Finding, evaluating, and reporting scientific issues – techniques & tools

MODULE REFERENCES

Teyssou, D., Leung, J.-M., Apostolidis, E., Apostolidis, K. ,Papadopoulos S. ,Zampoglou M. ,Papadopoulou O., Mezaris, V. (2017). The InVID Plug-in: Web Video Verification on the Browser, 1st International Workshop on Multimedia Verification at the ACM Multimedia Conference, Mountain View, CA, USA

WEB-BASED REFERENCES

Silverman, G. (Ed.) (2015), Verification Handbook, European Journalism Centre, available at http://verificationhandbook.com/

Silverman, G. (Ed.) (2015), Verification Handbook for Investigative Reporting, European Journalism Centre, available at http://verificationhandbook.com/downloads/verification.handbook.2.pdf

Silverman, G. (Ed.) (2015), Verification Handbook Additional Materials, European Journalism Centre, available at http://verificationhandbook.com/downloads/verification.handbook_additional.pdf

Wardle, C. (2017). Launching our new Chrome extension NewsCheck, FIRST DRAFT, available at https://firstdraftnews.org/launching-new-chrome-extension-newscheck/

Wood, Molly. 2013. Social Media as Breaking-News Feed: Worse Information, Faster, available at https://www.cnet.com/news/social-media-as-breaking-news-feed-worse-information-faster/

Additional material - Content searching

Nowadays journalists have access to a large amount of information. Web 2.0 applications and services make every internet user a potential producer of information. But most of the time this information is of dubious quality. All of the above create two major problems for journalists: how to find the information available on the internet but also how to verify the truth of this information. The information that can be found and verified can be used in investigative journalism projects. This material comes from websites but also from posts on social media.

CONTENT FORMAT AND STORAGE METHODS

The format of the material can be: web pages, PDF files, files readable by spreadsheet applications (XLS, XLSX, CSV), photos and videos.

- Webpages: In the case of webpages the user can save the entire webpage locally or mark and save the content he is interested in (text or image).

- PDF files: PDF files can be easily saved but their content is not easy to download (many PDF files do not allow their content to be copied and pasted into another application).

- Spreadsheet files: The case of files readable by spreadsheet applications is the most convenient for the researcher as it allows the direct processing of the content as well as its transfer to another application. The XLS or XLSX format is owned by Microsoft (from Excel) and in the case of CSV it is an open format that can be read by all spreadsheet applications.

- Photos: In the case of photos the saving is usually done in jpg, gif or png format.

- Video: Finally, most videos require the use of specialized software for their local storage, as it is not certain that the specific video hosted on a multimedia content sharing service will be available at a later time.

CONTENT TO BE SEARCHED

The content that journalists look for can be organized into two different categories:
- Content already available. They concern investigations carried out by journalists in the given period of time. Data in this category is the most common case.

- Content that will appear at some point from now on. They concern issues that interest the journalist over time and he would like to be informed about any new information that appears.

TOOLS AND METHODS FOR VERIFYING CONTENT

In today's digital environment, journalists employ many sources in order to stay informed but also in order to find information on various subjects they investigate. Among all the information that is available today, multimedia content (images and videos) possesses a prominent role. Multimedia content supplements a news article and in many cases act as an attractor for the internet user to read the article. This is especially more evident in the case of news articles that concern crisis situations, like war, terrorist attacks, natural disasters, and refugees. In the case of breaking news, the speed that is required in order for an article to appear in media' web site is very important and thus media companies tend to make significant compromises in the content of the article (text and images and video). It seems to be a quite common phenomenon to use irrelevant images in news articles, or images that were posted on social media by third parties without verifying them first. Although the introduction of the information and communication technologies along with the internet has transformed considerably the way journalism is conducted, the basic values of verification remain about the same. The journalist should always verify his information by asking the 5Ws (Who, What, Where, When, Why) questions. In the era of the internet a significant number of the 5 Ws questions can be answered with the help of internet tools, which allow the journalists to verify and communicate remotely. These tools should help journalists: i) be able to monitor Social Media platform content and identify newsworthy information ii) be able to handle verification of varying forms of content, such as text or videos, and integrate content from several Social Media platforms into verification processes iii) offer the journalist a high level of control over, and possibilities to filter, what type of content is tracked or presented iv) be able to identify the geographical location of a source. To this end various tools which can be employed for verifying text, images and videos are presented and briefly discussed. The tools are organized in various categories but obviously many of the tools can also be included in other categories of verification processes.

<u>Effective Web Searching</u>

Although today journalists have many sources of information (namely, news agencies, databases, reliable colleagues, etc) in many cases they have to use general web searching in order to find content that is relevant to their stories. As expected the main search engine that journalist should employ is Google, although other search engines and specifically Microsoft Bing should also be

considered. But they should utilized advanced search techniques. This can be facilitated by using advanced search syntax or by using the advanced search page. From the two previous search solutions the use of advanced search syntax is more convenient since it can be implemented from the home page of Google search engine. The syntax may include various parameters but the most prominent, that allow journalists to focus their searches, are :

- site - which narrows the search in one site (i.e. www.ejta.eu) or limit the results to a particular domain (i.e. .eu or .gr).
- filetype - which allows users to search only for items in a specific format. Useful content usually can be found in pdf format.

Although the use of parameters is very fast, in the case that journalists want to conduct a search with many different parameters and combination of keywords, the advanced search page is a very good method since it can support very complex searches.

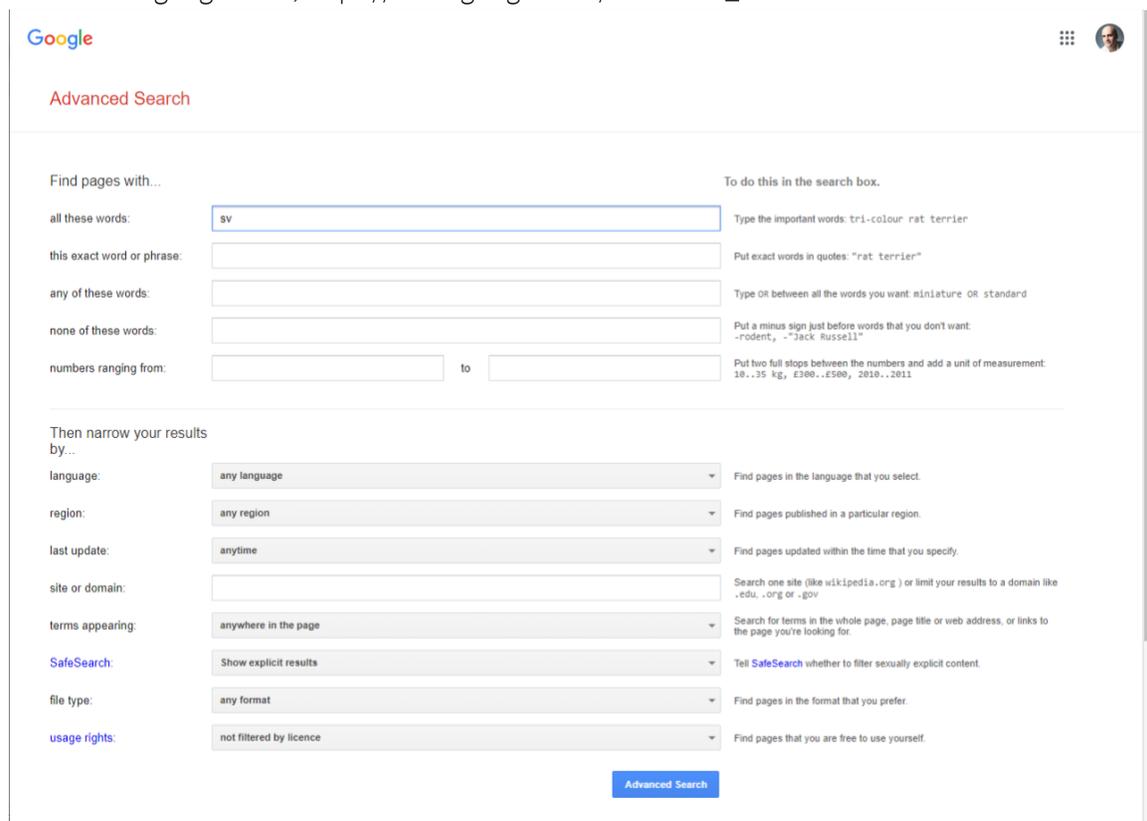Tools: www.google.com, https://www.google.com/advanced_search

Figure 1: Google Advanced Search (https://www.google.com/advanced_search).

Verifying images

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Co-funded by the
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of the European Union

Images are multimedia content that are usually employed in news articles. A significant amount of images are currently available on the web and thus it is quite common for a web article to employ irrelevant images that refer to the same subject. Therefor journalists must check the validity of an image that they have found on the web before including it in their articles (with the necessary reference to the source). In order to ensure that a certain image is recent journalists employ a reverse image search operation. This can be accomplished with the help of Google Reverse Image search or with TinEye which is another online service that provide such services. Google indexes significantly more images that TinEye but in many cases the results it displays are not correct and thus, journalists should check carefully its results.
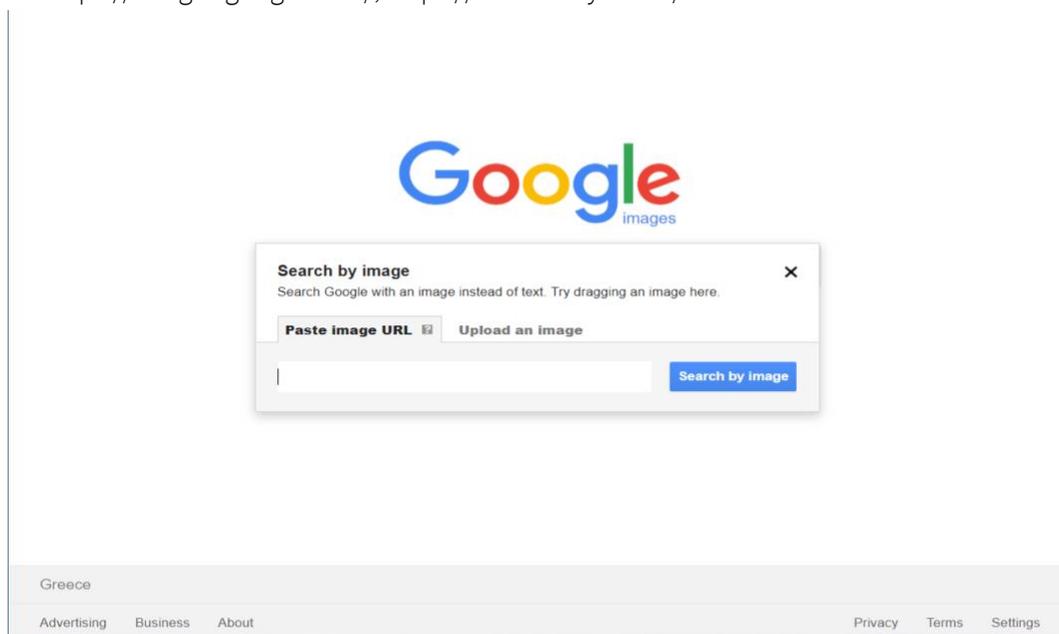
Tools: https://images.google.com/, https://www.tineye.com/.

Figure 2: Google Reverse Image Search (https://images.google.com/).
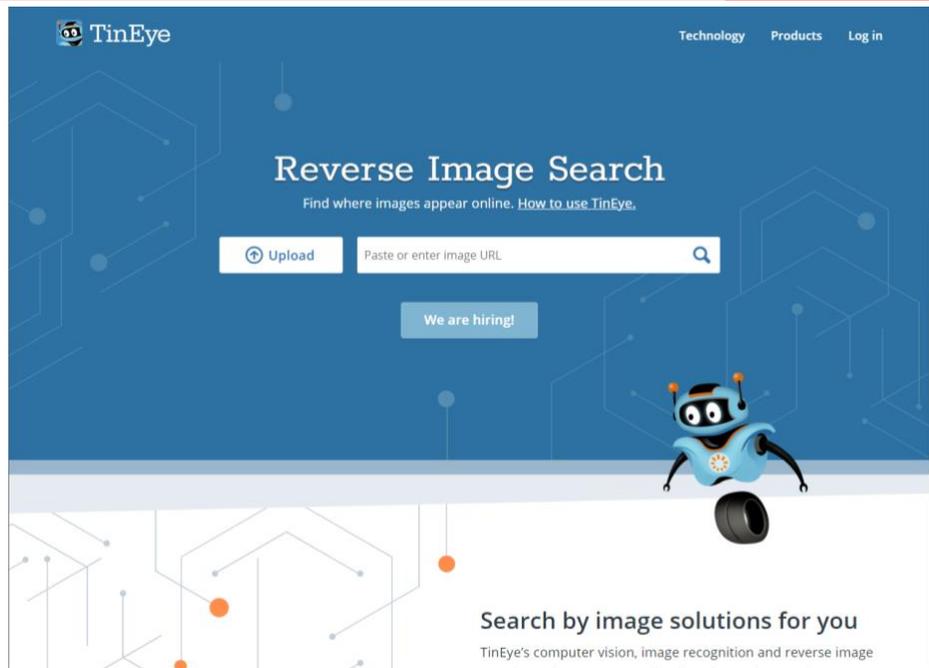
Figure 3: Reverse Image Search with TinEye (https://www.tineye.com).

One other interesting tool is the Image Verification Assistant (https://mever.iti.gr/forensics/). It was developed within previous EU projects (InVID, Reveal) and is maintained and extended in WeVerify. The tool consists of a set of image forensics algorithms that try to find traces of forgeries in the query images. Five image forensics algorithms were implemented, from which two are based on deep learning approaches. Finally, a fusion method is developed in order to combine the diverse outputs from the forensics algorithms of the tool.

Verifying places

One of the most difficult processes in verification is to confirm that a specific image or video is from a specific geographical location. Obviously the most preferred method would be to visit the specific location, but this is rarely possible due to financial and also time restrictions. In this case journalists can rely on online services like Google maps (and specifically Google Street View) or Bing Maps which give them the ability to visit specific geographical location remotely. Of course, bear in mind that such services do not cover all geographical locations.
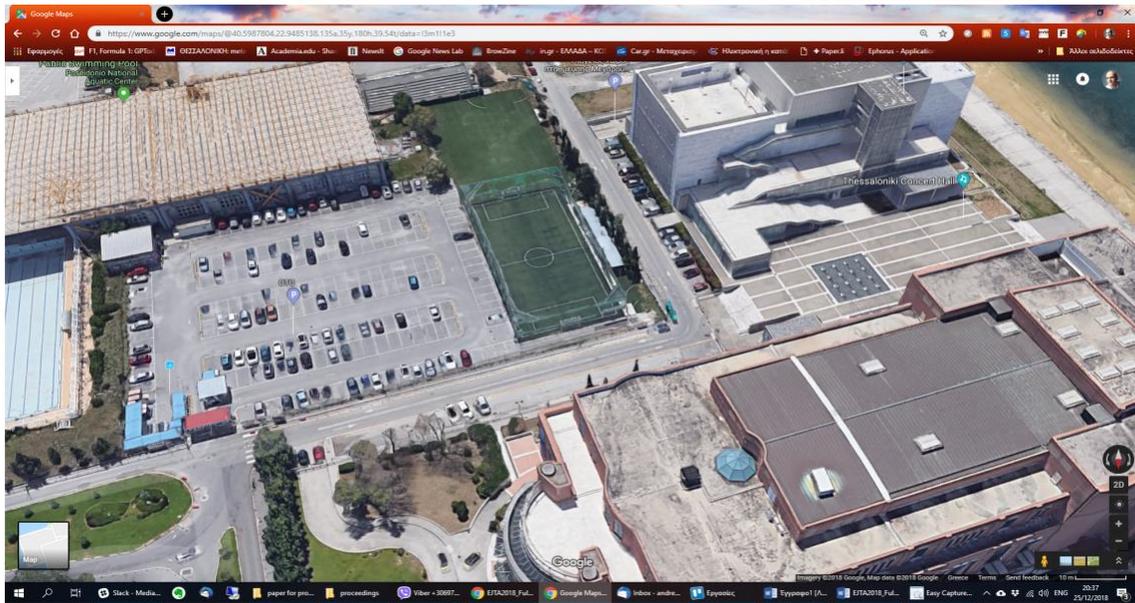
Tools: http://www.google.com/maps, https://www.bing.com/maps.

Figure 4: Verify a location with Google maps (http://www.google.com/maps).

Verifying time

Equally difficult is considered to be to determine if a specific multimedia content is captured at a specific time. In order to succeed in this task journalists may try to indirectly verify the time. Various methods can be employed but the most prominent include:

- Verification based on weather conditions - which includes searching for the weather conditions in particular time and location with the help of the Wolfram Alpha engine. It is a computational answer engine that responds to questions using structured and curated data from its knowledge base.

- Verification based on the sun's position - in this case the user can check if the light of the sun in the multimedia content is at the correct position (of course this can be used only when the weather is sunny). This can be accomplished with the help of SunCalc, which displays the sun movements and sunlight phases during a given day at a given location.

Tools: https://www.wolframalpha.com/, http://suncalc.net,
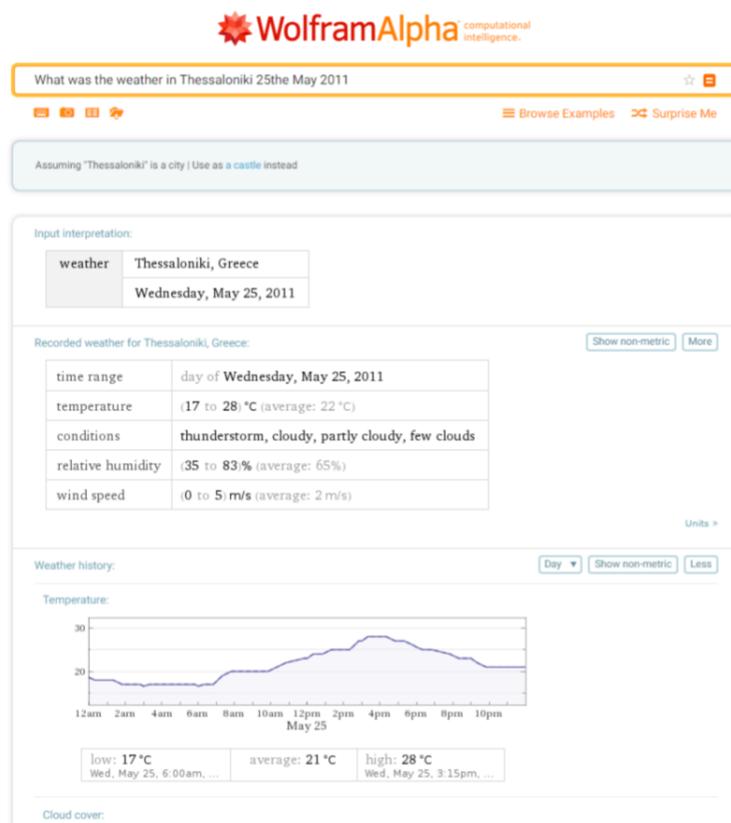
Figure 5: Verifying weather conditions with Wolfram Alpha (https://www.wolframalpha.com).

One other method that can be employed for verifying the place and the time that an image was captured is the inspection of the EXIF (Exchangeable image file format) data. EXIF data includes many information among which the date and time of the capture, but also the model of the device and geographical location information based on the GPS of the device that captured the image. The display of the EXIF metadata can be facilitated by downloading and installing a stand alone application or by uploading the image file to an online EXIF reader. This method requires the acquisition of the original multimedia file since the publication of the multimedia file to social media platforms usually automatically erases the EXIF data.
Tools: http://exif.regex.info/exif.cgi, http://exif-viewer.com/.

Verifying Video

One of the most difficult tasks in verification is the case of video. As in the case of images, today there is an abundance of videos on the WWW that any user can download, edit and upload again

as they were their own. Thus, the whole process of video verification is quite complicated and can not be achieved without technological help. Today there are various tools or initiatives that attempt to tackle the problem of video verification. One of the most complete tool is considered to be the WeVerify Verification Plugin. It is provided by the WEVERIFY European Project to help journalists to save time and be more efficient in their fact-checking and debunking tasks on social networks with emphasis on verifying multimedia content. The plugin is available for Google Chrome and Mozilla Firefox. It includes a variety of tools, which allow journalists i) to acquire contextual information on Facebook and YouTube videos, ii) to perform reverse image search on Google, Baidu or Yandex search engines, iii) to fragment videos from various platforms (Facebook, Instagram, YouTube, Twitter, Daily Motion) into keyframes, iv) to enhance and explore keyframes and images through a magnifying lens, v) to query Twitter more efficiently through time intervals and many other filters, vi) to read video and image metadata, vii) to check the video copyrights, viii) and to apply forensic filters on still images.

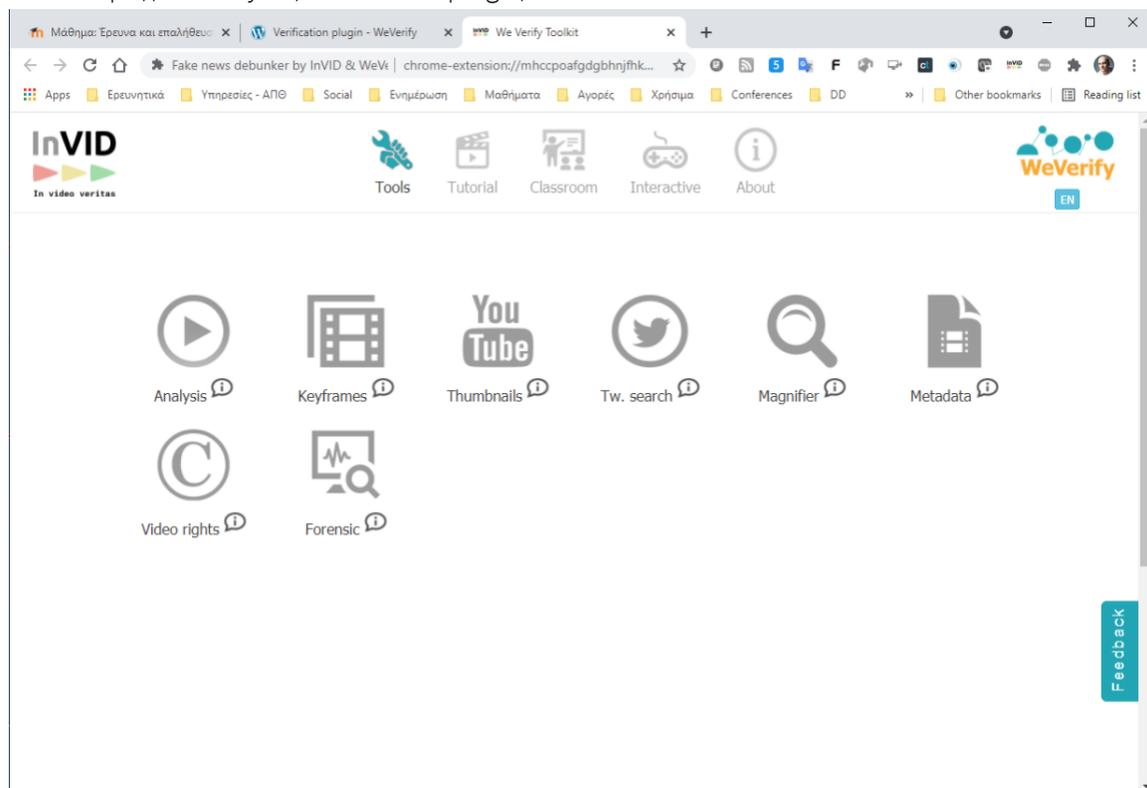Tool: https://weverify.eu/verification-plugin/.

Figure 5: WeVerify Verification Plugin (https://weverify.eu/verification-plugin/).

Verification method for multimedia content

Although the previously mentioned tools for verifying multimedia content can be proven to be very helpful, that does not mean that traditional verifying methods are not applicable when verifying images and videos. On the contrary all the previously mentioned tools should be used in conjunction with traditional verification methods. The NewsCheck extension, developed by First Draft News initiative, allows users to investigate the authenticity of an online image or video by running through a standardized checklist. The extension supports a four-step process that examine: i) Whether the content is original, ii) Who created the content, iii) Where the content was created, iv) When the content was created. For each of the questions, a series of color-coded prompts are provided. The results of the checks (which are provided in the form of percentage) are then viewed as a set of results. The tool is designed so that users can embed the image or video in a website and place the results of the checklist alongside allowing other users to understand how trustworthy the piece of content is by seeing the verification checks clearly outlined.
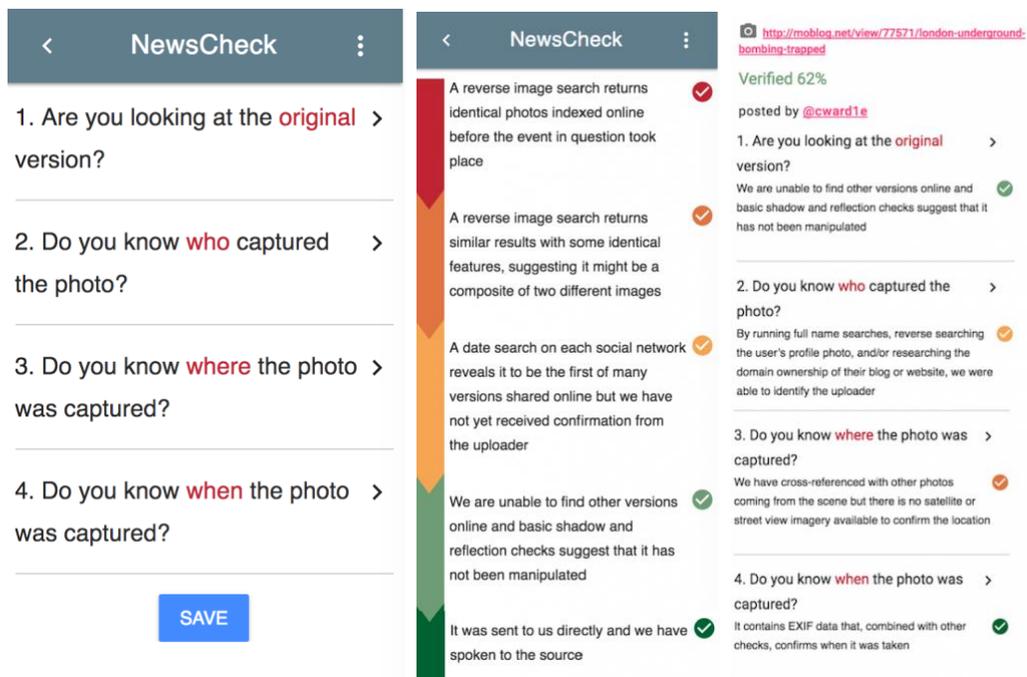Tool: https://firstdraftnews.org/launching-new-chrome-extension-newscheck/.

Figure 5: The NewsCheck process (depicted from https://firstdraftnews.org/launching-new-chrome-extension-newscheck/).

Social account analysis

In nowadays social media play an important role in journalism. They are an important information source for journalists but they also include rumors and invalid information. Shortly after the appearance of a news story on social media it is very important for the journalist to be able to validate its truthfulness. This among other includes a detail check of the social history of the account that published the news story. This process is very time consuming and not easy to implement. Thus, special tools that performs social account analysis are now available, among which TruthNest. ThuthNest that was developed by ATC (Athens Technology Center - http://www.atc.gr), offer very unique characteristics. It offers a holistic analysis including a plethora of social dimensions, automatic controls and metrics in order to enable media organizations and journalists to: i) identify early signals of events, ii) verify authenticity of information posted, iii) locate possible credible sources of information, iv) monitor the social ecosystem effectively by creating smart, semantically meaningful, context-aware, dynamic, cross-network streams.
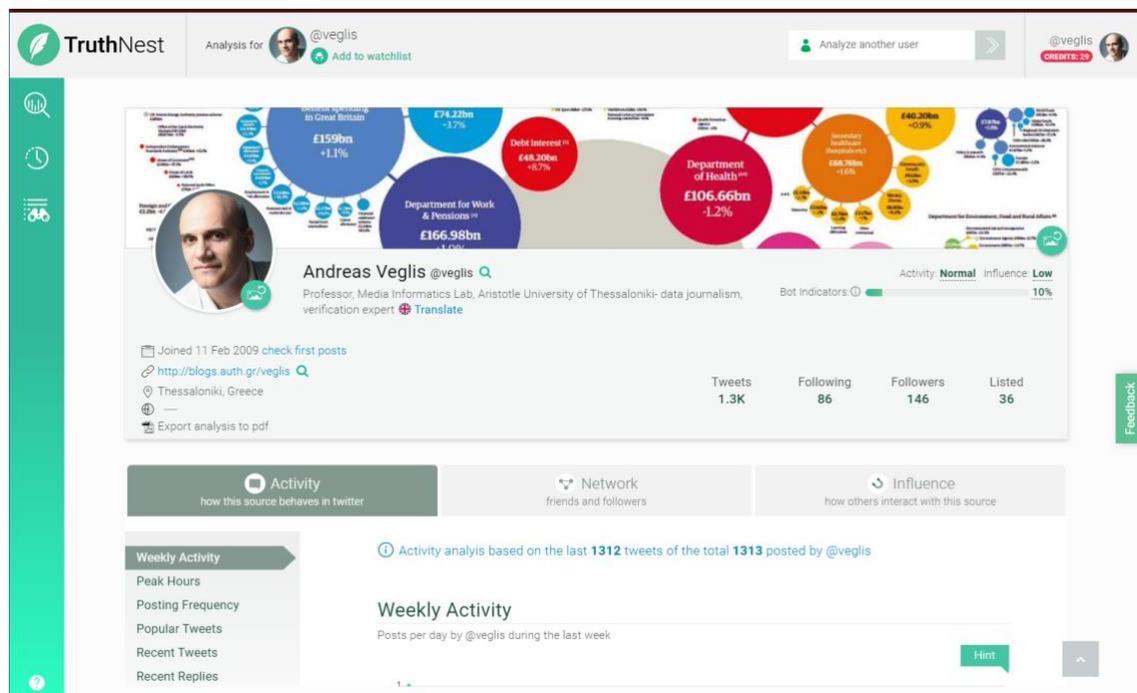Tool: http://app.truthnest.com/, http://www.truthnest.com/.

Figure 6: Social analysis with TruthNest (http://app.truthnest.com/).

Truthnest can be used by any user by providing comprehensible measurable data, no matter how technologically advanced they are and in whatever business they belong to (journalist, freelance researcher, marketing professional or casual user). A variety of elements are provided that allow you to sketch a complete user profile based on the activity, network, and influence of an account. Using the parameters of the application, troll and spam accounts are identified, while the profiles are determined by the probability (score probability) of being automated systems and machines (bots). The investigation is based on the use of media, hashtags and automated systems, along with activity analysis. An overview of each account is provided, with the display of measurable data related to the messages such as density, popularity and recipients, the most important followers, the level of influence and its tactics.

In a special part of the application, the possibilities for journalists are presented. They are about evaluating the reliability of Twitter content, a variety of metrics and tips that support the verification process, sources, linked accounts, social network structure, timeline activity, and influence. The application provides real-time monitoring of information and dynamic analysis for selected accounts. It is also possible to export all the resolutions in PDF format.

Each account collects archival data obtained from publicly available information. Posts of tweets and re-tweets made by the accounts are listed, while in the advanced version of the application it is possible to limit the time window under consideration, as well as focus on follower activities.

Conceptually, the examination concerns:

1. Content analysis of publications - posts.
2. Thematic analysis of the content
3. The analysis of social network in a wide and narrow context.
4. The export of statistics concerning the use of media and automation technologies.
5. Semantic analysis, with examination and presentation of expressions, topics and identities, the monitoring of the language used by the account in the writing of the publication, its texts and comments.
6. Analysis of the time characteristics concerning the account, its activity and its interaction.

The application performs the analysis of the account by developing three fields which concern:

a) Activity
b) Network
c) Activity

In all fields remains the title the ability to analyze the profile images of the account and the key indicator for its characterization as a bot - automated digital account function, an element that refers to a most likely non-personal use (automated, mechanical or group operation).

The application displays the results of the analysis by presenting an introductory card with the account frame, the user profile icon and the introductory note, as he has selected it. The initial information regarding the start date, the headquarters, links to personal websites and other networks, are the same as those found on the physical Twitter profile. There is information about the accounts that follow or are followed, about the number of tweets that have been published and the number of categories and groups in which the user belongs. Our application also has in the first use the original tweets of the account. On the left there is a vertical box with three options related to the application as a whole, personalized to the researcher regarding his research so far, platform settings and presentation of graphs of previous searches.

Below the image analysis field is the analysis of the account with the corresponding labels to characterize the activity and its degree of authenticity (as at least it is determined by the data of its interactions), as a brief information note about its identity, such as this evaluated by the application. The evaluation itself outlines the character of the account and the researcher is called upon to compare the individual data to compare and draw safe initial conclusions.

The application provides the ability to analyze the profile picture and the frame of the account, as well as its origin. By using an appropriate icon in the lower right area of the image through three applications (Tin eye, google) results are obtained for the origin and frequency of use of the image, if it is primary and useful data for the time of its appearance in the digital environment. The resolution of this image in combination with the character that the user has formed can be indicative or identical to the reasoning of its use, while there may be no obvious connection. In accounts active in the field of information and journalism, this differentiation is certainly smaller and images are provided that ensure the identity of the account. The results of image processing are sufficient in the first year and are orienting - they provide the directions for further thorough analysis, when it is possible to communicate in time for any clarifications with the producer or creator.

The analysis of the activity includes 15 sub-sections which in turn are examined and are:

1. Weekly activity
2. Peak hours
3. Posting Frequency
4. Popular Tweets
5. Recent Tweets
6. Recent Replies
7. Hashtags
8. Mentioned Users
9. Retweeted Users

10. Tweet Types
11. Tweets' Content
12. Mentioned Websites
13. Languages
14. Posting Tools
15. Posted Images

The Network of the users includes the following parameters:

1. Network size
2. Updated Frequency
3. Important Followers
4. Follower's Activity

The field of influence of the source, is the third basic aspect - field of examination of a user and is analyzed in the following categories:

1. Lists Memberships
2. Average Likes/Retweets
3. Recent Likes/Retweets
4. Mentions Received
5. Replies Received
6. Popular Referrers
7. Frequent Referrers
8. Related Profiles