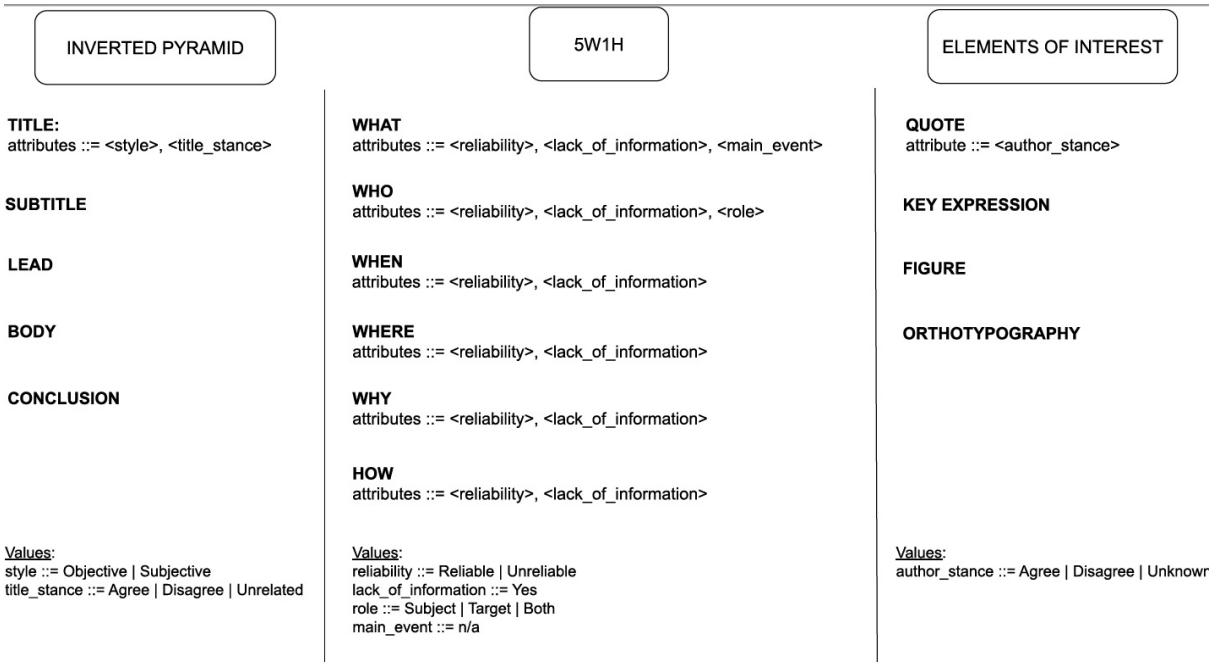
Previous research data (anonymous)

This research has been published in relevant journals, or it is now in press but it can not be provided at this point of the reviewing process. Main data of this previous work is extracted to support reviewing. If the paper is accepted the references would be added to clarify the proposal to the readers.

Annotation scheme

For each news item, these three levels of content are annotated:



Besides, a global reliability and veracity value is assigned to the news item.
Found the complete detailed annotation guidelines at the end of this document.

Evaluation of reliability with news content annotation following the schema:

Experiments	Baseline model (TF-IDF)		Model with [redacted] features	
	Acc	$F_1 m$	Acc	$F_1 m$
SVM	0.662	0.395	0.937	0.925
Random Forest	0.75	0.639	0.912	0.898
Logistic Regression	0.65	0.392	0.912	0.875
Decision Tree	0.737	0.683	**0.95**	**0.948**
MLP	0.712	0.57	0.925	0.912
AdaBoost	**0.787**	**0.748**	**0.95**	0.945
GaussianNB	0.612	0.456	0.687	0.57
	Baseline model		**Model with [redacted] features**	
BETO	0.85	0.80	**0.887**	**0.854**

As can be observed from the previous research results, the approaches trained with a dataset annotated with the schema is very powerful to determine reliability of the documents.

This is the previous experimentation that demonstrates the appropriateness of the annotation.

Evaluation of <u>veracity</u> only with news content annotation following the schema:

Model	True News			Fake News				
	P	R	F_1	P	R	F_1	Acc	Macro F_1
Baseline (Random)	0.551	0.549	0.548	0.498	0.500	0.497	0.526	0.522
Baseline (TF-IDF)	0.609	0.868	0.715	0.726	0.381	0.494	0.637	0.605
[redacted]	0.920	0.550	**0.790**	0.680	0.950	**0.690**	**0.750**	**0.740**

Using the content annotation features of the schema, the features are improving baselines for veracity detection, and the new approach presented at ICDAR is improving these previous published results that are only using content features and not using external evidences from world knowledge. These previous references and baseline results could be added to the experimental section of the camera-ready manuscript if accepted for clarification purposes.

Conclusion from previous research based only on reliability:

When fake news items are detected using only reliability features (content of the news item), as observed in previous results, it can be observed that not all the reliable news items are true or the unreliable are false, so the performance of the approach is lower when only reliability is used in veracity detection task. These results extracted from previous research lead us to the conclusion that a hybrid approach that combines reliability and external world knowledge could results in a more robust solution and it would improve coverage detection of fake news, as was demonstrated in our ICDAR manuscript.

Appendix. Annotation schema details.

2. Structure level

The structure level divides a news item into different parts following the Inverted Pyramid journalistic technique. According to this technique, each structure part contains information with different levels of relevance, placing the most important information at the beginning of the news item and the least relevant at the end. Structure labels are described in order of relevance bellow.

2.1. <TITLE>

The TITLE of the news article provides the main idea of the story. Normally in one sentence, it summarises the basic and essential information about the story and the idea around which the news piece has been created. The main objective of the TITLE is to attract readers.

This label presents two attributes that provide additional information about the TITLE:

2.1.1. style

This attribute allows to mark two values: Objective and Subjective. An objective title will present information in an accurate and informative way, while a subjective title will provide information in an alarmist, connotative or emotional way.

2.1.2. title_stance

This attribute indicates whether the information presented in the BODY is consistent with the information of the TITLE. This consistency is represented by the following values: Agree (information provided is consistent in both parts), Disagree (information provided is inconsistent in one of the parts) or Unrelated (information provided in the TITLE has no relation with the rest of the news item).

2.2. <SUBTITLE>

The SUBTITLE explains the TITLE in more detail. It completes the information by presenting the idea in a very summarised way or can provide additional information not mentioned in the TITLE. The SUBTITLE'S purpose is to keep the reader's attention and encourage him/her to read the whole news article.

2.3. <LEAD>

The LEAD is the paragraph that develops the main information by answering the six key questions allowing to communicate information in an accurate and objective way (the 5W1H journalistic technique).

2.4. <BODY>

The BODY contains all the information developed in the news article. The BODY presents all the background, facts and arguments of the story in detail. The key questions answered in the LEAD are developed in the BODY by explaining all the elements that are involved in the news piece.

2.5. <CONCLUSION>

The main idea of the story can be summarised in a sentence or in a paragraph but, even if the CONCLUSION is considered part of a well-structured article, it does not always appear. It presents the least important information, as it is only a summary of all the important information that has been developed in the previous parts of the news story.

3. Content level

The second level focuses on the essential content elements of news. The approach followed in this level is based on the journalistic technique known as 5W1H, which enables the detection of the key elements needed to accurately communicate a story. The 5W1H questions used for this journalistic method are WHAT, WHO, WHERE, WHEN, WHY and HOW. All the content level labels are marked with the attributes reliability and lack_of_information (if necessary):

- reliability

Attribute allowing to annotate a news item as Reliable or Unreliable depending on the level of accuracy and objectivity.

3.1. <WHO>

In a sentence, the WHO represents the subject or entity involved or acting in an event. It may usually refer to people, organisations or even personified entities (such a country: e.g., France discovers a vaccine…)

3.2. <WHAT>

The WHAT label refers to the circumstances, events or facts of the action performed by the subject.

3.3. <WHEN>

The WHEN label indicates the time or the moment when the events occurred. It is found in temporary expressions (e.g., on Wednesday, in 2010, last Friday…)

3.4. <WHERE>

This label designates the location where the events occurred. It is found in location expressions, either physical (e.g., in France, in a laboratory) or not (e.g., in Facebook).

3.5. <WHY>

This label refers to the cause of the event. It must not be confused with the purpose.

3.6. <HOW>

This label refers to the way events have developed, the manner or the method in which a given action has been carried out.

4. Elements of Interest

This level allows to mark textual information that could be interesting to differentiate unreliable news from reliable news.

4.1. <KEY_EXPRESSION>

Phraseology that urges readers to share the information or that expresses emotions such as fear, contempt, alarm, hope or economic and ideological purposes.

Examples

ENGLISH:

<KEY_EXPRESSION>SHARE THIS INFORMATION</KEY_EXPRESSION>

<KEY_EXPRESSION>THIS CAN SAVE YOUR LIFE</KEY_EXPRESSION>

<KEY_EXPRESSION>THE LEMON PREVENTS AND CURES CANCER</KEY_EXPRESSION>

SPANISH:

<KEY_EXPRESSION>COMPARTE ESTA INFORMACIÓN</KEY_EXPRESSION>

<KEY_EXPRESSION>ESTO PUEDE SALVAR TU VIDA</KEY_EXPRESSION>

<KEY_EXPRESSION>EL LIMÓN PREVIENE Y CURA EL CÁNCER</KEY_EXPRESSION>

4.2. <FIGURE>

Label allowing to mark figures in the text, as it is a characteristic that can be verified by fact-checking techniques.

Examples

<FIGURE>8</FIGURE>

<FIGURE>1200</FIGURE>

<FIGURE>560</FIGURE>

4.3. <ORTHOTYPOGRAPHY>

This label is used to mark grammatical, spelling of formatting mistakes that can be found in the text. Some examples of orthotypography are whole sentences in capital letters, suspension points in the middle of the text or incomplete, double spaces, many exclamation marks, grammatical errors, spelling mistakes, lack of cohesion, etc.

Examples

ENGLISH:

<ORTHOTYPOGRAPHY>This will completly change your life</ORTHOTYPOGRAPHY>

<ORTHOTYPOGRAPHY>LEMON IS AN ANTI-CANCER FOOD…that can save your life thanks to…its anti-cancer properties!!!!!!!</ORTHOTYPOGRAPHY>

<ORTHOTYPOGRAPHY>IF YOU DON'T SHARE THIS INFORMATION, YOU WILL HAVE 5 YEARS OF BAD LUCK</ORTHOTYPOGRAPHY>

SPANISH:

<ORTHOTYPOGRAPHY>Esto camviará completamente tu bida</ORTHOTYPOGRAPHY>

<ORTHOTYPOGRAPHY>EL LIMÓN ES UN ALIMENTO ANTICÁNCER…que puede salvar tu vida gracias a…sus propiedades anticancerígenas!!!!!!!</ORTHOTYPOGRAPHY>

<ORTHOTYPOGRAPHY>SI NO COMPARTES ESTA INFORMACIÓN, TENDRÁS 5 AÑOS DE MALA SUERTE</ORTHOTYPOGRAPHY>

4.4. <QUOTE>

This label enables the annotation of elements or sentences that textually quote a message or reproduce an already reported idea.

4.4.1. author_stance

The QUOTE label only has an attribute called author_stance represented by the following values: Disagree (to express its disagreement towards the idea), Agree (to share its agreement) or Unknown (just to inform, without showing its stance towards it).