ONE HEALTH ATLAS

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Using PADI-web to monitor animal and plant diseases in digital media sources

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New and re-emerging disease outbreaks have become increasingly common in recent decades, driven by climate change, anthropization of natural environments and contact with wildlife due to human mobility and animal trade activities. A global approach to monitoring public, animal and plant health is needed to address this issue. Monitoring the news across digital media can provide relevant information on disease outbreaks and make disease surveillance and pandemic prepared-ness more comprehensive. However, manually extracting relevant information from unofficial digital news sources is time-consuming.

The Platform for Automated Extraction of Disease Information from the web (PADI-web[1]) was designed to make this task easier. PADI-web has been used since 2016 as part of the epidemic intelligence activities of the French National Animal Surveillance Health Plateform. This tool crawls Google news related to pub-lic, animal and plant health, including zoonotic diseases. It offers a multilingual approach, automated information classification and extraction modules, a notification tool con-figurable according to end-user needs, and maps for animal and plant health monitoring. The PADI-web pipeline involves five steps (Figure 1), and the algorithms associated with steps 3 and 4 use text mining and artificial intelligence approaches that are fine-tuned for animal and plant diseases. PADI-web for ani-mal disease surveillance focuses specifically on zoonotic diseases such as avian influenza, which enables cases detected in mammalian species to be investigated (Figure 2). Human vector-borne diseases (e.g. chikungunya and dengue) have also been added to a new version of PADI-web, and the version for plant disease surveillance focuses on several EU quarantine pests, such as *Xylella fastidiosa* (Figure 3). The platform will be enhanced to enable syndromic surveillance for the early detection of emerg-ing epidemics and new host plants.

PADI-web has been integrated into inter-national projects, including the Monitoring Outbreaks for Disease Surveillance in a data science context (MOOD) project (H2020 2020–2024). The MOOD project seeks to develop innovative tools and services for the early detection, assessment, and monitoring of current and future infectious disease threats in the context of continuous global, environmen-tal and climatic change. As part of the MOOD project, different case studies have focused on widespread diseases (e.g. avian influenza and West Nile) as well as neglected diseases (e.g. leptospirosis).

[1] https://www.padi-web-one-health.org

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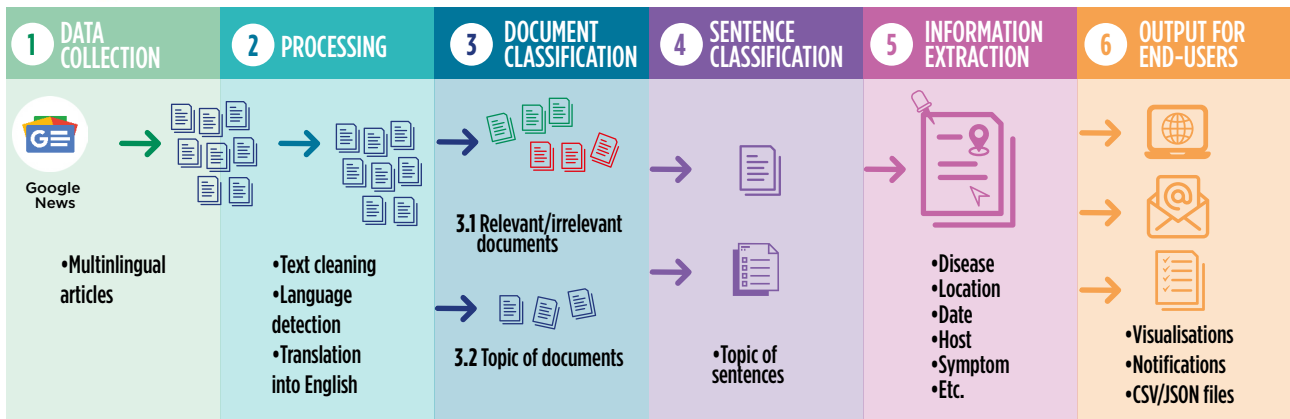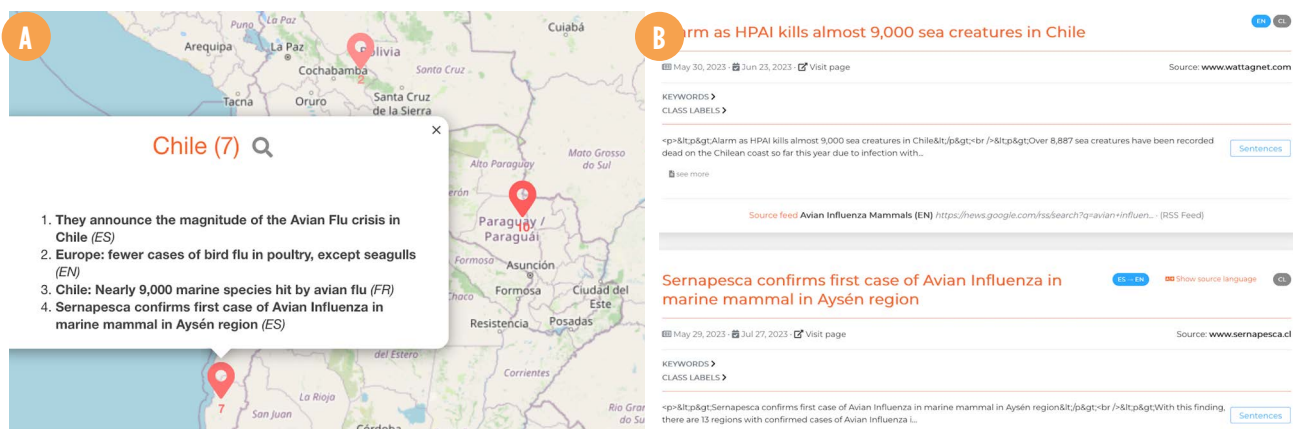
Figure 1. PADI-web pipeline.

Figure 2. Avian influenza (animal health) (01/05/2023–01/07/2023). (A) List of texts automatically classified as outbreak declarations focusing on Chile. (B) Examples of texts collected in English, French and Spanish that are formatted with PADI-web. Note that the first events of detection of avian influenza on mammals were identified in Chile with PADI-web on 25 May 2023 vs. 7 June 2023 with the World Animal Health Information System (WAHIS).
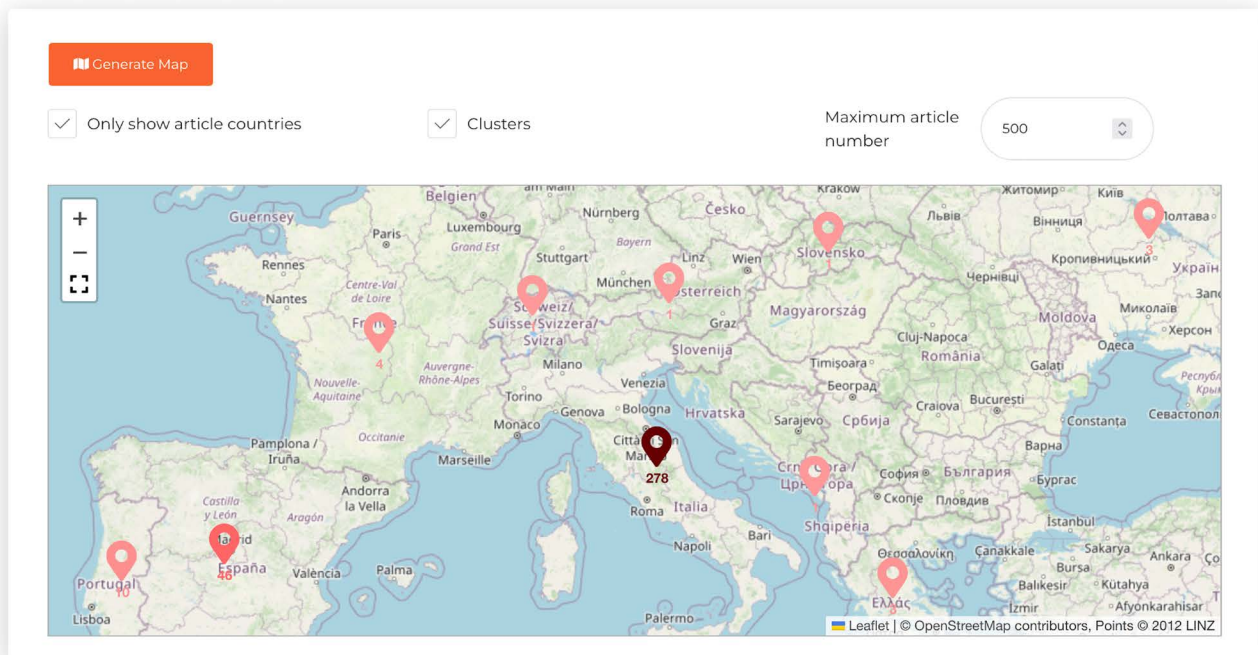

Figure 3. *Xylella fastidiosa* (plant health) (01/03/2024–01/09/2024). Geolocation of news collected and normalized with PADI-web and automatically classified as relevant using artificial intelligence approaches – 363 texts.