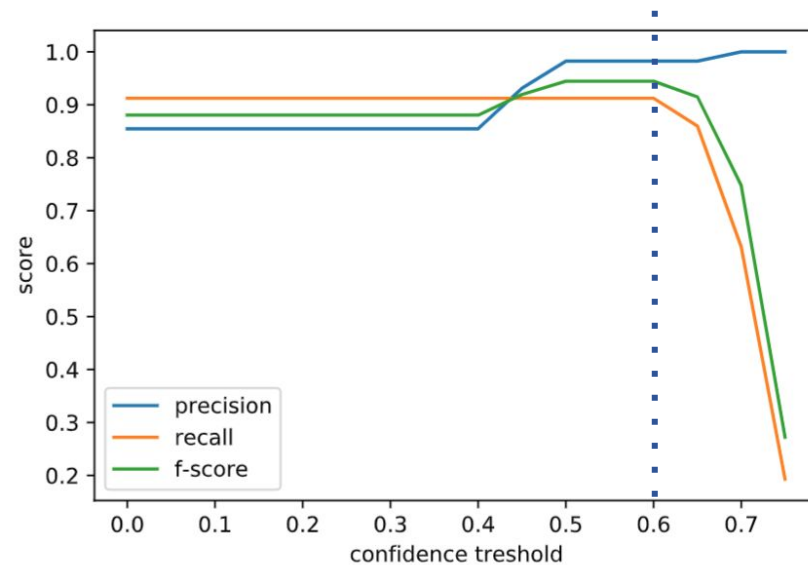
Evaluation: Choosing the threshold



ANTRACT



MeMAD



Evaluation: Results



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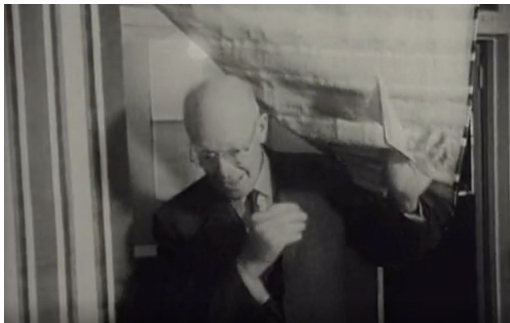
Person	P	R	F	S
Ahmed Ben Bella	1.00	0.46	0.63	13
François Mitterrand	1.00	0.92	0.96	13
Pierre Mendès France	1.00	0.61	0.76	13
Guy Mollet	0.92	0.92	0.92	13
Georges Bidault	0.83	0.71	0.76	14
Charles De Gaulle	1.00	0.57	0.73	19
Nikita Khrushchev	1.00	0.38	0.55	13
Vincent Auriol	1.00	0.46	0.63	13
Konrad Adenauer	1.00	0.53	0.70	13
Dwight Eisenhower	0.85	0.46	0.60	13
Elisabeth II	1.00	0.71	0.83	14
Vyacheslav Molotov	1.00	0.23	0.37	13
Georges Pompidou	1.00	0.69	0.81	13
– unknown –	0.35	0.97	0.52	39
average (unknown apart)	0.97	0.59	0.71	216



MeMAD

Person	P	R	F	S
Le Saint, Sophie	0.90	0.90	0.90	10
Delahousse, Laurent	1.00	1.00	1.00	7
Lucet, Elise	1.00	0.90	0.94	10
Gastrin, Sophie	1.00	0.90	0.94	10
Rincquesen, Nathanaël de	1.00	0.80	0.88	10
Drucker, Marie	1.00	1.00	1.00	10
– unknown –	0.89	0.97	0.93	43
average (unknown apart)	0.98	0.91	0.94	100

Evaluation: Common errors



Glasses or other occlusion



Side of the face



Small resolution

Evaluation: Clustering



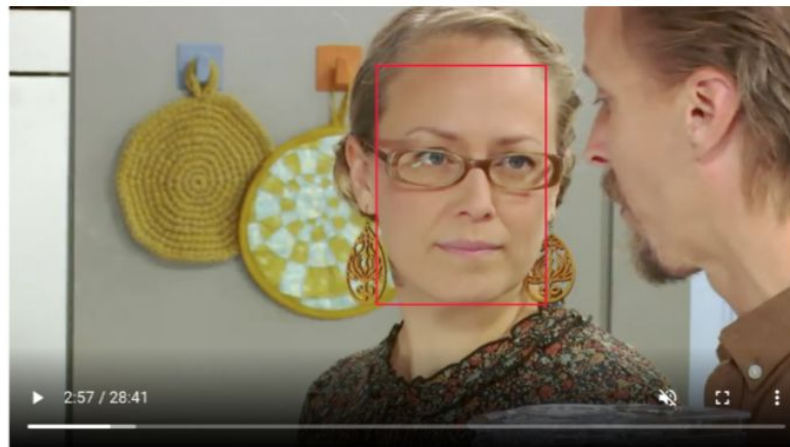
Min confidence: 0.7

02:08 - 02:10 Unknown 0 Confidence: 0.00
02:12 - 02:13 Unknown 3 Confidence: 0.00
02:34 - 02:37 Unknown 0 Confidence: 0.00
02:42 - 02:43 Unknown 3 Confidence: 0.00
08:50 - 08:53 Unknown 0 Confidence: 0.00
08:56 - 09:00 Unknown 3 Confidence: 0.00
09:54 - 09:56 Unknown 0 Confidence: 0.00
10:03 - 10:04 Unknown 3 Confidence: 0.00

Show unknown:

In this video:

- Unknown 0
- Unknown 3
- Unknown 8
- Unknown 7
- Unknown 1
- Unknown 5
- Unknown 6



Min confidence: 0.45

02:19 - 02:21 Elin Skagersten-Ström Confidence: 0.55
02:57 - 02:58 Elin Skagersten-Ström Confidence: 0.59
03:04 - 03:06 Elin Skagersten-Ström Confidence: 0.66
03:57 - 04:00 Elin Skagersten-Ström Confidence: 0.54
08:58 - 09:01 Elin Skagersten-Ström Confidence: 0.59
09:09 - 09:12 Elin Skagersten-Ström Confidence: 0.58

Show unknown:

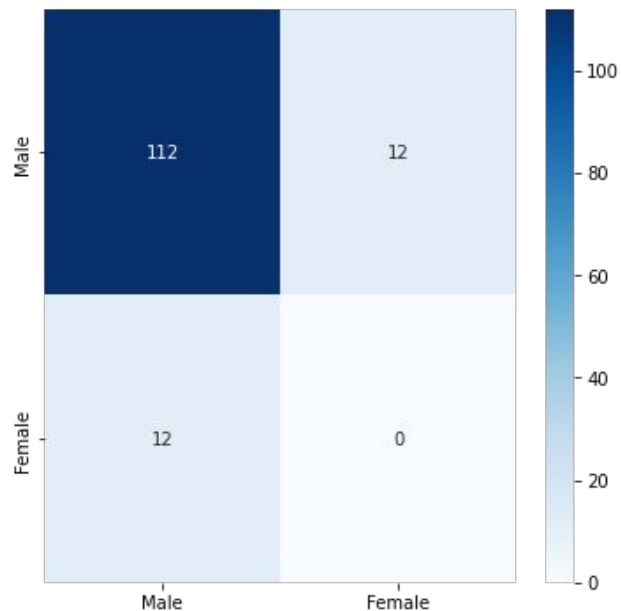
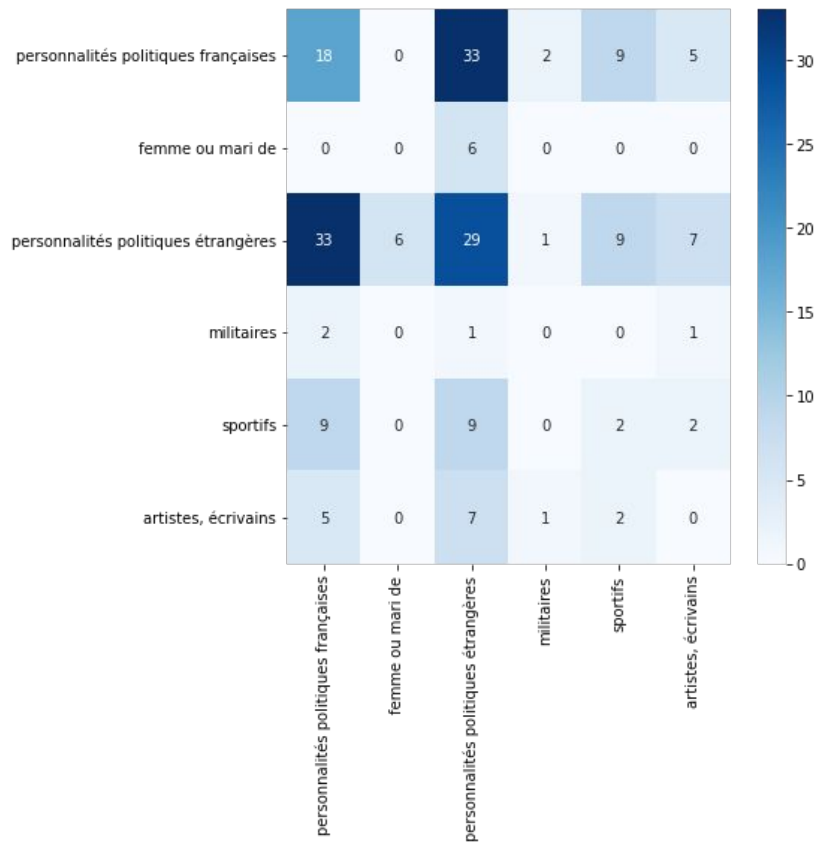
In this video:

Elin Skagersten-Ström

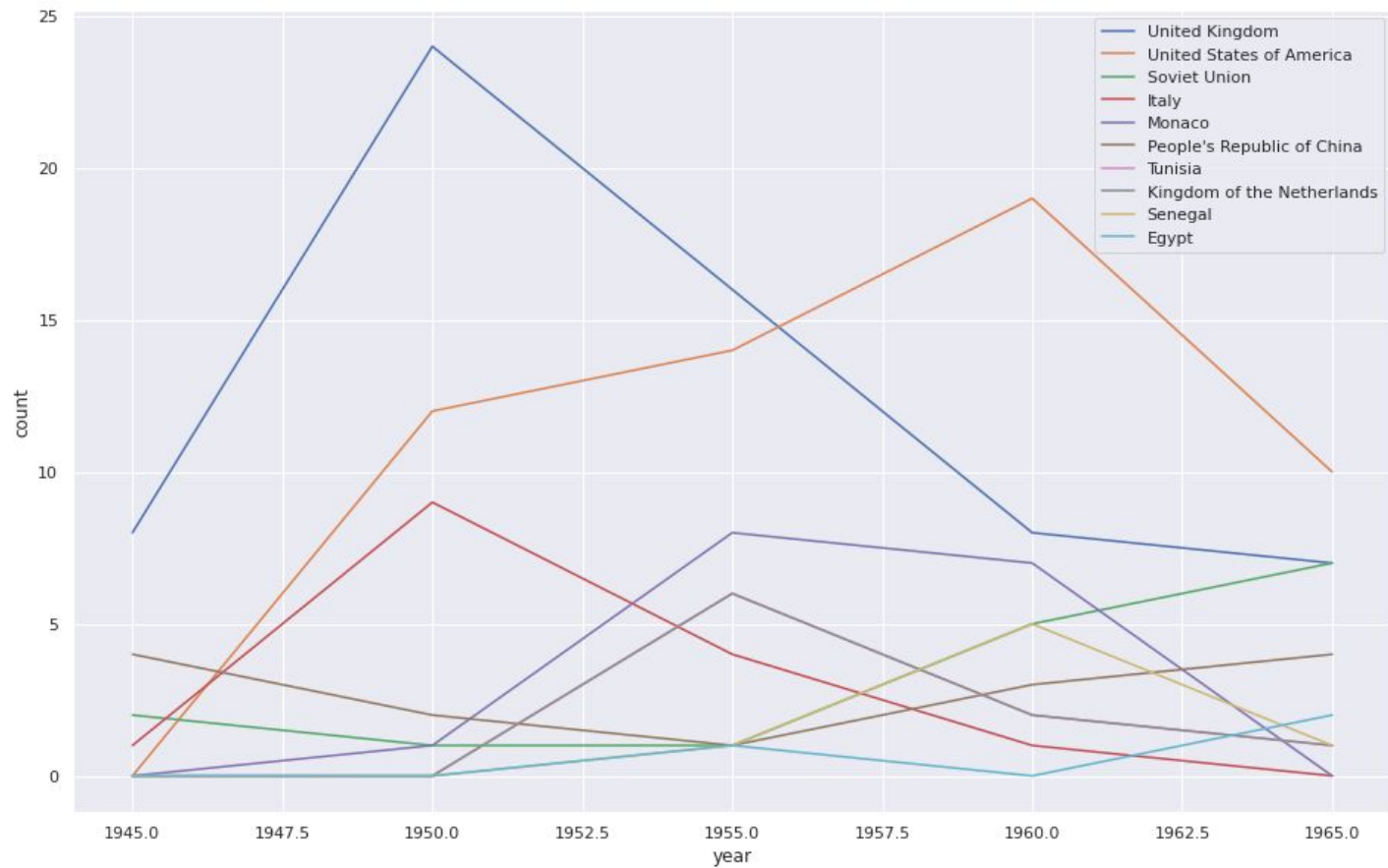
Meeting between people

index	who1	who2	times
122	Couve de Murville , Maurice	Baudouin Ier	3
123	Mollet , Guy	Schneider , Pierre	3
116	Chevalier , Maurice	Mao , Tsé Toung	2
114	Eisenhower , Dwight David	Senghor , Léopold Sédar	2
115	Elizabeth II	Mao , Tsé Toung	2
119	Gaulle , Charles de	Maurois , André	2
120	Gaulle , Charles de	Perillat , Guy	2
121	Gaulle , Charles de	Baudouin Ier	2
118	Mollet , Guy	Duclos , Jacques	2
117	Truman , Harry	Carol , Martine	2
100	Acheson , Dean	Koblet , Hugo	1
111	Adenauer , Konrad	Pie XII	1
112	Adenauer , Konrad	Molotov , Viatcheslav	1
109	André , Michelle	Coffin , Jefferon	1

Meeting between categories



Presence by Year





Interact with FaceRec



REST API

<http://facerec.eurecom.fr/>

Face Recognition Api 0.1.0

[Base URL: /]

<http://facerec.eurecom.fr/swagger.json>

Recognise celebrities on videos.

facerec Default namespace

GET /crawler

GET /disabled/{project}

POST /disabled/{project}

GET /projects

GET /track

GET /train/{project}

GET /training-set

Visualizer Web APP

<http://facerec.eurecom.fr/visualizer>

Analyze a video

Search celebrities in our datasets in a video.

Insert URI of a video

GO

Try an example: <http://www.ina.fr/media/AFE86004832>

Add a celebrity in the dataset

Crawl the web for new celebrities.

Insert the name of a person

GO

Already in the dataset:

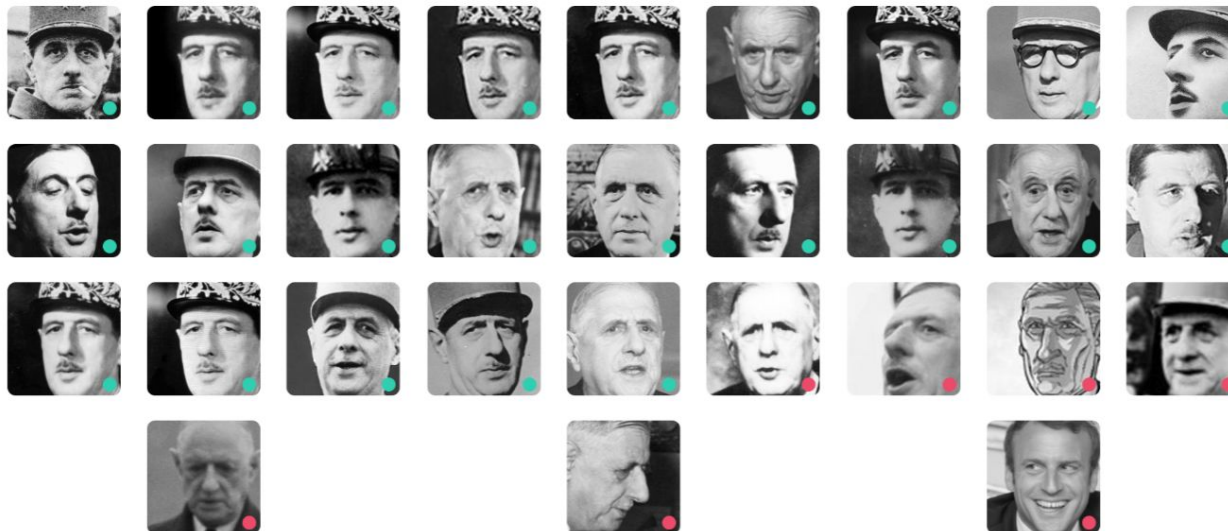
- [Ahmed Ben Bella](#)
- [Charles De Gaulle](#)
- [Dwight Eisenhower](#)
- [Elisabeth II](#)
- [François Mitterrand](#)
- [Georges Bidault](#)
- [Georges Pompidou](#)
- [Guy Mollet](#)
- [Konrad Adenauer](#)

Charles De Gaulle

Click on any image for enabling (●) / disabling (●) it in the training

23 enabled / 7 disabled

Blurred images



LES ACTUALITES FRANCAISES :EDITION DU 22 JANVIER 1953

Date

1953-01-22T00:00:00

Segments

- PREMIERE REUNION DE L'EQUIPE MINISTERIELLE D'EISENHOWER
00:00:13 - 00:00:49
- La dernière séance du cabinet Truman
00:00:13 - 00:00:49
- Paris-Bogota par Air France
00:00:49 - 00:01:21
- VOYAGE DE MONSIEUR LEONARD AU HOGGAR
00:01:23 - 00:02:22
- TEMOIN DE LA PREHISTOIRE : LE COELACANTHE
00:02:21 - 00:02:50
- RENTREE A LA SCENE D'HENRI GARAT
00:02:51 - 00:04:03
- REMISE DE LA BARETTE A MONSEIGNEUR RONCALLI
00:04:03 - 00:06:19
- Les 24 nouveaux cardinaux
00:04:04 - 00:06:20
- Le Consistoire secret
00:04:04 - 00:06:20
- Eisenhower Président
00:06:20 - 00:08:16



Min confidence:  0.35

00:43 - 00:44 Dwight Eisenhower Confidence: 0.44

03:21 - 03:25 Konrad Adenauer Confidence: 0.43

06:55 - 06:56 Dwight Eisenhower Confidence: 0.78


07:00 - 07:02 Dwight Eisenhower Confidence: 0.54

Show unknown:

In this video:

-  Dwight Eisenhower
-  Konrad Adenauer

[Recompute](#)



Charles De Gaulle

Dwight D. Eisenhower

Contact

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Tool

Repo: <https://git.io/facerec>

API: <http://facerec.eurecom.fr/>

Visualizer:

<http://facerec.eurecom.fr/visualizer/>