An Event Factuality Annotation Proposal for Basque

Begoña Altuna María Jesús Aranzabe
Arantza Díaz de Ilarraza
University of the Basque Country
E-mail: begona.altuna;maxux.aranzabe;a.diazdeilarraza@ehu.eus

Abstract

Factuality information gives evidence on whether the events in texts have happened. This information can be relevant in natural language processing tasks such as timeline generation as it helps discriminating the events that are relevant to a certain timeline. We analysed some factuality annotation schemes and proposed a new scheme that aims at concise and easy annotation. We worked on a Basque corpus for the creation of the factuality annotation scheme as an additional layer to temporal information and we evaluated our annotation decisions through an inter-annotator agreement experiment.

1 Introduction

Temporal information plays a crucial role in the structuring of the information in text since it allows placing the events along a temporal axis, commonly known as a "timeline". The automatic creation of those is our final goal. For this, the events and the time points and intervals in text have to be identified, as well as identifying whether those events have happened, as only events that have happened are to be displayed in the timeline. That is what is called "factuality", that is to say "whether events mentioned in text correspond to real situations in the world or, instead, to situations of uncertain status" [9].

In this paper we present a proposal for factuality annotation for events and a manual annotation effort to evaluate the annotation decisions. We aimed at a scheme as simplified as possible, but without compromising too much information. For that we have examined previous factuality schemes and we have built a proposal that has been proved in a corpus of news documents in Basque.

2 Event factuality and its classifications

Event factuality is described in [8] as "the level of information expressing the factual nature of eventualities mentioned in text", that is, whether events correspond

to a fact in the world, a possibility or a situation that does not hold. For example, *prompted* in example (1) is a fact in the world that has happened.

(1) President Donald Trump's move **prompted** international criticism.

In order to classify events according to the factuality they express, many factuality classifications have been defined. After analysing those, a basic division can be made: i) facts, situations that hold in the world, ii) counterfacts, situations that do not hold in the world and iii) a wide spectrum of uncertain or undefined values of factuality. A summary of the different factuality feature proposals is given in the following lines and Table 1[1].

First, a bi-dimensional deterministic scale of factuality degrees depending on their certainty and their polarity is offered in [8] for FactBank, a corpus that contains factuality. From the combination of these two features, 8 values for factuality were defined: factual, counterfactual, probable, not probable, possible, not possible, certain but unknown output and unknown or uncommitted.

On its part, SIBILA [11] is an annotation scheme for temporal information that was explicitly focused on event factuality, what they called *factivity*. Although they admitted factivity was closely related to tense, polarity and modality, they were aware of the association not being automatic. As a consequence, they disagree with [8], who claims for a deterministic model to assign factuality values.

More recent works on factuality annotation include the approaches of [10] and [5]. The first [10] analysed event factuality and sentiments for the extraction and interpretation of perspectives expressed in news texts, in order to divide the information into positive and negative views on the actual or future world. For factuality, they got inspiration on the FactBank annotation scheme, although some conceptualisation changes were done; namely making a clear distinction between past and present events and future events, as these will always convey a certain amount of uncertainty. Factuality was described as "the level of information expressing the commitment of relevant sources towards the factual nature of events mentioned in discourse". They proposed a four-value factuality classification which was built on three axes: polarity, certainty and temporality. Temporality was added as their corpus did not have previous temporality annotation.

The factuality annotation scheme in [5] is included in the NewsReader project framework[2]. The factuality annotation was done on a temporal information annotation, similar to TimeML, and was inspired on [10]. They followed the aforementioned when they proposed factuality values that were determined by time, polarity and certainty. Nevertheless, they were aware of some special cases, such as the the hypothetical events in conditionals and the general statements that are not anchored in time for they are ever-present situations. These special cases were explicitly annotated by means of a dedicated attribute.

[1] The features between parentheses respond to indirectly considered features.

[2] http://www.newsreader-project.eu/

Table 1: Factuality features in different factuality annotation schemes

Features	FactBank [8]	SIBILA [11]	van Son et al. [10]	NewsReader [5]
Polarity	✓	(✓)	✓	✓
Certainty	✓	(✓)	✓	✓
Temporality	(✓)	(✓)	✓	✓
Special Cases				✓
Factuality	Factual Probable Possible Counterfactual Not probable Not possible Certain but unknown output Unknown or uncommitted	Yes No Programmed_future Negated_future Possible Indefinite	Fact Counterfact Possibility (uncertain) Possibility (future)	Factual Counterfactual Non factual

3 Event factuality in Basque

We aim to create a factuality annotation scheme that will assign factuality values to the events defined in Basque. As being previously done for other languages, Basque has a corpus annotated with temporal information, EusTimeBank, and the factuality annotation has been conducted on this previously annotated corpus. In this section we present the temporal mark-up scheme for Basque, EusTimeML [3], the EusTimeBank corpus, our proposal for factuality annotation and the manual annotation effort we conducted in order to achieve a robust factuality mark-up scheme and an annotated corpus.

However, although our working language is Basque and that we have built our factuality annotation scheme on top of a temporal information annotation scheme, we aim at offering a universal factuality scheme, as, whereas the expressions of factuality vary among languages, the factuality information remains the same.

3.1 EusTimeML and EusTimeBank

As mentioned before, temporal information comprehends information about the events and the time points and intervals, as well as the relations that are created among those. In order to normalise and make that information machine readable, EusTimeML, a mark-up language for temporal information inspired in TimeML [6] has been developed for Basque.

EusTimeML is a mark-up scheme that offers XML tags for events, time expressions and temporal relation signals as well as tags for temporal, subordination and aspectual relations. An example of an annotation using EusTimeML can be seen in Figure 1. In this example the event *fakturatu zituen* (“turned over”) and the time expression *iaz* (“last year”) which refers to 2016 are displayed and their main attributes represented. The temporal relation between those is also represented as an inclusion relation, that is to say: the turning over happened in 2016.

Nonetheless, the mere temporal information is not enough when developing more complex tools. In our case, in order to build timelines, we considered adding

Figure 1: Temporal information in *Iaz 1.167 milioi euro fakturatu zituen* (“Last year 1,167 million euros were turned over”)

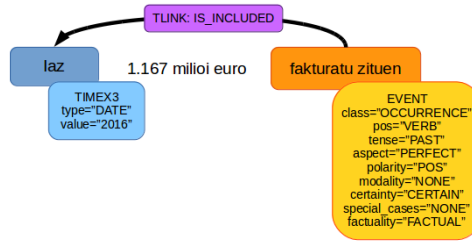

Table 2: Proposed factuality annotation scheme for Basque

FACTUALITY RELATED ATTRIBUTES		FACTUALITY VALUE
CERTAINTY	SPECIAL CASES	
Certain Uncertain Underspecified	Cond. Condition Cond. Main clause Generic Statement None	Factual Counterfactual Non factual No factuality value Underspecified

factuality information to the temporal information in EusTimeML, since we reckoned that only factual events should appear in historical chronologies, for example. As a consequence, we have developed a mark-up scheme for factuality annotation in Basque (Table 2) and we have integrated it in the EusTimeML guidelines.

To conduct our analysis and experimentation on factuality, we used a section of the EusTimeBank corpus, a continuously growing economy news corpus in Basque. Nowadays, it contains 75 documents manually annotated following EusTimeML. It has been employed in temporal information annotation tasks such as guideline validation [1, 2]. It has also been used for the analysis of the negation in Basque [4], which is a crucial step towards factuality annotation. Finally, some of its documents have formed the training and evaluation sets for *bTime* [7], a tool for temporal information annotation in Basque. For this experiment, a section of 15 documents (3,463 tokens) has been manually annotated. Document length was 13 sentences in average and they contained an average of 231 tokens.

3.2 Factuality annotation proposal for Basque

After analysing the state of the art proposals for factuality annotation, we opted for a simple scheme in order to ease the burden of manual annotation. However, we did not want to sacrifice much information. Thus, we defined the scheme shown in Table 2. *Certainty*, as well as *polarity* and temporality (verb *tense* and *aspect*), are widely considered factuality features as they convey the majority of factual information, while identifying *special cases* adds relevant information to factuality resolution. That is the reason for adopting it from [5].

As can be seen in the table, we represent factuality through five factuality val-

ues: FACTUAL for events that have happened, COUNTERFACTUAL for events that have not happened in the past, NON_ FACTUAL for future events, UNDERSPECIFIED for those events of which the factuality value cannot be assessed and NO_FACTUALITY_ VALUE for the events that do not express any specific event. These values are conditioned by the values of the factuality related attributes.

First, *certainty* expresses the commitment of the source with the information expressed. We have considered that, unless there is an explicit uncertainty marker or it is impossible to give a certainty value, we will consider the events certain (2). The uncertainty particle *ote* in example (3) marks the uncommitment of the utterer for the certainty of *galdu* ("to loose").

(2) Boeing-ek 11.000 milioi dolar **lortu** **ditu** akordioetan.
Boeing.ERG 11,000 million dollar **obtained has** agreement.PL.INE.
'Boeing **has obtained** 11,000 million dollars in agreements.'

(3) Hegazkin-merkatuaren kontrola galdu **ote** zuen
Airplane-market.GEN control.ABS loose **UNCERT.PART** AUX
eztabaida piztu zen.
discussion light AUX.
'Discussion on **whether** (it) had lost control over the aeroplane market was started.'

In what concerns the *special cases*, we wanted to emphasize the effects of conditionals and generic statements. For example, when using the hypothetical tense like in "If only I had come…", although the verb has a positive polarity, humans know that the utterer has not come. In (4) *ematen badu* ("if it gives") in the protasis is marked as CONDITIONAL_CONDITION while *bilatuko du* ("will look for") in the apodosis is marked as CONDITIONAL_MAIN. The specific mark for generic statements express that those events do not refer to a specific event in a specific time and place. Such is the case of *da* ("is") in (5).

(4) Bilaketak fruiturik *ematen* ez *badu*, BEAk jarraitzeko
Search.ERG results.PART *bring* no *AUX*, ANR.ERG continue.FIN
dirua **bilatuko du**.
money.ABS **look.for AUX**.
'If the search *brings* no results, the ANR **will look for** money to continue.'

(5) Airbus A320a korridore bakarreko hegazkina **da**.
Airbus A320.ABS aisle single.REL aeroplane **is**.
'The Airbus A320 **is** a single aisle aeroplane.'

As we conceived factuality as an additional layer for the temporal information annotation, we took into account previous annotation when deciding the factuality values. This is the case of *polarity*—whether the events appear affirmed (6) or negated (7)—as this feature plays a crucial role when defining the factuality value of an event.

(6) Boeing-ek 11.000 milioi dolar **lortu ditu** akordioetan.
Boeing.ERG 11,000 million dollar **obtained has** agreements.INE.
'Boeing **has obtained** 11,000 million dollars in agreements.'

(7) Hegazkin erraldoiak *ez* **du** Malasian **lur hartuko**.
Aeroplane giant *no* **AUX** Malaysia.INE **earth take.FUT**.
'The giant aeroplane **will** *not* **land** in Malaysia.'

In the case of temporality, one may notice that verbal events convey much more information about factuality as many of them have *aspect* and *tense* features. In fact, aspect in Basque expresses whether the verb is perfect or refers to a future action. Basque tense system, on its part, has three main values: past, present and hypothetical. In example (8) the tensed verb *erabaki dute* ("(they) have decided") is a factual event as there is no negation element nor any uncertainty marker and the aspect and tense and aspect suggest the event has already happened. In example (9), instead, *bidaliko dizkie* ("(He/she) will send (them to them)") has future aspect and present tense and, thus it is a non-factual event that has not happened yet.

(8) Txinako Herri Errepublikako agintariek Boeing 787
China.REL People Republic.REL leaders.ERG Boeing 787
Dreamlinerra erostea **erabaki dute**.
Dreamliner.ABS buy **decided have**.
'People's Republic of China leaders **have decided** to buy the Boeing 787 Dreamliner.'

(9) Dreamlinerrak sei aerolineari **bidaliko dizkie**.
Dreamliners.ABS six airline.DAT **send.FUT AUX**.
'(He/she) will send the Dreamliners to six airlines.'

Nonetheless, we wanted to provide all the events with a factuality value, so the factuality annotation of non-verbal events was conditioned by the factuality features of the verbal event that accompanies them. In complex event structures in which a noun bears the semantics of the event and the verb adds the grammar information, both elements get the same factuality values as they refer to a single event (10). In this case *baimena eman zaio* ("has been given permission") is factual and *parte hartzeko* ("to take part") is an underspecified event as one cannot say whether Boeing has taken part or will take part. For some other non-verbal events instead, we have had to rely more on the context. In the case of example (11), we know *aukeraketa-prozesu* ("selection process") is a fact as it is anchored in a certain date, 1998.

(10) Boeing-i **baimena eman zaio** leihaketetan **parte hartzeko**.
Boeing.DAT **permission give have** biddings.INE **part take**
'Boeing **has been given permission** to **take part** in biddings.'

Table 3: Annotation of *lehen hegaldia* (13) according to the different schemes

EusTimeML	FactBank [8]	SIBILA [11]	van Son et al. [10]	NewsReader [5]
Positive Certain No special case	Positive	Positive	Positive Uncertain No special case	Positive Certain Future
Non factual	Probable	Programmed future	Possibility-future	Non factual

(11) 1998ko **beste aukeraketa-prozesu batean** Boeing-en leihakidea
1998.REL **other selection-process** **one.INE** Boeing.GEN rival
izan zen Lockheed Martin.
be AUX Lockheed Martin.
'Lockheed Martin was Boeing's rival **in another selection process** in 1998.'

Finally, it should be highlighted that the annotators should rely on the semantics of the events and the world-knowledge to give the appropriate factuality value. *Onartzen du* ("admits") in example (12) conditions the factuality value of *zutela* ("had") as the admission of the fact expresses the commitment of the utterer with the truth value of the event. That is to say, we know *zutela* is a counterfactual event as it is in the past tense, it is negated, it is not one of the aforementioned special cases and the utterer considers it is certain.

(12) *Onartzen du* ez **zutela** nahikoa gaitasun tekniko.
Admit *AUX* no **have.PAST.COMP** enough skill technical.
'(He/she) *admits* they **did** not **have** enough technical skills.'

3.3 Adequacy and adaptability of the factuality scheme

In Table 3 we compare our annotation of factuality of the event *lehen hegaldia* ("first flight") in example (13) to the annotation following other schemes.

(13) **Lehen hegaldia** martxoaren hasierarako programatu da.
First flight March.GEN beginning.ADL.REL programmed is.
'**The first flight** has been programmed for the beginning of March'

As can be seen from the table, some schemes are more descriptive than others. This might be caused by the fact that some annotation efforts like SIBILA are strongly integrated in a more comprehensive event annotation scheme. The main difference appears regarding to the certainty. In [11], [5] and EusTimeML the explicit presence of "programmed" justifies the absolute certainty of the event, whereas in [8] and [10], all future events convey certain amounts of uncertainty.

As mentioned before, we consider our scheme is suitable for the factuality annotation in other languages. Examples (14) and (15) and Table 4 represent the annotation of an English and a Spanish event (in bold) according to our guidelines.

Table 4: Factuality annotation of the events in examples (14) and (15).

Says/dice	Earn/ganan
Positive	Positive
Present tense	Present tense
Imperfect aspect	Imperfect aspect
Certain	Certain
No special cases	No special cases
Factual	Factual

(14) Shell **says** male staff working for the company on average **earn** 22% more than women in the UK.

(15) Shell **dice** que sus trabajadores masculinos **ganan** de media un 22% más en el Reino Unido.
(Shell **says** that its male workers **earn** on average a 22% more in the United Kingdom).

3.4 Manual annotation

Two annotators took part in this experiment. They were asked to fully annotate the events so as to use the EusTimeML information to determine the factuality value. They were also asked to use world knowledge to resolve factuality. In total 734 events (out of 787 or 818) were annotated by both annotators and the factuality referring attributes in the agreed ones were analysed.

Table 5 shows the accuracy and κ values for the attributes that convey factuality information. As one can see, accuracy is rather high for most of the attributes and κ shows also a high agreement. The lower κ values are a consequence of a large quantity of certain categories. In fact, some values, such as the *certain* or *factual* values for certainty and factuality are very frequent in our corpus since news narratives tend to represent facts and this conditions the κ values.

Table 5: Inter-annotator agreement results for factuality annotation

	Polarity	**Certainty**	**Special Cases**	**Factuality**
Accuracy	0.98	0.89	0.95	0.77
κ	0.68	0.24	0.29	0.53

Analysing the disagreement has given us better knowledge about factuality annotation. Most of the mistakes were due to too loose definitions of the guidelines and were corrected in a guideline discussion session. In addition, we expect that i) redefining the `UNCERTAIN` and `UNDERSPECIFIED` values for certainty, ii) defining the boundaries of the generic statement and iii) better analysing the focus of the negation will help us define more accurate guidelines.

(16) 20 milioi dolar arteko laguntza **emateko** prest dago.
20 million dollar until.REL help **give** ready is.
'(It) is ready to **give** up to 20 million dollar help.'

To illustrate this, *emateko* ("to give") in example (16) has been assigned UNCERTAIN and UNDERSPECIFIED by the annotators. It is stated in the guidelines that the events that express an aim will condition the certainty value of the subordinated event (UNCERTAIN). Nonetheless, *prest dago* ("is ready") is not a clear volition expression and was wrongly annotated by one of the annotators.

4 Conclusions

In this paper we have presented an event factuality annotation proposal. We aimed to reflect the factuality information concisely, while we wanted to create an easy-to-employ scheme to make the annotation effort easier. We have also evaluated our annotation decisions through an inter-annotator agreement experiment.

We attempted to offer a comprehensive factuality annotation scheme built as an additional layer to temporal information annotation. We have also compared our annotation scheme to other factuality annotation schemes, so as to highlight the differences between them. Finally we have also proved that our scheme is suitable for other languages (English and Spanish) even though it was modelled taking Basque as the basis for the analysis.

In order to evaluate the adequacy of our annotation decisions, two annotators have annotated a set of 15 documents. The results are satisfactory, although there is still room for improvement. From our first analysis, one can say that our corpus contained many events the factuality of which was easy to identify—news text usually contain big amounts of facts, real past events. As a consequence, inter-annotator agreement was high. The reanalysis and further discussion of the disagreement will give us a better insight of the factuality annotation.

Acknowledgements

This research is funded by the Basque Government PRE_2016_2_294 grant and by the TIN2016-77820-C3-1-R project of the Ministry of Economy and Competitiveness (Spain).

References

[1] Begoña Altuna, María Jesús Aranzabe, and Arantza Díaz de Ilarraza. Euskarazko denbora-egiturak. Azterketa eta etiketatze-esperimentua. *Linguamática*, 6(2):13–24, Dezembro 2014.

[2] Begoña Altuna, María Jesús Aranzabe, and Arantza Díaz de Ilarraza. Adapting TimeML to Basque: Event Annotation. In *Lecture Notes in Computer Science (LNCS)*. Springer, 2016.

[3] Begoña Altuna, María Jesús Aranzabe, and Arantza Díaz de Ilarraza. Euskarazko denbora-informazioaren tratamendu automatikoa TimeMLren eta HeidelTimeren bidez. *Ekaia*, (30):153–165, 2016.

[4] Begoña Altuna, María Jesús Aranzabe, and Arantza Díaz de Ilarraza. Euskarazko ezeztapenaren tratamendu automatikorako azterketa. In Iñaki Alegria, Ainhoa Latatu, Miren Josu Ormaetxebarria, and Patxi Salaberri, editors, *II. IkerGazte, Nazioarteko Ikerketa Euskaraz: Giza Zientziak eta Artea*, pages 127–134, Bilbao, Euskal Herria, 2017. Udako Euskal Unibertsitatea (UEU).

[5] Anne-Lyse Minard, Alessandro Marchetti, and Manuela Speranza. Event factuality in italian: Annotation of news stories from the ita-timebank. In *Proceedings of CLiC-it 2014, First Italian Conference on Computational Linguistic*, 2014.

[6] James Pustejovsky, José M. Castaño, Robert Ingria, Roser Saurí, Robert J. Gaizauskas, Andrea Setzer, Graham Katz, and Dragomir R. Radev. TimeML: Robust Specification of Event and Temporal Expressions in Text. *New directions in question answering*, 3:28–34, 2003.

[7] Haritz Salaberri Izko. *Rol semantikoen etiketatzeak testuetako espazio-denbora informazioaren prozesamenduan daukan eraginaz*. PhD thesis, Universidad del País Vasco/Euskal Herriko Unibertsitatea, Donostia, Euskal Herria, 2017.

[8] Roser Saurí. *A Factuality Profiler for Eventualities in Text*. PhD thesis, Waltham, MA, USA, 2008. AAI3304029.

[9] Roser Saurí, Olga Batiukova, and James Pustejovsky. Annotating Events in Spanish. TimeML Annotation Guidelines. Technical report, Technical Report Version TempEval-2010., Barcelona Media-Innovation Center, 2009.

[10] Chantal van Son, Marieke van Erp, Antske Fokkens, and Piek Vossen. Hope and Fear: Interpreting Perspectives by Integrating Sentiment and Event Factuality. In *Proceedings of the 9th Language Resources and Evaluation Conference (LREC 2014)*, pages 26–31, Reykjavik, Iceland, May 2014.

[11] Dina Wonsever, Aiala Rosá, Marisa Malcuori, Guillermo Moncecchi, and Alan Descoins. Event Annotation Schemes and Event Recognition in Spanish Texts. In Alexander Gelbukh, editor, *Computational Linguistics and Intelligent Text Processing*, volume 7182 of *Lecture Notes in Computer Science*, pages 206–218. Springer Berlin Heidelberg, 2012.