2-5 Development of a System to Point Out Misuse of Japanese Honorific

SHIRADO Tamotsu

We developed a computational system to indicate the misuse of honorifics in Japanese speech sentences. The misuse was checked by constructing a consistency table. The consistency table defined the consistency between the honorific features of sentences and the social relationship among the people involved in the sentence. The social relationship was represented by combinations of [relative social position among the people] × [in-group/out-group relationship among the people]. The proposed system was verified using test data prepared by the authors and also by third-party linguistic researchers. The results showed that the system was able to discriminate between the correct and the incorrect honorific sentences in all but a few cases.

1 Introduction

The use of honorifics is an important characteristic of the Japanese language. Japanese honorifics appear not simply in requests and demands and in pronouns indicating people but have become widely embedded in the language's linguistic structures and behaviors. However, in today's Japanese society a wide range of errors in use of Japanese honorifics can be noted. [1][2] This misuse of honorifics can negatively affect the recognition and structure of appropriate social relationships between individuals. To avoid such misuse, it is essential to have an accurate understanding of honorific norms. The development of computing systems to support the study of honorifics promises to assist in the efficient development of such understanding.

With the foregoing in mind, we have constructed a system to point out misuse of honorifics in Japanese speech. When Japanese-language speech and the social relationships between the persons involved in the conversation are input, the system returns information on whether the input speech includes any misuse of honorifics, and if so, the locations and types of such misuse.

To verify the effectiveness of this system, the authors prepared test data and had linguists specializing in Japanese within another research group prepare test data as well. The authors used these sets of test data in experiments in which the computer system judged the use of honorifics included in the data. With the exception of a very small number of cases, for the most part we were able to confirm that the system provided reliably appropriate output.

2 Misuse of honorifics

The misuse of honorifics can be grouped into two major categories: word-form misuse and usage misuse. This system incorporates a feature for pointing out cases of word-form misuse using a structured list of expressions regarding cases of such misuse. The system also applies a structure of normative rules (specifically, a consistency table) to check consistency

between (1) honorific characteristics of speech, (2) subjects and objects of speech predicates, and (2) social relationships between the persons involved in speech.

2.1 Word-form misuse

Cases of word-form misuse refer to use of expressions in which word forms are incorrect for honorific use. Table 1 shows part of the list of expressions including cases of word-form misuse used by this system. In this table, an asterisk (*) represents a verb.

2.2 Usage misuse

Usage misuse refers to the use of expressions that are inconsistent with the social relationships between the persons involved in the conversation, although the word forms are correct. We expressed these social relationships between the people involved in the content of the conversation as combinations of social hierarchical relations and social "in-group" and "out-group" status (i.e., whether or not the individuals are members of the same social group, such as a company or a family). This system can handle cases in which hierarchical relations are not clear — in other words, cases in which the individuals involved have the same social status instead of being in clearly recognizable hierarchical relationsr — as well as cases in which hierarchical relations are clear.

3 System for pointing out misuse of honorifics

3.1 Speech covered by this system

Japanese speech and the social relationships of the persons involved in the speech are entered into the system. The system processes the speech on the assumption that the social relationships of the individuals involved are always correctly input. Speech input must satisfy the following restrictions:

Restriction 1

Each speech sentence must contain only one predicate, containing one subject and one object each.

Restriction 2

Each conversation must involve from two to four persons. When the conversation involves two persons, one must be the speaker (always referred to as "S") and one the listener (always referred to as "L"). When the conversation involves three persons, in addition to the speaker and the listener the third person is a person referred to in the speech (always referred to as "A"), and when the conversation involves four persons, the fourth is a second person referred to in the speech (always referred to as "B").

Restriction 3

When the speaker (S), listener (L), A, or B is the subject or object of a predicate, the symbol pointing to this person must be indicated clearly.

3.2 Patterns of honorific characteristics

Honorifics are grouped into the following major categories: respectful expressions, humble expressions, and polite expressions. Most standard types of respectful expressions are predicates with forms for respectful expressions and honorific titles for persons (such as "-*sama*"). Most standard types of humble expressions are predicates with forms for humble expressions. Humble expressions can be categorized further into humble expressions that ennobles objects ("humble expression a" hereinafter) and humble expressions that do not ennoble objects ("humble expression b" hereinafter). Polite expressions primarily refers to polite terms (such as "*desu*") used at the end of sentences.

Honorific characteristics in accordance with restrictions 1–3 can be considered capable of being expressed by the presence or absence of an honorific title used for the sub-

Table 1 Partial list of expressions including cases of word-form misuse

Expression ("*": verb)	Type of misuse
O/go ni narareru	Honorific duplication
O/go nasareru	Honorific duplication
O/go wo nasareru	Honorific duplication
O/go sareru	Confusion of respectful and humble expressions

Table 2	Sample dictionary of honorific types ("*": verb)

Morpheme section and line	Honorific type
"L" + "*sama*"	Honorific title
"A" + "*san*"	Honorific title
"B" + "*shi*"	Honorific title
"*O*" + * + "*suru*"	Humble expression <u>a</u>
"*Go*" + * + "*suru*"	Humble expression <u>a</u>
"*Go*" + * + "*itasu*"	Humble expression <u>a</u>
"*Itadaku*"	Humble expression <u>a</u>
"*Mousu*"	Humble expression <u>a</u>
"*O*" + * + "*nasaru*"	Respectful expression
"*Go*" + * + "*ni*" + "*naru*"	Respectful expression
"*Ossharu*"	Respectful expression
"*Irassharu*"	Respectful expression
"*Itadaku*" + "*rareru*"	Humble expression <u>a</u> + respectful expression
"*Desu*" + "."	Polite expression
"*Masu*" + "."	Polite expression

Table 3	Definitions of honorific-character-istic patterns

Value of each element in the honorific-characteristic pattern	Sentence characteristics
$s = 0$	No honorific title used for *subj*
$s = 1$	Honorific title used for *subj*
$o = 0$	No honorific title used for *obj*
$o = 1$	Honorific title used for *obj*
$e = 0$	Sentence does not end in polite expression
$e = 1$	Sentence ends in polite expression
$p = 0$	Plain-form predicate
$p = 1$	Respectful-expression predicate
$p = 2$	Humble-expression-<u>a</u> predicate
$p = 3$	Humble-expression-<u>a</u> + respectful-expression predicate
$p = 4$	Humble-expression-<u>b</u> predicate

Fig.1 System input and output

ject of a predicate, by the presence or absence of an honorific title used for the object of a predicate, and by whether or not the sentence ends with a polite term and honorific characteristics of the predicater — in other words, whether the honorific is expressed using a respectful expression, humble expression <u>a</u>, humble expression <u>b</u>, humble expression <u>a</u> + respectful expression (bidirectional honorific), or the plain form. In this study, all of the above are referred to collectively as "honorific types". Accordingly, this system uses the dictionary of honorific types shown in Table 2 to create the patterns shown in Table 3, based on subject and object data obtained through sentence-structure analysis of speech sentences and of rows of morphemes obtained through morpho-logical analysis of the speech sentences. The system expresses the honorific characteristics of speech sentences using these patterns (referred to hereinafter as "honorific-charac-teristic patterns").

Honorific-characteristic patterns (Table 3) consist of the four elements *s, o, e,* and *p*. Element s takes the value 1 or 0 depending on whether or not an honorific title is used with the subject (indicated as "*subj*") of the predi-cate. Element *o* takes the value 1 or 0 depend-ing on whether or not an honorific title is used with the object (indicated as "*obj*") of the pred-
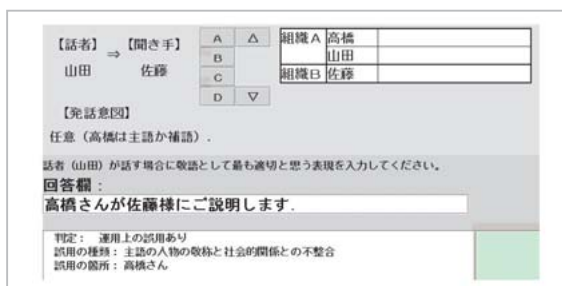
icate. Element *e* takes the value 1 or 0 depend-ing on whether or not the sentence ends with a polite expression. Element *p* takes the value 0, 1, 2, 3, or 4 depending on whether the predi-cate is in plain form or the form of a respectful expression, humble expression <u>a</u>, humble expression <u>a</u> + respectful expression (bidirec-tional honorific), or humble expression <u>b</u>.

3.3 Input and output

Figures 1 shows sample system input and output. Standardized names are used for the persons involved in the conversation. Specifi-cally, the speaker is named "Yamada", the lis-tener "Sato", and the third person "Takahashi". In addition, although this person does not appear in Fig. 1, the fourth person has been named "Kimura". (In subsequent processing, the names "Yamada", "Sato", "Takahashi", and "Kimura" have been replaced with the symbols "S", "L", "A", and "B".) The social relation-ships between the individuals involved in the conversation are shown in the upper-right of the figure. In this sample, both Takahashi and

Yamada belong to organization A (an in-group relationship) and Takahashi has a higher social position than Yamada. These two persons are in an out-group relation with Sato (who belongs to organization B). The system features buttons labeled with the organization names "A", "B", "C", and "D", making it possible to assign any individual to any organization. Up and down buttons are also provided to designate the social positions (higher, lower, or equal) of persons belonging to the same organization.

The user needs to be able to describe freely sentences using honorifics correctly under the social relationships between the persons involved as shown on the GUI, using the correct honorifics.

From the sentences input, the system checks for word-form misuse and usage misuse and outputs the type and location of any cases of misuse discovered. The example in Fig. 1 shows a case judged as usage misuse, because the honorific title used with the subject ("‐san") is not consistent with the social relationship (see Section **3.5** for details), although no word-form misuse was discovered.

3.4 Flow of processing

Figure 2 shows the flow of processing used in this system. Speech sentences and the social relationships between persons involved in the conversation are converted from input in the GUI shown in Fig. 1. Specifically, each of the names "Yamada", "Sato", and "Takahashi" (and "Kimura" where applicable) is converted to the symbols "S", "L", "A", and "B" as shown for the speech sentences in Fig. 2. In addition, the symbol strings generated corresponding to the social relationships between persons designated in the GUI shown in Fig. 1 (with the individuals' names expressed using the symbols shown above) represent the social relationships shown in Fig. 2. For example, the symbol string generated from Fig. 1 is "(A>S)(L)". Here, persons represented by symbols within the same pair of parentheses are in an in-group relation with each other and an out-group relation with the other persons. Additionally, the symbol to the left of a

"greater-than" sign (">") within a single pair of parentheses represents a person in a socially superior position to the person represented by the symbol to the right of the "greater-than" sign while the two persons represented by the symbols on either side of an "equals" sign ("=") are in equal social positions.

Speech text was first subjected to morphological analysis, with the rows of morphemes obtained as a result of this analysis checked for word-form misuse using the list of expressions including cases of word-form misuse (Table 1). For example, when the row of morphemes included "O" + verb + "ni" + "naru" + "reru", the system determined that the word-form misuse "O . . . ni narareru" had been used; processing was then completed with the output of a notice of this misuse. Sentence-structure analysis was also used to identify the subject and object of a given predicate. For example, in the speech sentence shown in Fig. 1 the subject was identified as A ("Takahashi") and the object as L ("Sato").

When no word-form misuse was present and sentence-structure analysis was successful, honorific-characteristic patterns were derived for speech sentences, based on data on rows of morphemes and subjects and objects. In this derivation, the honorific type dictionary (Table 2) and definitions of honorific-characteristic patterns (Table 3) were used. For example, the row of morphemes in the speech sentence shown in Fig. 1 is "A" "‐san" "ga" "L" "‐sama" "ni" "go" "setsumei" "suru" "masu"
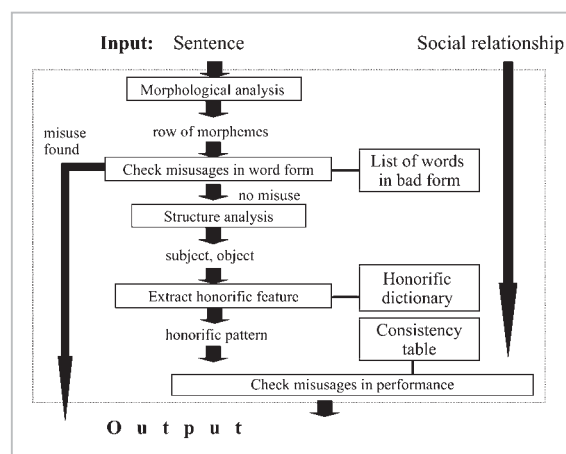

Fig.2 *System processing flow*

"." Since an honorific title ("A" "‑san")
applies to the subject (A) and another honorific
title ("L" "‑sama") applies to the object (L), the
sentence ends with polite expression ("masu"
"."), and the predicate is expressed in humble
expression $\underline{a}$ ("go . . . suru"), $s = 1$, $o = 1$, $e = 1$,
and $p = 2$.

Lastly, the consistency table is used to
check consistency between the honorific-char-
acteristic patterns and the social relationships
of the individuals involved in the conversa-
tion, and the results of judgment are output
indicating whether there are any cases of
usage misuse.

3.5 Consistency table

The consistency table (part of which is
shown in Table 4) is a set of rules covering
honorific norms related to the social positions
of persons involved in speech relative to the
subjects and objects in predicates; these rules
also apply to the correspondence between
honorific-characteristic patterns and the values
of each element. Here, the social positions of
persons involved in speech relative to the sub-
jects and objects in predicates are represented
by logical expressions including the up- and
down-arrow symbols ("∧" and "∨"). The sys-
tem of notation is the same as that described
above. The symbols "S", "L", "A", and "B"
indicate persons. Symbols included within a
single pair of parentheses represent persons
bearing in-group relations with each other,
while symbols outside the pair of parentheses
represent persons in out-group relations with
the persons within the single pair of parenthe-
ses. The symbol to the left of a "greater-than"
sign within a single pair of parentheses repre-
sents a person in a position socially superior to
that of the person represented by the symbol
to the right of the "greater-than" sign, while
the two persons represented by the symbols on
either side of an "equals" sign are in equal
social positions. Further, "$\{subj : X\}$" and
"$\{obj : Y\}$" indicate that the predicate's sub-
ject is X and its object Y, respectively. For
example, the input shown in Fig. 1 is repre-
sented as: $(A>S)(L) \wedge \{subj : A\} \wedge \{obj : L\}$.

Table 4 Consistency table (for two persons —
speaker and listener — involved in a
conversation)

Factors of honorific-characteristic pattern	Social positions of persons involved in speech relative to the subjects and objects in predicates
$s = 0$	$(S=L) \vee (S>L) \vee [(L>S) \wedge \{subj : S\}] \vee [(L>S) \wedge \{obj : L\}] \vee [(S)(L) \wedge \{subj : S\}] \vee [(S)(L) \wedge \{obj : L\}]$
$s = 1$	$[(L>S) \wedge \{subj : L\}] \vee [(L>S)\{obj : S\}] \vee [(S)(L) \wedge \{subj : L\}] \vee [(S)(L) \wedge \{obj : S\}]$
$o = 0$	$(S=L) \vee (S>L) \vee [(L>S) \wedge \{subj : L\}] \vee [(L>S) \wedge \{obj : L\}] \vee [(S)(L) \wedge \{subj : L\}] \vee [(S)(L) \wedge \{obj : S\}]$
$o = 1$	$[(L>S) \wedge \{subj : S\}] \vee [(L>S) \wedge \{obj : L\}] \vee [(S)(L) \wedge \{subj : S\}] \vee [(S)(L) \wedge \{obj : L\}]$
$e = 0$	$(S=L) \vee (S>L)$
$e = 1$	$(L>S) \vee (S)(L)$
$p = 0$	$(S=L) \vee (S>L)$
$p = 1$	$[(L>S) \wedge \{subj : L\}] \vee [(L>S) \wedge \{obj : S\}]$
$p = 2$	$[(L>S) \wedge \{subj : S\}] \vee [(L>S) \wedge \{obj : L\}]$
$p = 0 \vee 1$	$[(S)(L) \wedge \{subj : L\}] \vee [(S)(L) \wedge \{obj : S\}]$
$p = 0 \vee 2 \vee 4$	$[(S)(L) \wedge \{subj : S\}] \vee [(S)(L) \wedge \{obj : L\}]$

In the example shown in Fig. 1 no logical
expression was found from among those that
satisfied the group of logical expressions cor-
responding to $s = 1$ in the consistency table
(i.e., with an honorific title for the subject); as
a result the system determined that this exam-
ple represented usage misuse in the employ-
ment of an honorific title for the subject.

4 Verifying system reliability

To verify the reliability of the system's
return of appropriate results, we conducted
experiments in which the system was prompt-
ed to make judgments using test data. Two
sets of test data were prepared: Test Data 1
(prepared by the authors) and Test Data 2
(prepared by a group of linguists specializing
in Japanese, other than the group to which the
authors belonged). The test data consists of
positive and negative examples. "Positive
examples" and "negative examples" as used
here refer to speech sentences paired with
social relationships between individuals that,
as honorifics, are either correct or incorrect (in
terms of usage), respectively.

Test Data 1 consisted of approximately
800 positive examples and the same number
of negative examples. Test Data 2 consisted of
approximately 4,000 positive examples and

the same number of negative examples.

When we input the test data described above into the system, all positive examples in Test Data 1 were judged to be correct and all negative examples in Test Data 1 were determined as misuse.

However, for Test Data 2 the system judged 99.4% of the positive examples to be correct but judged the remaining 0.6% to represent misuse. The upper half of Figures 3 shows a typical example of a case judged to represent misuse. In this example, the individuals S, L, and A are all in an in-group relation with each other and the hierarchical relation between them is represented by A>S>L. Here, L is the subject. For this example, the value of p matching (A>S>L) $\wedge$ {$subj$: L} in the consistency table is expressed as $p = 2$ (in other words, the predicate in the table is in the form of humble expression a). (This example has been omitted from Table 4.) However, since this sentence's predicate is in the plain form ($p = 0$), the system judged this plain form as misuse. The researchers who prepared Test Data 2 suggested that this case could not be considered definitely to violate norms if the predicate were not in honorific form. It seems likely that more than a few linguists specializing in Japanese would offer the same interpretation. Most of the remaining simple sentences judged to represent misuse were also attributable to differences in the recognition of honorific norms.

In addition, while approximately 97.3% of the negative examples in Test Data 2 were judged to represent misuse, the remaining approximately 2.7% were judged correct. The lower half of Fig. 3 shows a typical example of negative examples in Test Data 2 judged as correct. In this example, individuals L and A involved in the conversation are in an in-group relation, with the hierarchical relation between these two depicted by A>L. These two individuals are in an out-group relation with S, who is the subject. For this example, the value of p matching (A>L)(S) $\wedge$ {$subj$: S} in the consistency table is $p = 0 \vee 2 \vee 4$. (This example has been omitted from Table 4.) In this

【An example of positive sentence judged as "misuse"】
　Kimi ga A san ni setumei sita. (A>S>L)

【An example of negative sentence judged as "correct"】
　Watasi ga A san ni denwa o site agemasu. (A>L)(S)

Fig.3 *Examples of cases from Test Data 2 that did not match system predictions*

case, the predicate in the sentence ("*agemasu*") is deemed by the system simply to be in the plain form ($p = 0$), and since $p = 0$ is contained in $p = 0 \vee 2 \vee 4$, the system judges this example to be correct. However, most linguists specializing in Japanese consider "*agemasu*" to be an expression that should not be directed at out-group persons or persons ranked higher hierarchically. The researchers who prepared Test Data 2 may have used "*agemasu*" as a negative example based on this interpretation. It is likely that in order to enable the system to handle expressions such as this one correctly, steps to expand the system, such as increasing the number of predicate types it can handle, will be necessary.

5 Conclusions

We developed a system for pointing out cases of word-form misuse and cases of usage misuse included in Japanese speech sentences. This system accepts Japanese-language speech sentences and the social relationships between the people involved in such speech as input, and outputs information on whether the input speech includes any cases of misuse of honorifics and the locations and types of such cases of misuse. When we assessed the reliability of the system using sample sentences, we confirmed that the system generated appropriate output with the exception of a very small number of cases. We believe this system could prove useful particularly as a learning aid for beginning learners of Japanese honorifics. We also believe it could be useful for other persons in a wide range of applications, such as checking for careless errors

when Japanese text is entered in a computer. It would be even more convenient in terms of learning the use of honorifics if the system were to provide examples of correct expres-sions instead of simply pointing out cases of misuse. Our aim for the future is to make this system more practical by expanding it with functions addressing this and similar issues.

SHIRADO Tamotsu, *Dr. Eng.*

Research Manager, Project Promotion Office, Knowledge Creating Communication Research Center (former: Senior Researcher, Computational Linguistics Group, Keihanna Human Info-Communication Research Center, Information and Communications Department)

Computational Lingusitics