

# Cross-lingual Evidence Improves Monolingual Fake News Detection

Daryna Dementieva and Alexander Panchenko

Skolkovo Institute of Science and Technology, Moscow, Russia  
{daryna.dementieva, a.panchenko}@skoltech.ru

## Abstract

Misleading information spreads on the Internet at an incredible speed, which can lead to irreparable consequences in some cases. Therefore, it is becoming essential to develop fake news detection technologies. While substantial work has been done in this direction, one of the limitations of the current approaches is that these models are focused only on one language and do not use multilingual information. In this work, we propose a new technique based on cross-lingual evidence (CE) that can be used for fake news detection and improve existing approaches. The hypothesis of the usage of cross-lingual evidence as a feature for fake news detection is confirmed, firstly, by manual experiment based on a set of known true and fake news. Besides, we compared our fake news classification system based on the proposed feature with several strong baselines on two multi-domain datasets of general-topic news and one newly fake COVID-19 news dataset showing that combining cross-lingual evidence with strong baselines such as RoBERTa yields significant improvements in fake news detection.

## 1 Introduction

After the manipulation of opinions on Facebook during the 2016 U.S. election (Allcott and Gentzkow, 2017), the interest in the topic of fake news has increased substantially. Unfortunately, the distribution of fakes leads not only to misinformation of readers but also to more severe consequences such as shooting in Washington Pizzeria (Kang and Goldman, 2016) that was caused by the spreading of fake news about Hillary Clinton leading a child sex trafficking. Also, due to the global pandemic in 2020, there was a simultaneous emergence of infodemic (Alam et al., 2020) that could lead to an even worse epidemiological situation and harm people’s health dramatically.

As a result, fake news received tremendous public attention, as well as drawn increasing interest from the academic community. Multiple supervised fake news detection models were proposed based on linguistic features (Pérez-Rosas et al., 2018; Patwa et al., 2020); deep learning models (Barrón-Cedeño et al., 2019; Glazkova et al., 2020; Kaliyar et al., 2021); or signals from social networks (Nguyen et al., 2020; Cui et al., 2019). One of the directions of the supervised approaches is to use additional information from the Web (Popat et al., 2017; Karadzhov et al., 2017; Ghanem et al., 2018). However, in these works only monolingual signals were taken into account.

In our work, we assume that viral spreading of (fake) information may naturally hit the “language barrier” and cross-checking of facts across media in various languages (supposed to be strongly independent) could yield an additional signal. We aim to close this gap and perform an exploration of cross-lingual Web features to fake news detection.

The contribution of our work is a new **cross-lingual evidence** feature for fake news detection based on multilingual news verification.<sup>1</sup> We conduct a manual experiment based on cross-lingual dataset markup to evaluate if the user can use such a feature for misinformation identification. After that, we implement the proposed feature showing that adding cross-lingual evidence consistently improves the results of strong baselines including large pre-trained transformers. We release publicly all code and data.<sup>2</sup>

## 2 Related Work

Firstly, several datasets have been collected for different sub-tasks of fake news detection pipeline:

<sup>1</sup>This work is a substantially extended version of the preliminary experiment by Dementieva and Panchenko (2020).

<sup>2</sup><https://github.com/skoltech-nlp/multilingual-fake-news>

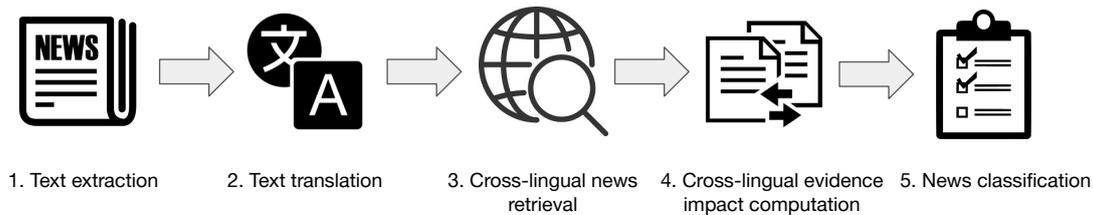


Figure 1 – Overview of our approach: checking for fake news based on cross-lingual evidence (CE).

dataset from *The Fake News Challenge*<sup>3</sup> for stance detection; *LIAR* (Wang, 2017), *FakeNewsNet* (Shu et al., 2018), *FakeNewsDatasets* (Pérez-Rosas et al., 2018), and *NELA-GT-2018* (Norregaard et al., 2019) for fake news classification tasks; *FEVER* (Thorne et al., 2018) for fact checking tasks. Responding to current events in 2020, COVID-19 fake news classification datasets *COVID-19 Fake News* (Patwa et al., 2020), *ReCOVeRy* (Zhou et al., 2020) have been already created.

Several supervised models were previously explored. Some of the works focused on exploring internal features of news. In (Pérez-Rosas et al., 2018; Patwa et al., 2020) different linguistic features extracted from news texts were used. In (Ghanem et al., 2020) the perspective of the usage of emotional signals extracted from the news text for detecting fakes was shown. In addition to internal features, a set of external features can add more confidence in fake news detection model decision reasoning. For instance, user interaction signals were explored in (Nguyen et al., 2020; Cui et al., 2019). Another quite strong signal can be additional information extracted from the Web. In (Popat et al., 2017; Karadzhov et al., 2017; Ghanem et al., 2018; Li and Zhou, 2020) the authors referred to the Web search (Google or Bing) to collect relevant articles and use such scraped information as an external feature to build a fake news classifier.

Seeking information via some search engine to find evidence is a quite natural feature motivated by real users’ behaviour. Several studies tried to figure out how users authenticate the information from the Web. Jr. et al. (2018) showed that individuals rely on both their judgment of the source and the message, and when this does not adequately provide a definitive answer, they turn to external resources to authenticate news. The intentional and institutional reaction was seeking confirmation from institutional sources (some respondents answered simply “Google”). Moreover, participants that received messages across different media plat-

forms (Zhao, 2019) and different perspectives of the information (Geeng et al., 2020) showed greater awareness about news evidence. Consequently, the information from the external search is an important feature for news authenticity evaluation and evidence seeking. While the idea of multilingualism was already explored for hate speech (Aluru et al., 2020) and rumors (Wen et al., 2018) detection, however, previous works did not fully use multilingual information of fake news detection. In our study, we explore fake news spread on the Web for different languages and extend evidence retrieval to cross-lingual news verification.

### 3 Detection of Fake News using Cross-lingual Evidence (CE)

Our approach is based on the following **hypothesis**: if the news is *true*, then it will be widespread in different languages and also across media with different biases, and the facts mentioned should be identical. On the other hand, if it is *fake* news, it will receive a lesser response in the foreign press than true news. The step-by-step process, schematically represented in Figure 1, is as follows:

**Step 1. Text extraction:** As a new article arrives, title and content are extracted from it.

**Step 2. Text translation:** The title is translated into target languages and new search requests are generated.

**Step 3. Cross-lingual news retrieval:** Search is executed based on the translated titles in multiple languages.

**Step 4. Cross-lingual evidence impact computation** Top-N articles from search results are used to evaluate the authenticity of the initial news. The information described in the news is compared with the information in the articles from the search result. The number of articles that confirms or disproves the original news is estimated.

**Step 5. News classification:** Based on the information from the previous step, the decision is made about the authenticity of the news. If the majority of results support the original news, then it is more

<sup>3</sup><http://www.fakenewschallenge.org>

likely to be true; if there are contradictions – it is a signal to consider the news as fake.

To confirm the hypothesis that cross-lingual evidence can be used for fake news detection we conducted two experiments. The first one (Section 4) is a manual small-scale study confirming the hypothesis that a person can distinguish fake news based on such cross-lingual evidence. The second one (Section 5) is an automated fake news detection system tested on several fake news datasets: we implemented our cross-lingual evidence feature and compared it with several baselines achieving SOTA on all datasets.

## 4 Experiment 1: Manual Verification

First, we conducted a manual experiment on a small dataset to test the hypothesis in “ideal conditions”.

### 4.1 Dataset

For fake news examples, we used the list of top 50 fake news from 2018 according to BuzzFeed.<sup>4</sup> For true news, we used NELA-GT-2018 dataset (Norregaard et al., 2019). We manually selected 10 fake and true news and manually executed all steps of our approach (Section 3) on this dataset. This dataset featuring 20 news is provided in Table 2 in the Appendix A: the dataset is combined by news from several fields – celebrities, science, politics, culture, and world.

### 4.2 Experimental Setup

We precalculated **Step 2** and **Step 3** for annotators convenience and reproducibility. We generated cross-lingual requests in five languages – English, French, German, Spanish, and Russian. For translation from English, Google Translation service was used. As all news are of 2018, the time range of every search was limited only by this year. From search results, we used the first page of the search which consisted of 10 news. As a result, for 20 news for each of languages we got 1000 pairs of “original news  $\leftrightarrow$  scraped news” to markup.

We asked 6 annotators to take part in the experiment: manually conduct **Step 4**: cross-lingual evidence impact computation. For each news, we provide information about its title, content, and link of the source. Every annotator got 10 randomly selected news, as a result, we got each news cross-checked by 3 annotators. All non-English news

<sup>4</sup><https://github.com/BuzzFeedNews/2018-12-fake-news-top-50>

were translated into English. For each pair “original news  $\leftrightarrow$  scraped news” the annotator provided one of three answers: 1) **Support**: the information in the scraped news supports the original news; 2) **Refute**: the information is opposite or differ from the original news or there is an explicit refutation; 3) **Not enough info**: the information is not relevant or not sufficient to support/refute the original news. Finally, at the end of the annotation of a sample, the annotator was asked to conduct **Step 5** of the pipeline and classify the news as fake or true.

The used interface for manual markup is presented in Appendix A Figure 3.



Figure 2 – The results of manual annotation: the distribution of annotators answers for fake (a) and legit (b) news.

### 4.3 Discussion of Results

Based on the collected annotations, for each news we chose the final label based on the majority voted. We estimated confidence in the annotators’ agreement with Krippendorff’s alpha ( $\alpha = 0.83$ ). After that, we calculated the distribution of each type of annotators’ answers for the top 10 search results by language for fake and true news separately. The results are provided in Figure 2.

As we can see, the distribution of labels for true news significantly differs from the distribution for fake ones: the number of supporting articles is

	FakeNewsAMT			Celebrity			ReCOVery		
	Pre.	Rec.	F1	Pre.	Rec.	F1	Pre.	Rec.	F1
TextCNN	0.276	0.250	0.260	0.641	0.703	0.664	0.733	0.913	0.805
LSTM	0.614	0.614	0.614	0.745	0.740	0.740	0.800	0.803	0.793
ME Sim + ME AlexaRank	0.539	0.593	0.592	0.552	0.550	0.550	0.794	0.798	0.793
CE AlexaRank	0.541	0.541	0.541	0.605	0.605	0.605	0.768	0.773	0.765
CE Sim + CE AlexaRank	0.872	0.864	0.864	0.631	0.620	0.619	0.829	0.829	0.829
BERT	0.586	0.586	0.586	0.800	0.800	0.800	0.868	0.868	0.866
BERT + CE AlexaRank	0.541	0.541	0.541	0.810	0.728	0.915	0.768	0.773	0.765
BERT + CE Sim + CE AlexaRank	<b>0.884</b>	<b>0.885</b>	<b>0.894</b>	<b>0.982</b>	<b>0.982</b>	<b>0.982</b>	<b>0.870</b>	<b>0.863</b>	<b>0.884</b>
RoBERTa	0.895	0.548	0.656	0.856	0.690	0.731	0.986	0.936	0.956
RoBERTa + CE AlexaRank	0.930	0.820	0.872	0.799	<b>0.890</b>	0.822	0.949	<b>0.986</b>	0.966
RoBERTa + CE Sim + CE AlexaRank	<b>0.973</b>	<b>0.938</b>	<b>0.953</b>	<b>0.952</b>	0.784	<b>0.856</b>	<b>0.992</b>	0.960	<b>0.975</b>
Ngrams	0.573	0.572	0.572	0.730	0.730	0.730	0.878	0.879	0.877
Ngrams + CE AlexaRank	0.655	0.655	0.655	0.740	0.740	0.740	0.891	0.891	0.891
Ngrams + CE Sim + CE AlexaRank	<b>0.864</b>	<b>0.854</b>	<b>0.853</b>	<b>0.789</b>	<b>0.790</b>	<b>0.789</b>	<b>0.931</b>	<b>0.932</b>	<b>0.931</b>
Punctuation	0.239	0.489	0.321	0.211	0.460	0.289	0.433	0.658	0.522
Punctuation + CE AlexaRank	0.741	0.741	0.741	0.605	0.600	0.600	0.668	0.673	0.665
Punctuation + CE Sim + CE AlexaRank	<b>0.872</b>	<b>0.864</b>	<b>0.864</b>	<b>0.631</b>	<b>0.620</b>	<b>0.619</b>	<b>0.829</b>	<b>0.829</b>	<b>0.829</b>
LIWC	0.597	0.593	0.592	0.630	0.610	0.605	0.768	0.771	0.756
LIWC + CE AlexaRank	0.646	0.645	0.644	0.712	0.700	0.690	0.846	0.846	0.842
LIWC + CE Sim + CE AlexaRank	<b>0.894</b>	<b>0.885</b>	<b>0.884</b>	<b>0.692</b>	<b>0.680</b>	<b>0.679</b>	<b>0.894</b>	<b>0.894</b>	<b>0.894</b>
Readability	0.729	0.729	0.729	0.478	0.470	0.468	0.732	0.741	0.724
Readability + CE AlexaRank	0.760	0.760	0.760	0.592	0.590	0.590	0.796	0.798	0.790
Readability + CE Sim + CE AlexaRank	<b>0.928</b>	<b>0.927</b>	<b>0.927</b>	<b>0.674</b>	<b>0.670</b>	<b>0.670</b>	<b>0.828</b>	<b>0.829</b>	<b>0.828</b>
Syntax	0.626	0.625	0.624	0.639	0.630	0.629	0.812	0.809	0.797
Syntax + CE AlexaRank	0.677	0.677	0.677	0.721	0.720	0.720	0.844	0.841	0.834
Syntax + CE Sim + CE AlexaRank	<b>0.902</b>	<b>0.895</b>	<b>0.895</b>	<b>0.754</b>	<b>0.750</b>	<b>0.750</b>	<b>0.886</b>	<b>0.886</b>	<b>0.886</b>
All linguistic	0.739	0.739	0.739	0.750	0.750	0.750	0.875	0.874	0.870
All linguistic + CE AlexaRank	0.641	0.641	0.641	0.605	0.600	0.600	0.868	0.868	0.868
All linguistic + CE Sim + CE AlexaRank	<b>0.940</b>	<b>0.937</b>	<b>0.937</b>	<b>0.801</b>	<b>0.800</b>	<b>0.800</b>	<b>0.916</b>	<b>0.917</b>	<b>0.916</b>

Table 1 – Results: adding our Cross-lingual Evidence (CE) improves various baseline systems and yields state-of-the-art results. The proposed feature is used in two parts: (i) content similarity score based on embeddings distance (Sim); (ii) AlexaRank score of the scraped news source (AlexaRank). ME stands for Monolingual Evidence. The statistical significance of the baselines improvements was tested with paired t-test over 5-fold cross-validation.

enough for almost every language. At the same time, for fake news we got more refuting signals than supporting for the English language and little or no evidence or relevant information dissemination for other languages. The average accuracy of annotators classification is 0.95. Thus, a person can distinguish fake based on cross-lingual evidence.

## 5 Experiment 2: Automatic Verification

We implemented cross-lingual evidence (CE) feature, as described below. We tested its performance on fake news detection on three multi-domain datasets comparing it with strong baselines.

### 5.1 Cross-lingual Evidence (CE) Feature

**Cross-lingual evidence retrieval** As in manual setup, for translation and search we used Google services via Python APIs. In our setup for the automated feature we focused as well on five languages:

English, French, German, Spanish, and Russian. We extracted only the first page of the search result that gave us 10 articles for each language.

**Cross-lingual text similarity** For unsupervised cross-lingual relevance computation between original news and scraped one, we chose cosine similarity between sentence embeddings. To get sentence vector representation, we averaged the both title and content sentence’s tokens’ embeddings extracted from M-BERT (Devlin et al., 2019). For the sample news the similarity score is extracted for all 10 pairs “original news ↔ scraped news” for each of 5 languages.

**Source credibility** Also, we took into account the credibility of the source. Following Popat et al. (2016) we used AlexaRank for source assessment.

**Cross-lingual evidence (CE) feature** is constructed of two parts: content similarity score based

on embeddings distance (Sim) and AlexaRank score of the scraped news source (AlexaRank).

## 5.2 Datasets

Firstly, we evaluate the systems on a multi-domain dataset by Pérez-Rosas et al. (2018) which consist of two parts: *FakeNewsAMT* dataset (240 fake and 240 legit articles) and *CelebrityDataset* dataset (250 fake and 250 legit articles). *FakeNewsAMT* dataset consists of news from six topics: sports, business, entertainment, politics, technology, and education. *CelebrityDataset* is dedicated to rumors, hoaxes, and fake reports about famous actors, singers, socialites, and politicians. Secondly, we ran experiments on COVID-19 fake news dataset *ReCOVery* (Zhou et al., 2020). It consists of 2029 (665 fake and 1364 true news). All datasets are originally in English. We used 70%-20%-10% proportion for train-test-validation split.

## 5.3 Baselines

We compare to both linguistic-based fake news detection models and SOTA deep neural networks:

**Linguistic Features:** In (Pérez-Rosas et al., 2018) a baseline fake news classification model was trained based on Ngrams, punctuation, psycholinguistic features extracted with LIWC, readability, syntax, and concatenation of all these set of features. In (Zhou et al., 2020) LIWC features were also used as one of the proposed baselines. We tested these features separately, grouped them all, and in combination with our proposed feature. We experimented with SVM, RandomForest, LogRegression, and LightGBM. The best models based on LightGBM are presented.

**Text-CNN, LSTM:** Following (Zhou et al., 2020), we tested TextCNN and LSTM models on all datasets. We fined-tuned models hyperparameters and report the best ones in the results.

**BERT, RoBERTa:** BERT (Devlin et al., 2019) based models were used for fake news detection by Kaliyar et al. (2021) and specifically for COVID-19 fake news classification (Gundapu and Mamidi, 2021; Glazkova et al., 2020). We used pretrained models and fine-tuned them. The combination with CE feature was done as a concatenation with [CLS] token embedding before Linear layer.

**Monolingual Evidence (ME):** In addition, we compared our feature with the case when only monolingual English evidence was used. The LightGBM classification model was used as well.

## 5.4 Discussion of Results

Table 1 compares results of our model based on cross-lingual evidence (CE) with the baselines on three datasets. The statistical significance of the baselines improvements was tested with paired t-test over 5-fold cross-validation. The CE feature by itself outperforms all baseline for *FakeNewsAMT* and better than some linguistic features for *Celebrity* and *ReCOVery*. The monolingual English evidence (ME) works worse than the cross-lingual one. The usage of only rank feature improves the baselines, but the best scores are achieved by adding full CE features set. The combinations of CE feature with BERT and RoBERTa gains SOTA results for all dataset. At the same time, despite linguistic features did not outperform Transformer-based baselines, the combination of our CE feature and different linguistic features showed competitive results that can be more explainable than the transformer model. Examples how retrieved cross-lingual results can be used to explain the classification results are illustrated in Appendix B.

## 6 Conclusion

We presented an approach for fake news detection based on cross-lingual evidence (CE) which provides a different perspective on the event across languages verified in two experiments. A fake news classification model with CE significantly improves performance over various baselines and compares favorably to SOTA. Besides, the CE is interpretable as a user can check in which and how many languages a piece of given news was found.

A promising direction to explore is to increase the number of languages used for cross-lingual information retrieval. In addition to this, the general distribution of news in the world should be taken into account – for instance, US news tend to be covered in European presses more than European news are covered in the US press. Also, in our work the language of original news was English. The analogous experiments for other original languages of news should be conducted.

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## A Manual Evaluation

News title	URL	Label
Lottery winner arrested for dumping \$200,000 of manure on ex-boss' lawn	<a href="https://worldnewsdailyreport.com/lottery-winner-arrested-for-dumping-200000-of-manure-on-ex-boss-lawn/">https://worldnewsdailyreport.com/lottery-winner-arrested-for-dumping-200000-of-manure-on-ex-boss-lawn/</a>	Fake
Woman sues Samsung for \$1.8M after cell phone gets stuck inside her vagina	<a href="https://worldnewsdailyreport.com/woman-sues-samsung-for-1-8m-after-cell-phone-gets-stuck-inside-her-vagina/comment-page-58/">https://worldnewsdailyreport.com/woman-sues-samsung-for-1-8m-after-cell-phone-gets-stuck-inside-her-vagina/comment-page-58/</a>	Fake
BREAKING: Michael Jordan Resigns From The Board At Nike-Takes 'Air Jordans' With Him	<a href="https://www.newsbreak.com/news/944830700924/breaking-michael-jordan-resigns-from-the-board-at-nike-takes-air-jordans-with-him">https://www.newsbreak.com/news/944830700924/breaking-michael-jordan-resigns-from-the-board-at-nike-takes-air-jordans-with-him</a>	Fake
Donald Trump Ends School Shootings By Banning Schools	<a href="https://www.8shit.net/donald-trump-ends-school-shootings-banning-schools/">https://www.8shit.net/donald-trump-ends-school-shootings-banning-schools/</a>	Fake
New mosquito species discovered that can get you pregnant with a single bite	<a href="https://thereisnews.com/new-mosquito-species-discovered-can-make-you-pregnant/">https://thereisnews.com/new-mosquito-species-discovered-can-make-you-pregnant/</a>	Fake
Obama Announces Bid To Become UN Secretary General	<a href="https://www.pinterest.com/pin/465630048969491948/">https://www.pinterest.com/pin/465630048969491948/</a>	Fake
Lil Tay Rushed To Hospital After Being Beat By Group Of Children At A Playground	<a href="https://www.huzlers.com/lil-tay-rushed-to-hospital-after-being-beat-by-group-of-children-at-a-playground/">https://www.huzlers.com/lil-tay-rushed-to-hospital-after-being-beat-by-group-of-children-at-a-playground/</a>	Fake
Post Malone's Tour Manager Quits Says Post Malone Smells Like Expired Milk And Moldy Cheese	<a href="https://www.huzlers.com/post-malones-tour-manager-quits-says-post-malone-smells-like-expired-milk-and-moldy-cheese/">https://www.huzlers.com/post-malones-tour-manager-quits-says-post-malone-smells-like-expired-milk-and-moldy-cheese/</a>	Fake
Putin: Clinton Illegally Accepted \$400 Million From Russia During Election	<a href="https://newspunch.com/putin-clinton-campaign-400-million-russia/">https://newspunch.com/putin-clinton-campaign-400-million-russia/</a>	Fake
Elon Musk: 99.9% Of Media Is Owned By The 'New World Order'	<a href="https://newspunch.com/elon-musk-media-owned-new-world-order/">https://newspunch.com/elon-musk-media-owned-new-world-order/</a>	Fake
Scientists Develop New Method to Create Stem Cells Without Killing Human Embryos	<a href="https://www.christianpost.com/news/scientists-develop-new-method-to-create-stem-cells-without-killing-human-embryos.html">https://www.christianpost.com/news/scientists-develop-new-method-to-create-stem-cells-without-killing-human-embryos.html</a>	Legit
Luis Palau Diagnosed With Stage 4 Lung Cancer	<a href="https://cnnw.com/luis-palau-diagnosed-with-stage-4-lung-cancer/">https://cnnw.com/luis-palau-diagnosed-with-stage-4-lung-cancer/</a>	Legit
1st black woman nominated to be Marine brigadier general	<a href="https://edition.cnn.com/2018/04/12/politics/marine-corps-brigadier-general-first-black-female/index.html">https://edition.cnn.com/2018/04/12/politics/marine-corps-brigadier-general-first-black-female/index.html</a>	Legit
Disney CEO Bob Iger revealed that he seriously explored running for president	<a href="https://www.businessinsider.com/disney-ceo-bob-iger-says-he-considered-running-for-president-oprah-pushed-2018-4">https://www.businessinsider.com/disney-ceo-bob-iger-says-he-considered-running-for-president-oprah-pushed-2018-4</a>	Legit
Trump Has Canceled Via Twitter His G20 Meeting With Vladimir Putin	<a href="https://www.buzzfeednews.com/article/emilytamkin/trump-g20-putin-russia">https://www.buzzfeednews.com/article/emilytamkin/trump-g20-putin-russia</a>	Legit
US Mexico and Canada sign new USMCA trade deal	<a href="https://www.dw.com/en/us-mexico-canada-sign-usmca-trade-deal/a-51613992">https://www.dw.com/en/us-mexico-canada-sign-usmca-trade-deal/a-51613992</a>	Legit
Afghanistan Women children among 23 killed in US attack UN	<a href="https://www.aljazeera.com/news/2018/11/30/afghanistan-women-children-among-23-killed-in-us-attack-un">https://www.aljazeera.com/news/2018/11/30/afghanistan-women-children-among-23-killed-in-us-attack-un</a>	Legit
UNESCO adds reggae music to global cultural heritage list	<a href="https://www.aljazeera.com/features/2018/11/29/unesco-adds-reggae-music-to-global-cultural-heritage-list">https://www.aljazeera.com/features/2018/11/29/unesco-adds-reggae-music-to-global-cultural-heritage-list</a>	Legit
The Saudi women detained for demanding basic human rights	<a href="https://www.aljazeera.com/news/2018/11/29/the-saudi-women-detained-for-demanding-basic-human-rights/">https://www.aljazeera.com/news/2018/11/29/the-saudi-women-detained-for-demanding-basic-human-rights/</a>	Legit
Georgia ruling party candidate Zurabishvili wins presidential runoff	<a href="https://www.aljazeera.com/news/2018/11/30/ex-envoy-wins-georgia-presidency-vote-to-be-challenged">https://www.aljazeera.com/news/2018/11/30/ex-envoy-wins-georgia-presidency-vote-to-be-challenged</a>	Legit

Table 2 – The manually selected 20 news dataset (10 fake and 10 true news) for manual experiment. Fake news were selected from the top 50 fake news of 2018 according to BuzzFeed. Legit news were selected from NELA-GT-2018 dataset.

Original news:		<a href="https://worldnewsdailyreport.com/lottery-winner-arrested-for-dumping-200000-of-manure-on-ex-boss-lawn/">Lottery winner arrested for dumping \$200,000 of manure on ex-boss' lawn</a>		<a href="https://worldnewsdailyreport.com/lottery-winner-arrested-for-dumping-200000-of-manure-on-ex-boss-lawn/">https://worldnewsdailyreport.com/lottery-winner-arrested-for-dumping-200000-of-manure-on-ex-boss-lawn/</a>		
Title	Title in EN	Link	Text of the content	Content in EN	Do you think it supports original news? Answer: 1 (Support), 0 (Refute), -1 (Not enough info)	Any comments
0 Lottery winner arrested for dumping \$200,000 of manure on ex-boss' lawn	—	<a href="https://worldnewsdailyreport.com/lottery-winner-arrested-for-dumping-200000-of-manure-on-ex-boss-lawn/">https://worldnewsdailyreport.com/lottery-winner-arrested-for-dumping-200000-of-manure-on-ex-boss-lawn/</a>	<p>A man from Illinois was arrested for getting \$224,000 worth of manure dumped on his former employer's property, only two weeks after he won \$125 million at the lottery and quit his job.</p> <p>54-year old Brian Morris, from the small town of Clarendon Hills in Dupage County, bought over 20,000 tons of manure and asked for it to be dumped on his former boss' property, pretending it was his residence.</p>	—	—	
English query		<a href="https://www.google.com/search?cd_min:1/1/2018,cd_max:1/1/2019&amp;q=Lottery+winner+arrested+for+dumping+\$200000+of+manure+on+exboss%E2%84%A2+lawn&amp;num=10">https://www.google.com/search?cd_min:1/1/2018,cd_max:1/1/2019&amp;q=Lottery+winner+arrested+for+dumping+\$200000+of+manure+on+exboss%E2%84%A2+lawn&amp;num=10</a>				
Title	Title in EN	Link	Text of the content	Content in EN	Do you think it supports original news? Answer: 1 (Support), 0 (Refute), -1 (Not enough info)	Any comments
1 PolitiFact - Viral post that lottery winner was arrested for dumping manure on former boss' lawn reeks of falsity	—	<a href="https://www.politifact.com/factchecks/2018/nov/05/worldnewsdailyreportcom/viral-post-lottery-winner-was-arrested-dumping-man/">https://www.politifact.com/factchecks/2018/nov/05/worldnewsdailyreportcom/viral-post-lottery-winner-was-arrested-dumping-man/</a>	<p>A viral blog post claims that a man who won the lottery was arrested "for getting \$224,000 worth of manure dumped on his former employer's property." Published on World News Daily Report, the post claims that a 54-year-old Clarendon Hills, Ill., resident named Brian Morris bought over 20,000 tons of manure after winning \$125 million at Powerball Multi-state lottery two weeks before.</p> <p>This story was flagged as part of Facebook's efforts to combat false news and misinformation on its News Feed. (Read more about our partnership with Facebook.) The post received over 2.3 million interactions and had been shared over 285,000 times, CrowdTangle data show.</p>	—		
<b>Your decision:</b>				Finish!!!		
			Finally, how can you classifier the news: is it fake or true?			

Figure 3 – User interface that was used for annotators answer collection for manual verification. An annotator has to conduct **Step 4** and **Step 5** of the pipeline: (i) identify whether a cross-lingual scraped news supports, refutes or has not enough info with respect to the original one; (ii) classify the original news as a fake or a true one based on the provided cross-lingual evidence.

## B Samples of Cross-lingual Evidence for News Items

Title	English translation
<b>Original news (FAKE)</b>	
Kate Middleton & Prince William Try To Save Crumbling Marriage?	–
<b>English search results</b>	
Prince William and Kate Middleton’s Love Through the Years	–
How Princess Diana made desperate ‘last-ditch attempt’ to save marriage with Charles	–
Prince William of Wales — Economist - World News, Politics, Economics, Business & Finance	–
<b>French search results</b>	
Le jour où le prince William a demandé Kate Middleton en mariage	The day Prince William proposed to Kate Middleton
William et Kate, fiançailles avant le mariage royal	William and Kate, engagement before the royal wedding
Mariage William et Kate	William and Kate wedding
<b>German search results</b>	
Elternschaft, Babynamen, Prominente und königliche Nachrichten — CafeMom.com	Parenting, Baby Names, Celebrities, and Royal News — CafeMom.com
Kate Middletons umstrittenste Momente aller Zeiten	Kate Middleton’s Most Controversial Moments of All Time
Wie Kate Middleton und Prinz William das Leben ihrer Kinder normal halten	How Kate Middleton and Prince William Keep Their Kids’ Lives Normal
<b>Spanish search results</b>	
Príncipe William – Clarín.com	Prince William - Clarín.com
Con un comentario, Harry hizo llorar a Kate Middleton en el día de su boda	With a comment, Harry made Kate Middleton cry on his wedding day
El Príncipe Guillermo de Inglaterra se casará con su novia Kate Middleton en 2011 - RTVE.es	Prince William of England will marry his girlfriend Kate Middleton in 2011 - RTVE.es
<b>Russian search results</b>	
Факты о свадьбе Кейт Миддлтон и принца Уильяма, о которых вы могли не знать	Kate Middleton and Prince William’s wedding facts you might not know
Кейт Миддлтон	Kate Middleton
Кэтрин, герцогиня Кембриджская — Википедия	Catherine, Duchess of Cambridge - Wikipedia
<b>Original news (LEGIT)</b>	
Amazon Prime Air drone completes its first US public delivery	–
<b>English search results</b>	
Amazon Prime Air drone completes its first US public delivery	–
Amazon’s Prime Air drone delivery fleet gains FAA approval for trial commercial flights – TechCrunch	–
Amazon completes its first public US drone delivery	–
<b>French search results</b>	
E-commerce. Amazon autorisé à livrer par drone aux États-Unis	E-commerce. Amazon authorized to deliver by drone to the United States
Première livraison par drone réussie pour Amazon	First successful drone delivery for Amazon
Amazon a livré son premier colis par drone	Amazon delivered its first package by drone
<b>German search results</b>	
Prime Air: FAA erteilt Amazons Lieferdrohnen die Starterlaubnis	Prime Air: FAA gives Amazon’s delivery drones permission to take off
Amazon Prime Air-Drohne schließt erste öffentliche Auslieferung in den USA ab	Amazon Prime Air drone completes first US public delivery
Amazon Prime Air: Amazon kündigt Lieferungen per Drohne binnen Monaten an	Amazon Prime Air: Amazon announces drone deliveries within months
<b>Spanish search results</b>	
Amazon hace su primera entrega por dron en Estados Unidos	Amazon makes its first delivery by drone in the United States
Amazon recibe autorización para operar entregas con drones	Amazon receives authorization to operate drone deliveries
Amazon recibe aprobación federal para arrancar Prime Air, su propuesta de entrega con drones	Amazon receives federal approval to launch Prime Air, its drone delivery proposal
<b>Russian search results</b>	
Amazon запускает дроны Prime Air для быстрой доставки	Amazon launches Prime Air drones for fast delivery
В США прошла первая публичная демонстрация доставки товара с помощью дронов Amazon Prime Air	First Public Demonstration of Amazon Prime Air Product Delivery Held in USA
Amazon показала новые гибридные дроны для доставки заказов сервиса Prime Air	Amazon Shows New Hybrid Drones To Deliver Prime Air Orders

Table 3 – The example of the cross-lingual evidence extraction for fake and legit news from **FakeNewsAMT**. For each target language (English, French, German, Spanish, Russian) search results are presented: titles of top 3 news. For every non-English title the English translation is provided. For **fake news** the search results across other languages are only mildly topically related to the original news while for **legit news** the search results across other languages are strongly related to the original news.

Title	English translation
<b>Original news (FAKE)</b>	
В Израиле создали лекарство от коронавируса: <a href="https://www.vesty.co.il/article/SJxK1wRF8">https://www.vesty.co.il/article/SJxK1wRF8</a>	Israel invented a vaccine against coronavirus
<b>English search results</b>	
Israel isolates coronavirus antibody in 'significant breakthrough'	-
Israel is not releasing a coronavirus vaccine – The Forward	-
Hadassah treats COVID-19 patient with new concentrated passive vaccine	-
<b>French search results</b>	
Les Israéliens et le vaccin contre le coronavirus	The Israelis and the coronavirus vaccine
Pandémie de Covid-19 en Israël — Wikipédia	Covid-19 pandemic in Israel - Wikipedia
Vaccin contre la Covid-19 — Wikipédia	Vaccin contre la Covid-19 — Wikipédia
<b>German search results</b>	
Impfstoffe gegen Coronavirus – aktueller Forschungsstand	Coronavirus vaccines - current state of research
Warum es so lang dauert, einen Corona-Impfstoff zu entwickeln	Why it takes so long to develop a corona vaccine
Falschinformationen zur COVID-19-Pandemie – Wikipedia	Incorrect information about the COVID-19 pandemic - Wikipedia
<b>Spanish search results</b>	
Cuáles son y en qué estado están los esfuerzos israelíes para inventar una vacuna para el coronavirus	What are and in what state are Israeli efforts to invent a coronavirus vaccine
Sus mejores intentos ... - Consulado General H. de Israel	Your best attempts ... - Consulate General H. of Israel
Vacuna de Pfizer y BioNTech muestra resultados positivos	Pfizer and BioNTech vaccine shows positive results
<b>Russian search results</b>	
В Израиле заявили, что Covid-19 остановит лекарство от холестерина	Israel says cholesterol medication will stop Covid-19
Врач о Covid-19: «Мы не понимаем патогенез заболевания» — Израиль в фокусе	Doctor about Covid-19: «We do not understand the pathogenesis of the disease» - Israel in focus
Израильские технологии	Israeli technology
<b>Original news (LEGIT)</b>	
В Монголии произошла вспышка бубонной чумы: <a href="https://hightech.fm/2020/07/02/plague-outbreak">https://hightech.fm/2020/07/02/plague-outbreak</a>	Bubonic plague outbreak in Mongolia
<b>English search results</b>	
Bubonic plague: Case found in China's Inner Mongolia - CNN	-
Teenager dies of Black Death in Mongolia	-
China bubonic plague: Inner Mongolia takes precautions after case	-
<b>French search results</b>	
Epidémie : des cas de peste détectés en Chine et en Mongolie	Epidemic: cases of plague detected in China and Mongolia
Craintes d'une épidémie de peste bubonique? Un adolescent de 15 ans est la première victime recensée en Mongolie	Fear of a bubonic plague epidemic? A 15-year-old is the first victim in Mongolia
Chine : Un cas de peste bubonique détecté en Mongolie intérieure	China: Bubonic plague case detected in Inner Mongolia
<b>German search results</b>	
Mongolei: 15-Jähriger an Beulenpest gestorben - DER SPIEGEL	Mongolia: 15-year-old died of bubonic plague - DER SPIEGEL
Beulenpest - Was über die Pest-Fälle in China bekannt	Bubonic plague - what is known about the plague cases in China
Bringen Marmeltiere die Pest zurück? Mongolei warnt vor Tier-Kontakt	Will marmots bring the plague back? Mongolia warns of animal contact
<b>Spanish search results</b>	
BROTE DE PESTE BUBÓNICA EN MONGOLIA	BUBONIC PLAGUE OUTBREAK IN MONGOLIA
Brote de peste negra provoca cuarentena en Mongolia	Black plague outbreak causes quarantine in Mongolia
Brote de peste negra alarma en Mongolia y cierra frontera con Rusia	Black plague outbreak alarms Mongolia, closes border with Russia
<b>Russian search results</b>	
В Монголии произошла вспышка бубонной чумы ... - Гордон	There was an outbreak of bubonic plague in Mongolia ... - Gordon
В Монголии произошла вспышка бубонной чумы - Урал56.Ру	Bubonic plague outbreak in Mongolia - Ural56.Ru
Возвращение «Черной смерти»: главное о вспышке бубонной чумы в Монголии	Return of the "Black Death": the main thing about the outbreak of the bubonic plague in Mongolia

Table 4 – The result of the cross-lingual evidence extraction for real-life news. For each target language (English, French, German, Spanish, Russian) search results are presented: titles of top 3 news. For every non-English title the English translation is provided. For **fake news** the search results across other languages are only mildly topically related to the original news while for **legit news** the search results across other languages are strongly related to the original news.