

In Video Veritas – Verification of Social Media Video Content for the News Industry



**Fake news based on video reuse and how to deal with
it: video fragmentation and reverse image search**

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www.invid-project.eu

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 - A previously existing video is reused under a different and irrelevant context, aiming to deliberately mislead the viewers about a fact/event

Fake news based on video reuse

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**5/9/2017; Claim: Hurricane
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The image shows a side-by-side comparison of two video frames. On the left is a tweet from Dustin Lindskoog (@fuegoNugz) dated 5 Sept 2017, titled "Irma in the islands". The video shows a building with a sign that says "BOSCA" during a storm. On the right is a YouTube video titled "Hurricane Otto Hits Bocas del Toro" with 2,742 views, dated 24/11/2016. This video shows the same building during a storm. The comparison illustrates how the same video can be used to claim different events.

5/9/2017; Claim: Hurricane “Irma” in the islands near the l
24/11/2016; Claim: Hurricane Otto in Bocas del Toro, Panama

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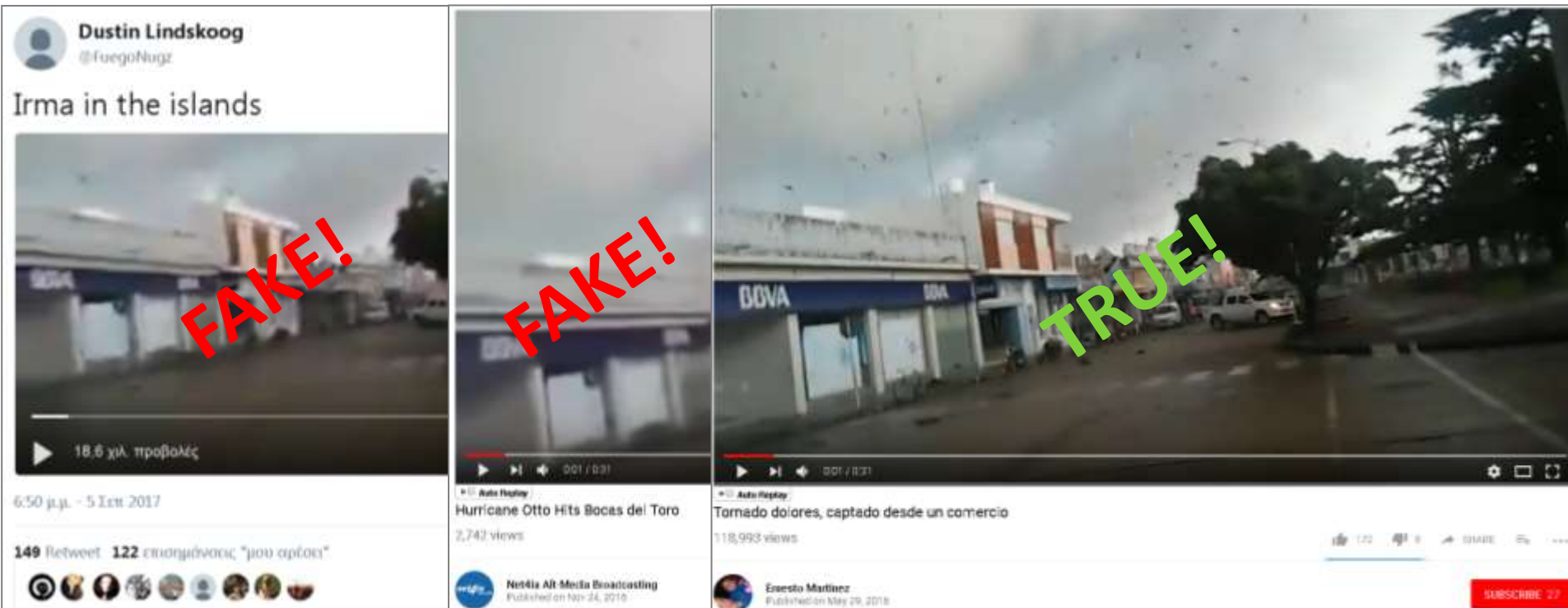
The image displays three side-by-side screenshots of YouTube video player interfaces, illustrating video reuse. Each screenshot shows a different video player with the same underlying footage of a street scene with a building labeled 'DOVA'.

- Left Screenshot:** User: Dustin Lindskoog (@fuegoNugz). Title: Irma in the islands. Video player shows a street scene with a building labeled 'DOVA'. Metadata: 18.6 χιλ. προβολές, 6:50 μ.μ. - 5 Σεπ 2017, 149 Retweet, 122 επισημόνομας "μου αρθεί".
- Middle Screenshot:** User: Net4ia All Media Broadcasting. Title: Hurricane Otto Hits Bocas del Toro. Video player shows a street scene with a building labeled 'DOVA'. Metadata: 2,742 views, Published on Nov 24, 2016.
- Right Screenshot:** User: Ernesto Martinez. Title: Tornado doiores, captado desde un comercio. Video player shows a street scene with a building labeled 'DOVA'. Metadata: 118,993 views, Published on May 29, 2016, SUBSCRIBE 27.

5/9/2017; Claim: Hurricane "Irma" in the islands near the l
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29/5/2016; Claim: Hurricane in Dolores, Uruguay

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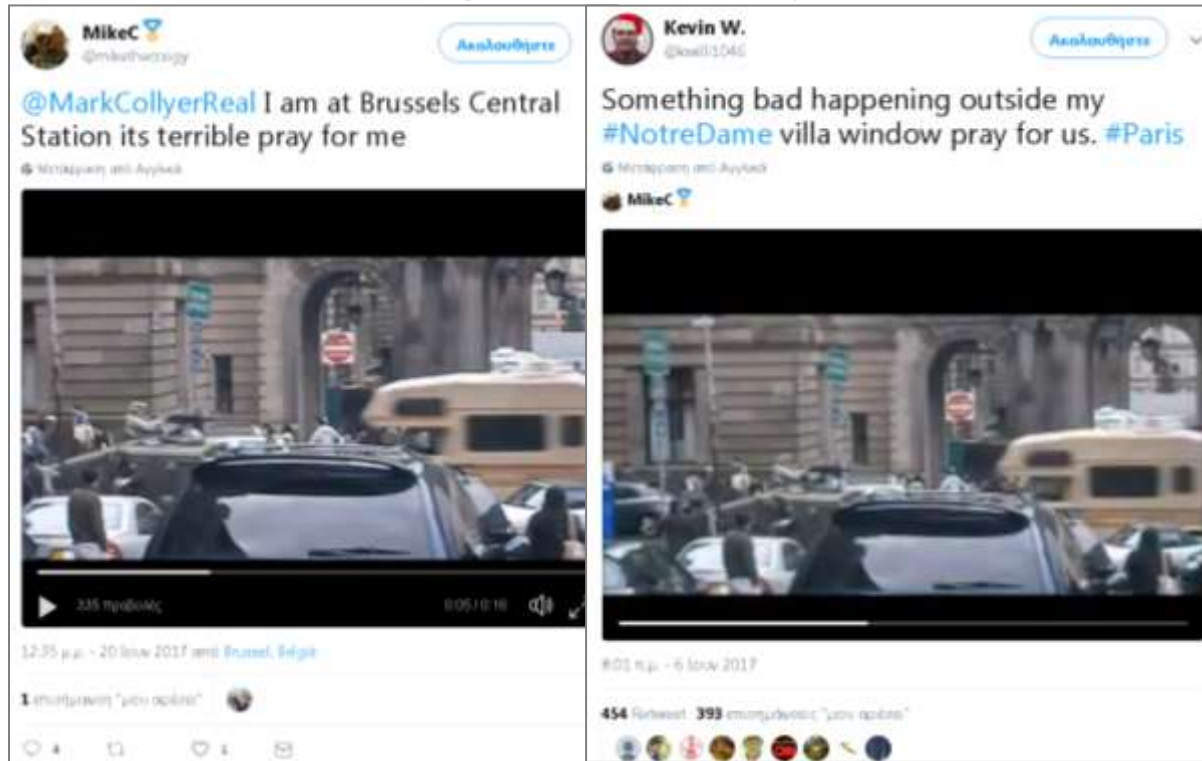
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**20/6/2017; Claim: Attack at
Gare Centrale, Brussels, Belgium**

Fake news based on video reuse

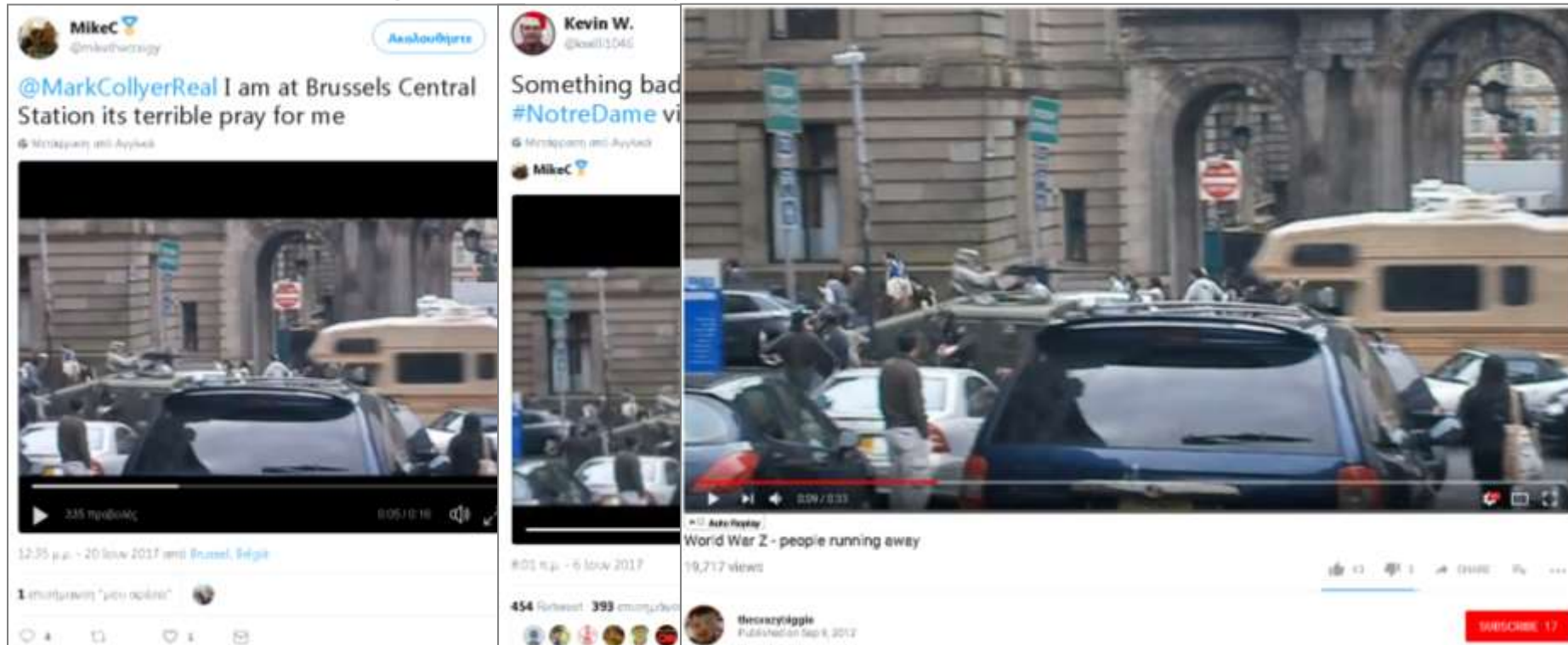
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20/6/2017; Claim: Att Centrale, Brussels, 6/6/2017; Claim: Hammer attack against police in Notre-Dame, Paris, France

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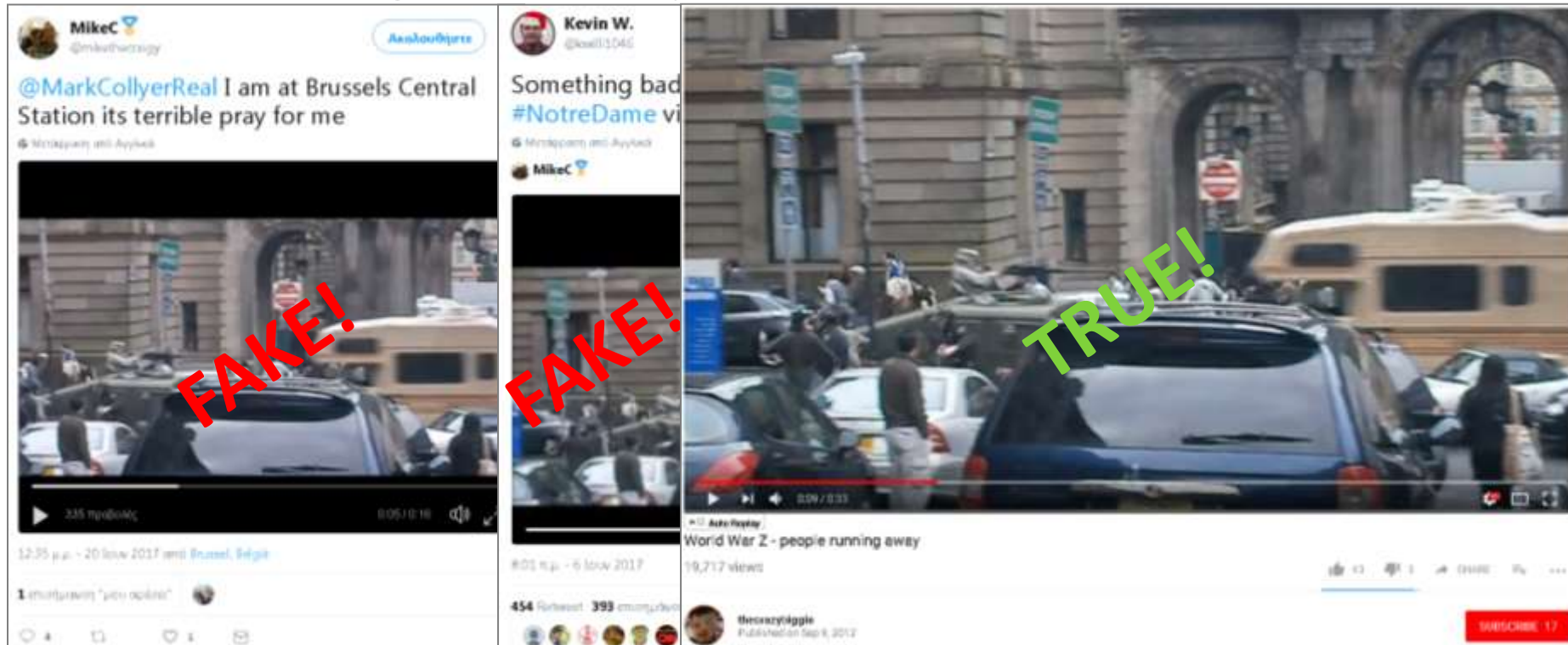
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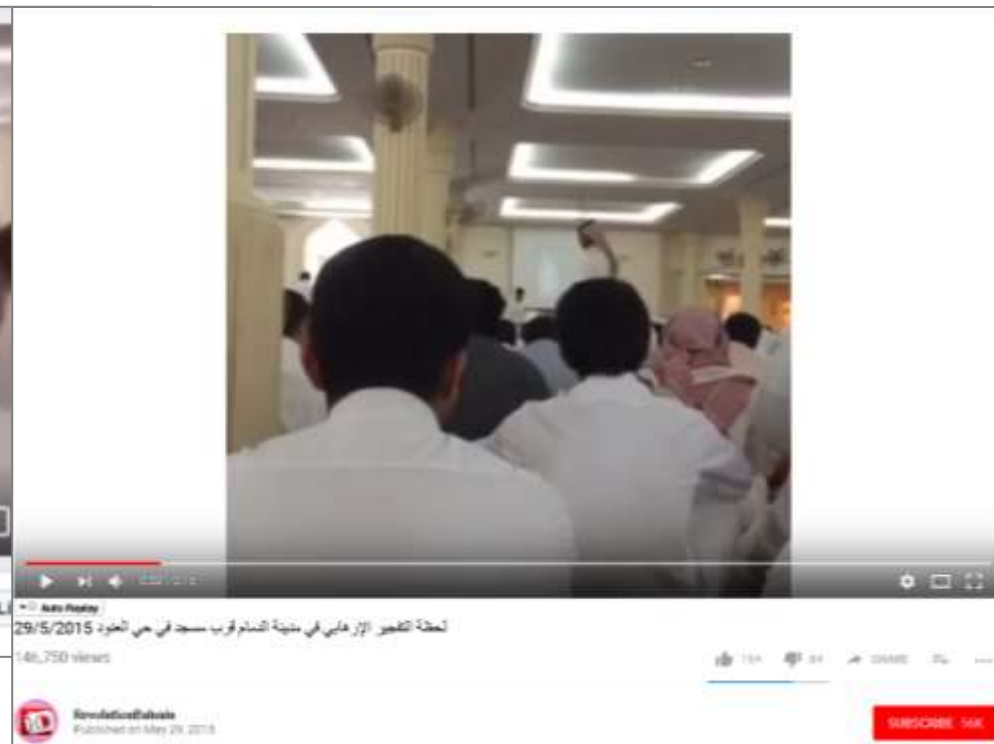
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Dealing with this type of fakes

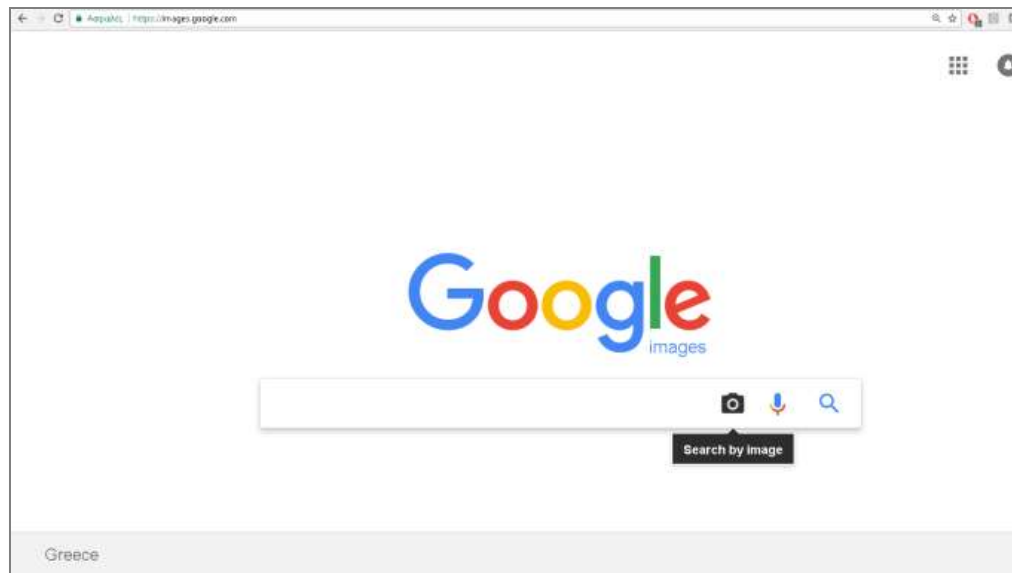
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 - Using search-engine-based plug-ins, such as RevEye¹ and TinEye², that allow reverse image search of Web images related to a video



1. <https://goo.gl/ZRHTDH>
2. <https://goo.gl/G5Rpu9>

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2. <https://goo.gl/G5Rpu9>
3. <https://citizenevidence.amnestyusa.org/>

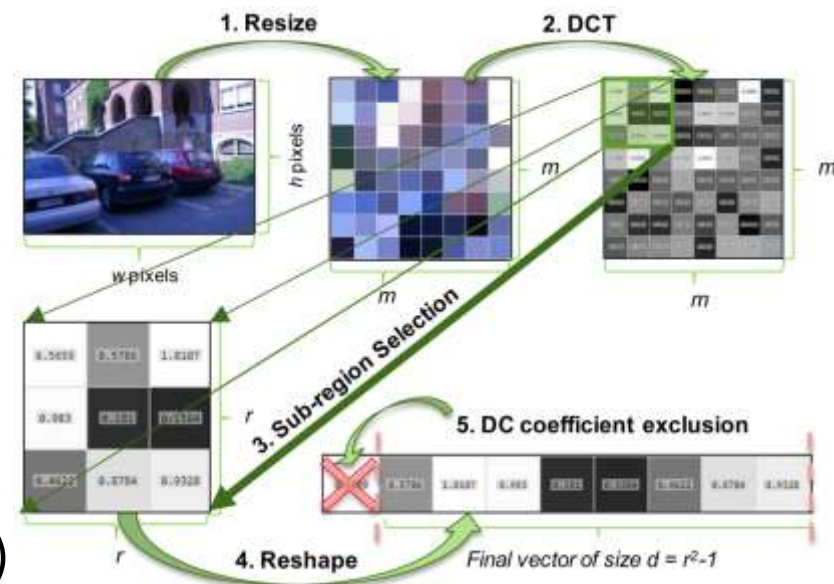
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 - Using the YouTube DataViewer³, which supports reverse search of YouTube video thumbnails
 - Time-consuming and cumbersome processes that:
 - either involve manual generation and uploading of video screenshots
 - or rely on the use of a limited set of video thumbnails

- Interactive tool for reverse video search on the Web
- Time-efficient process that requires minimum manual intervention
- Fine-grained search at the video-fragment-level, through:
 - segmentation of the video into visually coherent fragments
 - extraction of representative keyframes for each video fragment
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- User-generated videos (UGVs) are captured without interruption using a single camera, thus, being single-shot videos
- Algorithms for shot boundary detection (e.g. [1]) fail to reveal information about the structure of these videos
- A more fine-grained segmentation into sub-shots, is needed!
- Proposed approaches define video sub-shots, as:
 - sequences of frames with a small variation in their visual content, based mainly on pair-wise evaluation of frames' visual similarity/dissimilarity [3-7]
 - sequences of frames corresponding to different video recording actions (e.g. camera pan/tilt, camera zoom in/out), relying on motion extraction and classification using pre-defined motion models [8-10] or pre-trained systems [11-13]

- The InVID approach [2]
 - The visual content of each frame is represented with the help of a 2D Discrete Cosine Transform (see figure)
 - Video fragmentation into sub-shots is performed by assessing the visual resemblance of neighboring frames using the cosine similarity
 - The algorithm indicates both sub-shots with minor or no activity, and sub-shots with gradually, but consistently, changing visual content
 - As representative keyframe:
 - for the former type of sub-shots the middle frame is selected
 - for the latter type of sub-shots the frame with the most pronounced change of visual content is selected
 - The analysis takes approx. 3% of the video's duration (being more than 30 times faster than real-time processing)



The reverse video search tool

- Available at: http://multimedia3.itl.gr/videofragmentation_v5/service/start.html
- Allows the analysis of both online and locally stored videos
 - Supported platforms: YouTube, DailyMotion, Facebook, Twitter, Dropbox
 - Supported video formats: mp4, webm, avi, mov, wmv, ogv, mpg, flv, mkv
- The user can monitor the progress of the analysis, or close the browser and be notified (by e-mail) when the results are ready
- After the analysis ends, s/he gets the set of extracted keyframes and can perform reverse search by left clicking on any of them



- Debunking a fake video about hurricane Irma



- Debunking a fake video about hurricane Irma



Information Technologies Institute
Academic Knowledge and Social Media Education Laboratory

InVID
VIDEO4ALL
MAKING

On-line service for video fragmentation and reverse image search

Open a new tab to upload another resource

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Case study

- Debunking a fake video about hurricane Irma



Google
hurricane irma en san martin

Aug 1, 2017 - Aug 1, 2017

Irma en San Martín

¿Qué pasó por este video? **Huracán Irma en San Martín**

Huracán Irma destruye San Martín: difunden imágenes de la tragedia
El huracán Irma destruyó San Martín, un pueblo turístico de la isla de San Martín, República Dominicana. Las imágenes muestran el estado de la ciudad después de la llegada del huracán. Se puede ver el estado de la ciudad después de la llegada del huracán. Se puede ver el estado de la ciudad después de la llegada del huracán.

El aeropuerto de San Martín quedó devastado por el paso del...
El aeropuerto de San Martín quedó devastado por el paso del huracán Irma. Se puede ver el estado de la ciudad después de la llegada del huracán. Se puede ver el estado de la ciudad después de la llegada del huracán.

Visually similar images

Pages that include matching images

Hurricane hits Boca de Toro - YouTube
Hurricane Irma hits Boca de Toro, San Martín, Dominican Republic. The video shows the impact of the hurricane on the town.

Edge live - Watch or Download | download.net
Edge live - Watch or Download | download.net

Huracan en la isla bermudas - YouTube
Huracan Irma en la isla bermudas, San Martín, Dominican Republic. The video shows the impact of the hurricane on the island.

Temperatura cíclica en Cuba, del 1 de junio al 30 de noviembre...
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Huracan Oña: Huracán Oña pierde fuerza y vuelve a tormenta...
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Information Technologies Institute
Advanced Knowledge and Social Media Analytics Laboratory

On-line service for video fragmentation and reverse search

Open a new tab to install InVID browser extension

Upload a video to search for similar images

Click on a thumbnail to perform reverse image search

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Case study

- Debunking a fake video about hurricane Irma



Google search for "Huracan Irma en las islas"

Search for Irma en las islas

Search results for Irma en las islas

Visually similar images

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Hurricane Otto Hits Bocas del Toro - YouTube

Edige Inre - Watch or Download | download.net

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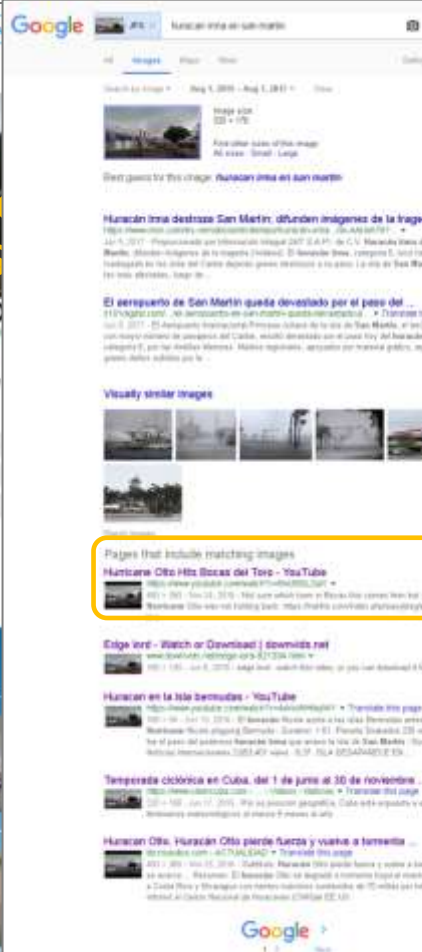
On-line service for video fragmentation and reverse

Open a new tab to upload another resource

Grid of image thumbnails

Case study

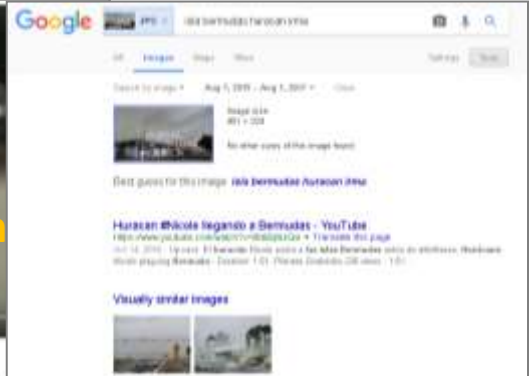
- Debunking a fake video about hurricane Irma



Case study



- Debunking a fake video about hurricane Irma



Case study

- Debunking a fake video about hurricane Irma



- The developed tool for video fragmentation and reverse image search facilitates the detection of previously existing occurrences of a published video on the Web
- Its interactive UI makes the detection of such videos a “few-clicks” process that requires minimum manual intervention
- The gathered feedback from journalists and media verification experts (through its integration into the InVID Verification Plugin) is very positive and encouraging
- Improvements are foreseen regarding:
 - the keyframe selection process
 - the compatibility with online video platforms
 - the detection of mirrored videos

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Thank you for your attention!

Any questions?