

OPINION MINING BASED ON MODAL MEANINGS

Kong Joo Lee¹, Jee Eun Kim²

¹Dept.of Information Communications Engineering, ChungNam National University, 220 Gung-Dong
Yuseong-Gu Daejeon 305-764 Korea

²Dept. of English Linguistics, Hankuk University of Foreign Studies, 107 Imun-ro Dongdaemun-gu
Seoul 130-791 Korea

Abstract

This research aims to classify Korean modal expressions influencing a sentiment value. With frequent and easy access to the web, user-generated online texts are easily created in great quantities and usually contain opinions which express the user's sentiments. Sentiments are identified from a given opinion and evaluated to determine the final polarity value of an entity occurring in the text. However, the accuracy of evaluating the polarity is not satisfying if the number of sentiment words appearing in the text is simply counted to interpret their semantic orientations. In particular, polarity values are affected by contextual words or expressions, some of which are represented utilizing modality. The modal expressions are constructed with mood or a modal system in Korean. The irrealis in particular convert a sentiment value to a hypothetical or unlikely state, in which interpretation of the sentiment has to be approached differently. Modality affects the polarity value of a sentiment in various ways which include diminishing, intensifying or removing the polarity value at all. Therefore, correctly interpreting modality plays a crucial role in assigning an accurate polarity value. This paper focuses on classifying Korean modal expressions which influence interpreting sentiments. Their structures are also discussed since Korean modality presents a complex predicate, utilizing modal suffixes, auxiliaries, and modal verbs.

Key words: sentiment analysis, polarity value, modal meaning, mood, modal systems

1. INTRODUCTION

This research proposes the classification of Korean modal expressions which influence on identifying subjectivity and interpreting sentiments. The expressions are created by encoding modality. Modality is a semantic grammatical category representing meaning, and adds a broad range of semantic nuances to an utterance. Modal meanings are classified by a binary distinction, realis and irrealis which are further categorized into various classes. Modality in Korean is expressed through mood and a modal system. Mood is a grammatical category of the verb with a modal function, and mood in Korean is represented morphosyntactically. The modal system is constructed utilizing modal suffixes, modal auxiliaries and several categories of lexical items which include verbs, nouns, adverbs and auxiliary postpositions. Various types of modal meanings influence evaluating a sentiment value.

Sentiment analysis is a process to identify a sentiment and assign its polarity value to an entity which appears in user-generated texts. The polarity is generally interpreted using three types of values, positive, neutral and negative. The result of evaluating the polarity value captures the attitude of a user towards the entity. User-generated texts found on the web often represent opinions towards an entity. With the rapidly growing number of such online resources, it is possible to access enormous amount of opinionated texts from which subjective information can be retrieved utilizing modality. By definition, modality is a grammatical category indicating the expression of the speaker's attitude towards a proposition made in the utterance. A sentiment is also an expression of semantic attitude of the author who generates the text. This complies with the definition of modality proposed by John Lyons in Semantics (1977: 792), "the expressions of the speaker's attitude". The modality can be put to use not only for identifying subjective sentences from the texts, but also figuring out the user's sentiment towards an entity. However, the sentiment implying irrealis should be treated differently when its polarity value is evaluated. Since it expresses speaker's emotional attitude towards the unreal world, it

is converted to a hypothetical or unlikely state. Accordingly it should be disregarded for evaluation or treated as a polarity shifter.

Modality has been described with various linguistic frameworks. This research adopts the one presented by Palmer (1986, 2001), which provides four major classes and their corresponding subclasses. However, not all of the classes are engaged in evaluating sentiment values. This paper lists the classes of modality which influence evaluating sentiment values, and describes the grammatical construction of modal expressions.

In the following sections of the paper, Korean mood and modal systems are introduced in terms of their constructions and classification of modal meanings. Section 3 describes the role of modality in sentiment analysis; how modal meanings affect a polarity value of sentiment words or phrases. Section 4 concludes the paper, summarizing the research and suggesting a direction of the future research.

2. MODAL MEANINGS IN KOREAN AND THEIR CONSTRUCTIONS

Modality in Korean is realized through mood and a modal system, both of which express various types of modal meanings. Mood is a grammatical feature carried by a verb and encodes modality. With a dichotomy approach, it can be represented with two categories, realis and irrealis which are considered as “the grammaticization of speakers’ subjective attitudes and opinions” (Bybee et al, 1994: 176). Realis is used to make a factual statement in which something is actually the case or not the case. Irrealis, on the other hands, describe what is not known to be happened. The situation of irrealis resides only in the domain of thought or imagination, and can only be accessed through imagination (Mithun, 1999). The notion of irrealis, however, is not grammatically marked. It has to be recognized by means of identifying the modal meanings some of which denote irrealis. The modal system is constructed utilizing different categories of lexical items in addition to modal suffixes while expressing various types of modal meanings.

Modal meanings are conveyed using morphosyntactic patterns marked by means of morphological categories which include modal suffixes and modal auxiliaries. Since Korean is an agglutinative language, it presents a sequence of morphemes attached to the stem of a verb appearing at the sentence-final position. The modal suffixes are attached to the verb stem or another suffix to convey modal meanings. Modal auxiliaries are also realized morphosyntactically. All the auxiliary verbs require a preceding morpheme that is attached to the main verb. The auxiliary with the suffix encodes modality. In addition to morphosyntactic categories, there are lexical items including adjectives, verbs and adverbs, all of which express modality.

2.1 *Classification of Modality*

Modality represents additive information of a proposition. Palmer (2001) has adopted a binary distinction to classify the information into realis and irrealis. Mood and modal systems encode the modal expressions of the two types. Identifying the distinction from the expressions is crucial for sentiment analysis since a sentiment value appearing in the irrealis context should be interpreted differently from the one in the realis.

Mood is represented by the use of verbal inflections although less commonly, it can be realized with non-inflectional phrases. Different modal meanings are conveyed by means of various types of mood, such as indicative, subjunctive, conditional, imperative, jussive, interrogative, and so on. However, not all of them have an impact on evaluating a sentiment value.

Modal systems are classified into two types according to Palmer (2001); propositional modality an event modality. The former is further categorized into epistemic and evidential modality while the latter is into deontic and dynamic. All four types are represented using their subcategories. Each class represents different modal meanings. When they are expressed along with sentiment in a sentence, it affects evaluation of the sentiment.

2.2 Encoding modal meanings in Korean

Modal meanings of mood in Korean are realized morphologically without syntactic interplay. Modal systems, however, are constructed utilizing morphosyntactic categories. Both mood and modal systems in Korean express both realis and irrealis.

Mood is a grammatical category which can be defined utilizing a set of criteria in morphology and semantics. Mood is in general represented inflectionally, and performs modal functions by expressing realis or irrealis in addition to the illocutionary forces. Realis is generally encoded in indicative mood whereas irrealis is in subjunctive, conditional, jussive, optative and potential, among others.

A modal system is constructed differently depending on the language in question. It is usually formed utilizing morphosyntactic categories, verbal suffixes, and lexical items including different parts of speech, subcategories of a particular part of speech, and so on.

2.2.1 Mood

Mood in the Korean language is formed by verbal suffixes while expressing various types of modal meanings. Korean verbal suffixes can be classified into terminal or non-terminal depending on their distribution within the verbal complex. Non-terminal suffixes are attached to the lemma of a verb or a lexical form composed of the lemma followed by a combination of different types of non-terminal suffixes¹. A non-terminal suffix, ‘-keyss’² encodes different types of mood including volitive, deductive speculative and assumptive. The type of mood is identified depending on the given context, that is, who the speaker is affects the determination. The subject being human also influences the interpretation of the function of the suffix.

- (1) *John-i ka-keyss-ta-ko malha-yess-ta.*
John-NOM go-VOL-DEC-CMPL say-PAST-DEC
John said that he would go.
- (2) *John-i ka-keyss-ta.*
John-NOM go-SPEC-DEC
John would go.
- (3) *pi-ka o-keyss-ta.*
rain-NOM come-SPEC-DEC
It would rain.

When the third person is both the subject and the speaker, it encodes volitive as shown in (1). In contrast, the third person or the non-human is the subject, the suffix cannot express volitive, but speculative as presented in example sentences (2) and (3). In both cases, the suffix also implies future time which is always associated with irrealis (Palmer, 2001). Additionally, volitive and speculative encodes irrealis.

¹ These suffixes include honorific, tense, perfective aspect, volitional, and mood markers.

² Korean is transcribed according to the Yale Romanization system (Martin, 1954) which is conventionally used among Korean linguists.

- (4) *nay-ka ka-keyss-ta.*
I-NOM go-VOL-DEC
I will go.
- (5) *na-nun tap-ul al-keyss-ta.*
I-TOP answer-ACC know-ASSUM-DEC
I probably know the answer.

With the speaker being the first person as in (4), it cannot be interpreted as speculative, but volitive. However, it adds an assumptive meaning if the verb can be classified as a cognitive verb, such as the verb ‘*al*’ (to know) appearing in example (5). Assumptive is still associated with irrealis, but it is closer to realis compared to speculative.

- (6) *phwumcil-i coh-keyss-ta.*
quality-NOM good-ASSUM-DEC
The quality seems good.
- (7) *phwumcil-i coh-keyss-te-la.*
quality-NOM good-ASSUM-RT-DEC
The quality seems to be good (based on some fact/ knowledge).

When it is attached to an adjective forming a predicate as in example (6), it also encodes an assumptive meaning. A sequence of ‘-keyss’ and a retrospective suffix ‘-te’ also add a assumptive meaning as in (7). The suffix, ‘-te’ also denotes past time while marking evidentiality, the foundation for speculation from a fact or knowledge which is acquired from the past. Accordingly, the meaning of the sequence should be interpreted differently from that of ‘-keyss’ used alone.

There are several terminal suffixes which convey different types of modal meanings. The terminal suffixes complete a verbal complex.

- (8) *phwumcil-i coh-ulkel.*
quality-NOM good-SPEC
The quality seems good.
- (9) *phwumcil-i coh-ass-ulkel.*
quality-NOM good-PST- SPEC
The quality seemed good.
- (10) *phwumcil-ey silmangha-lla.*
quality-GOL disappoint-ASSUM
I worry that (you/he/she/they) will be disappointed at the quality.
- (11) **phwumcil-ey silmangha-ass-ulla.*
quality-GOL disappoint-PAST-ASSUM
I worry that (you/he/she/they) might have been disappointed at the quality.

Terminal suffixes, ‘-lkel/ulkel’ and ‘-lla/ulla’¹ add a speculative and assumptive meaning, respectively while both of them complete a sentence. The former conveys the same meaning when it occurs with different tenses as in (8) and (9). The latter marks future and encodes an assumptive meaning, implying precaution about future as presented in (10). When it occurs with an explicit tense marker as in (11), it not only fails to express the intended meaning, but also violates grammaticality

- (12) *phwumcil-i coh-ayaci.*
quality-NOM good-OBL
The quality should be good.
- (13) *phwumcil-i coh-ass-ayaci.*
quality-NOM good-PAST-OBL
The quality should have been good.

Another terminal suffix, ‘-eyaci/ayaci’ provides an obligative meaning as shown in example (12). It still expresses the same meaning when the past tense marker is used as in (13). However, it describes the state; what it was supposed to be. Its interpretation should be the reversal of the meaning the predicate originally denotes. Obligative in present and past represent irrealis.

A terminal suffix, ‘-myen/umyen’ expresses conditional which is known as one of the main constructions encoding irrealis. Korean, however, does not distinguish conditional from subjunctive in terms of their structure.

- (14) *tulama-ka caymiiss-umeyn po-keyss-ta.*
drama -NOM interesting-COND watch-VOL-DEC
I will watch the drama if it is interesting.
- (15) *tulama-ka caymiiss-ess-umeyn po-ass-keyss-ci.*
drama -NOM interesting-PAST-COND watch-PAST-SPEC-SUBJ
I would have watched the drama if it had been interesting.
- (16) *tulama-ka caymiiss-umeyn coh-keyss-ta.*
drama -NOM interesting-COND good-ASSUM-DEC
It would be nice if the drama were interesting.

Example (14) presents conditional which is constructed with the conditional suffix. Example (15), on the other hand, expresses subjunctive by employing the same suffix. It describes a hypothetical event. Both conditional and subjunctive can be realized by means of another suffixes ‘-tameyn/-ntameyn/-untameyn’. In (16), the suffix encodes desiderative occurring with an adjective ‘coh’. All three types of modality represent irrealis.

Irrealis is also realized with reported markings. Another terminal suffix, ‘-tay’ adds a reported meaning which lacks evidentiality. When a statement does not contain evidentiality, it is deprived of reality since the speaker is in no position to assess the evidence. The suffix is originated from contraction of ‘ta-ko ha’ (DEC-COMP AUX) and grammaticalization of a complex sentence where the higher subject

¹ Some suffixes present allomorphs, one of which is chosen depending on whether the preceding syllable ends with in a trailing consonant or not.

is the speaker.

- (17) *tulama-ka caymiiss-tay.*
drama -NOM interesting-REPORT
(I hear that) the drama is interesting.

The subject, '*tulama-ka*' in example (17) is not the higher subject or the source of information, but the theme of the predicate. The higher subject, the speaker is omitted as the silent subject reporting whatever he or she heard or was informed of. In other words, the subjectivity or sentiment expressed in the embedded clause belongs to someone else, not the subject of the sentence.

Mood related to sentence types is realized utilizing a terminal suffix which completes a sentence. Korean presents the interrogative mood utilizing a suffix. The interrogative, however, is the mood of question seeking information, and sentences expressing the interrogative lack the evidentiality.

- (18) *tulama-ka caymiiss-ni?*
drama-NOM interesting-INTR
Is the drama interesting?

In sentence (18), the implicit speaker inquires whether the drama is interesting. Although the sentence includes a sentiment word, '*caymiiss*', its value cannot be determined. Similarly, other types of mood lack the evidentiality when they mark different sentence types such as imperative and hortative.

2.2.2 Modal system

Korean modal systems are realized utilizing mostly auxiliaries, modal adverbs, cognitive verbs, modal nouns and auxiliary postpositions. The predominant system is the one using auxiliaries which must occur with a connective suffix attached to the preceding main verb.

- (19) *tulama-ka caymiiss-nun kes kath-ta.*
drama-NOM interesting-ADN assumption likely-DEC
The drama seems interesting.
- (20) *tulama-ka caymiiss -n tusha-ta.*
drama-NOM interesting -CS assume-DEC
The drama seems interesting .
- (21) *tulama-ka caymiiss-na po-ta.*
drama-NOM interesting-CS seem-DEC
The drama seems interesting (to someone other than the speaker).
- (22) *tulama-ka caymiiss-e po-i-n-ta.*
drama-NOM interesting-CS seem-PASS-PRES-DEC
The drama seems interesting (to the speaker).

Sentences (19) ~ (22) encodes assumptive which is realized through different constructions. In (19), a complex modal system is introduced using the sequence '*-nun kes kath*'. Modal auxiliaries, '*tuha*' in

(20) and ‘*po*’ (21) both occur with a preceding connective suffix, ‘*-n/nun/un/l/ul*’ and ‘*-na/nka/nunka/lkka/ulkka*’, respectively. However, there is a distinction between (21) and (22) in terms of the higher subject. In (21), it refers to a non-speaker, not the speaker whereas in (22) the speaker is the higher subject. Both can be the higher subject in (19) and (20). Although assumptive represents irrealis, it should be treated differently since it is based on the known. It can function as a polarity shifter toward diminishing the degree of evidentiality.

- (23) *tulama-ka caymiiss-umeyn siph-ta.*
drama-NOM interesting-CS desire-DEC
(I wish) the drama was interesting.
- (24) *tulama-ka caymiiss-umeyn ha-n-ta.*
drama-NOM interesting-CS AUX-PRES-DEC
(I wish) the drama was interesting.
- (25) *tulama-ka caymiiss-eoya ha-n-ta.*
drama-NOM interesting -CS AUX-PRES-DEC
The drama has to be interesting.

An auxiliary, ‘*siph*’ presented in (23) expresses a desiderative meaning when it is used with the preceding connective suffix, ‘*-meyn/umeyn*’ which also implies condition. Auxiliary ‘*ha*’ in example (24), however, is a light verb whose meaning is determined by the context. It denotes desiderative when occurring with the conditional suffix. It is ambiguous in that it encodes many different modal meanings when it is paired with a different connective suffix. In (25), it encodes obligative with the connective suffix, ‘*-eoya*’ which implies obligation.

Modality in Korean can be realized employing lexical items including cognitive verbs, nouns, adverbs and auxiliary postpositions. When a cognitive verb is used, it has to be preceded by a complementizer or a connective suffix implying assumption.

- (26) *tulama-ka caymiiss-ta-ko sayngkakha-n-ta.*
drama-NOM interesting-DEC-COMP think-PRES-DEC
The drama is thought to be interesting.
- (27) *tulama-ka caymiiss-ulci molu-n-ta..*
drama-NOM interesting-CS not_know-PRES-DEC
The drama may be interesting.
- (28) *tulama-ka elmana caymiiss-nunci molu-n-ta.*
drama-NOM how much interesting-CS not_know-PRES-DEC
The drama is not expected to be this much interesting.

A group of cognitive verbs constructs a modal system. The verb ‘*sayngkakha*’ (to think) in (26) adds an assumptive meaning when it is preceded by a complementizer ‘*-ko*’ attached to the verb which composes the predicate of the embedded clause. Another verb of the same group, ‘*molu*’ (to not know) also encodes possibility as in (27) while preceded by a connective suffix ‘*-ulci*’ which itself denotes possibility. However, the verb does not convey a modal meaning when it occurs with another connective suffix ‘*-nunci*’ and an adverb ‘*elmana*’ as shown in (28). It simply emphasizes the meaning of the adjective ‘*caymiiss*’ which the suffix is attached to.

- (29) *tulama-ka caymiiss-ul swu iss-ta.*
drama-NOM interesting-ADN possibility exist-DEC
The drama can be interesting.
- (30) *tulama-ka caymiiss-ul li eps-ta.*
drama-NOM interesting-ADN reason not exist-DEC
The drama cannot be interesting.
- (31) *tulama-ka caymiiss-ul li iss-na?*
drama-NOM interesting-ADN reason exist-INTR
Can the drama be interesting?

A modal noun is used within a complex construction. The sequence ‘-l/ul swu iss’ in (29) functions as a modal auxiliary which adds possibility. An adnominal suffix ‘-l/ul’ is attached to ‘caymiiss’, modifying a dependent noun, ‘swu’ followed by a verb ‘iss’. The modal meaning is provided by the modal noun ‘swu’ which expresses possibility. The sequence ‘-l/ul li eps’, however, in (30) encodes the negation of the same modal meaning by means of the noun ‘li’ and ‘eps’ (not exist). They together denotes ‘possibility not’ by which the proposition is negated. The same sequence ‘-l/ul li’ can occur with a positive ‘iss’ (exist), but only in the question as presented in (31). Although it occurs in the interrogative which inquires information, it is just rhetoric to express the negative meaning. The expression still denotes the negative meaning.

There is a class of adverbs that adds modal meanings. They include ‘ama’, ‘pilok’, ‘hoksi’, ‘selma’, and so on. However, they do not determine the factuality of the sentence by themselves, but have to be used with other modal system or a mood marker.

- (32) *tulama-ka ama caymiiss-keyss-ci*
drama-NOM probably interesting-ASSUM-DEC
The drama is probably interesting.
- (33) *tulama-ka caymiiss-keyss-ci*
drama-NOM interesting-ASSUM-DEC
The drama is probably interesting.
- (34) *?tulama-ka ama caymiiss-ci*
drama-NOM probably interesting-DEC

In example (32), ‘ama’ expressing assumptive occurs with a modal suffix, ‘-keyss’ attached by a mood marker denoting declarative. The modal meaning of the sentence is determined by the suffix since the sentence still means the same without the adverb as shown in (33). It confirms the modal meaning of the sentence. Furthermore, the sentence is semantically anomalous when ‘ama’ is used without other modal system or a modal suffix, as in (34).

A modal meaning in Korean can be realized by adopting a rather special category known as auxiliary postposition. It is a bound morpheme which is attached to the noun lemma while replacing a case marker.

- (35) *tulama-nun caymi-cocha eps-ul ke-ya*
drama-TOP fun-AUX_P not_exist-ADN ke-CPL-DEC
With everything else not satisfying, the drama would not be even interesting.
- (36) *tulama-nun caymi-cocha eps-ta*
drama-TOP fun-AUX_P not_exist-DEC
With everything else not satisfying, the drama is not even interesting.

An auxiliary postposition ‘*cocha*’ (even) in examples (35) and (36) adds a modal meaning, concessive. However, the factuality of the sentence is determined by other modal system. In example (35), the auxiliary postposition intensifies the meaning of the noun that it is attached to. The sentence encodes irrealis by means of the modal system ‘*-ul ke-ya*’. In comparison, example (34) encodes realis since the sentence does not contain any modal system or a mood marker.

3. SENTIMENT ANALYSIS AND MODALITY

Having opinions accessible to an automated machine requires several steps of processing. They include identifying subjectivity, evaluating sentiment values, and converting them to some forms that can be classified and measured. Evaluation of sentiments has to be provided with accurate interpretations of the opinion which rely on utilizing not only various types of linguistic knowledge, but also contextual expressions. When a sentiment is analyzed, the modality of the sentence has to be checked concerning whether its meaning being realis or irrealis and its specific type. If a sentiment is identified in the irrealis context, its value has to be interpreted differently.

A sentiment value of a sentence is calculate and assigned when the polarity value is evaluated from sentiment words included in the sentence. Before assigning the value, the sentiment has to be interpreted considering the contextual expressions. The expressions may provide the triggers by which the polarity value can be shifted for reversing, intensifying, or diminishing. The intensified or diminished values can further be gradated according to the degree.

A modal expression can play a role as a polarity shifter when it occurs in the context which includes sentiment. The expression provides additional meaning which affects interpreting the sentiment. Modal meanings denoting irrealis in general remove the polarity value from a sentiment word since they lacks evidentiality.

- (37) *phwumcil-i coh-ta.*
quality-NOM good-DEC
The quality seems good.

Example (37) contains a sentiment word ‘*coh*’ whose prior polarity value is positive. Since the sentence represents realis without a polarity shifter, it is assigned with the prior value of the sentiment word. Examples (6) and (7) listed in 2.2.1 are identical to (37) except an additional modal meaning is applied to the sentiment word in (6) and (7). Example (6) expresses the assumptive, one of the mechanisms to encode irrealis by which the positive value should be reevaluated. Since the positive meaning is expressed, it has to be removed or diminished to the great extent due to the lack of evidentiality. Sentence (7) also represents irrealis since the same modal suffix, ‘*-keyss*’ is included. However, the sentiment value should not be changed since it is attached by another modal suffix ‘*-te*’ which marks evidentiality. The modal expression ‘*-keysste*’ posits the value between the realis and irrealis. Accordingly, the final polarity should be evaluated as the same as the one with realis, but diminished to some extent in terms of its degree.

- (38) *phwumcil-i coh-ci anh-keyss-ta.*
quality-NOM good-CS not-PRSM-DEC
The quality would not be good.

Negating the assumptive does not convert the irrealis to the realis, but still expresses the negative polarity as shown in example (31). Nevertheless, the degree of the sentiment value has to be reconsidered since it lacks evidentiality of being negative. The degree of negation can be adjusted, by which the intensity of the negated meaning is reduced.

Some of the modal meanings implying irrealis can function as a polarity shifter as discussed with the examples including the assumptive suffix, ‘-keyss’. Those modal meanings include assumptive, abilitive, obligation, possibility, reported, desiderative, volitive, subjunctive and conditional. The assumptive, possibility and reported, however, need to be studied further for subcategorizing them as the ones working as a polarity shifter and those which do not. For the shifters, their affecting intensity should also be measured. For example, the modal expression using ‘-ulci molu’ cannot function as a polarity shifter whereas the expressions including other cognitive verbs such as ‘chwuchukha’ can affect the evaluating the sentiment value.

When they are identified as a polarity shifter, the shifting is directed only towards diminishing the degree of polarity. This equally applies to both negative and positive values. Accordingly, correctly identifying and interpreting modality will surely contribute to improving the accuracy of automated sentiment evaluation.

4. CONCLUSION

Modality in Korean is represented by both mood and a modal system, and realized by means of various types of constructions. Mood and modal systems convey different types of modal meanings which represent either realis or irrealis. A modal meaning representing irrealis in particular affects calculating sentiment values to a certain degree of polarity. Since irrealis is not grammatically marked, it cannot be identified utilizing grammatical features or categories. Accurately identifying modal constructions and interpreting their meanings, however, can lead to distinguish irrealis. In addition, various types of modal meanings need to be correctly classified since only some of the types describe the irrealis.

Correctly identified modal meanings and their types are utilized for evaluating sentiments. Modality by definition expresses the speaker’s attitude which is subjective and indicates semantic orientation on a proposition. Similarly, sentiment analysis aims to capture and evaluate the nature of opinions where the speaker’s subjective sentiments towards an entity are expressed. Modal meanings denoting irrealis, however, remove subjectivity from the opinion in some cases. Instead of eliminating the subjectivity completely, they rather reduce the intensity of sentiments in some other cases. The degree of diminishing sentiments differs depending on the classes of modal meanings. The influencing classes this research has found include assumptive, abilitive, obligation, possibility, reported, desiderative, volitive, subjunctive and conditional.

The modal expressions denoting the influencing classes need to be systematically categorized. The resultant classification information has to be described in the sentiment lexicon and retrieved during the process of automated sentiment analysis. Since the performance of a sentiment analysis system relies on how accurately the system identifies the modal meaning applied to an entity, careful and thorough classification of modal expressions are required. Systematic classification of modal expressions is to proceed with a corpus in the future research.

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