Japanese Self-Directed Learning System with YouTube Requires Meta-knowledge of Collocation

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Abstract

This study proposed a self-directed learning system that extracts subtitle information from YouTube videos and presents it as learning vocabulary. In recent years, Japanese language learners' interests have become more diverse, with easy access to multilingual information through SNS. Thus, it is assumed that there are many potential learners not enrolled in Japanese language institutes or less-than-learners. This study proposes a system for learners to learn Japanese from desired YouTube videos. The basic concept of the system is to extract subtitle information from 10 videos and present high-frequency words. The results of frequency analysis and co-occurrence analysis showed the feasibility of this system. At the same time, it was suggested that the characteristic words of each video should be presented together with their collocations and that meta-knowledge of their usages is required.

Keywords: Japanese Language Education, YouTube-based learning, Less-than-learners, Language Learning

1. Introduction

Motivations for language learning are becoming more diverse as contact with multilingual information through SNS is becoming more common. Therefore, it is expected that the number of potential 'less-than-learners,' who are not explicit learners in the classroom, is increasing.

In this study, I propose a system that allows such potential learners to watch videos of their own interest, focusing on the words they need to know. With this background, several studies have been proposed to incorporate YouTube into language education (e.g., [1][2][3]). In this study, students will create a system that allows them to watch their favorite Japanese-language YouTube videos and learn the vocabulary and grammar used in those videos.

2. Method

2.1. Self-learning system with YouTube

In this project, I propose a system that learners (including less-than-learners) to watch their favorite Japanese-language YouTube videos and learn the vocabulary and grammar used in those videos. The configuration of the system is shown in Figure 1.

Outlines of the system

This system is planned as a web application. Learners will select their Japanese level and input links of videos they want to watch. In order to obtain a sufficient word size for the co-occurrence analysis, it is desirable that the links be entered for approximately 10 videos of 10 minutes in length. If the video length is for several hours,
such as a video of a live game, a single video link would be sufficient in size.

**How to use the self-study system**

1) Visit the system website
2) Select your Japanese language level
3) Enter 5-10 links to the videos you want to watch
4) Press the [Search] button
5) Learn the displayed list of words and grammar list
6) Watch the video you want to watch

**2.2. Video Materials**

In this study, cooking-related YouTube videos will be used as the material for this study, with a view toward educational practice in the food and beverage department where the author belongs. Cooking-related YouTube videos include various genres such as recipe, cooking, mysterious dishes, eating huge volumes, and videos in which the eating sound is played. Of these, this study will use the "Kimagure-Cook" channel, which has the largest number of subscribers among Japanese YouTube channels, as its material.

Kimagure-Cook consists mainly of videos showing one man dismantling and cooking fish and other marine products. In the fish cooking process, terms that are not used in general conversation, such as parts of the fish, cooking utensils, and verbs for cooking, appear. These words are not included in general language instructional materials, or they are considered advanced content. The 10 videos used in this study are listed in the reference.

As language materials, 10 videos were compiled into a corpus, detailed as Table 1. Note that the corpus is analyzed unformatted, assuming that learners use arbitrary videos. (i.e., errors in speech analysis, unknown words, etc., were not removed or corrected).

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**3. Analysis and brief results**

The output of this system is the presentation of learning vocabulary according to the learner’s level. For this goal, the system analyzes the words necessary to understand the video in Japanese (the original language).

There are two main types of analysis. One is the frequency analysis of words to extract high-frequency words, and the other is the characteristic words in each of the 10 videos based on co-occurrence relations.

**3.1. High Frequency Words**

Of the words that appeared in the 10 videos, the high-frequency words (set as frequency 8 or higher) were as shown in Table 2. Note that following analysis focuses on verbs and nouns.

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<th>Table 1</th>
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<td>豚肉</td>
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**3.2. Common words and characteristic words**

These high-frequency words can be categorized into common words that appear in all videos and characteristic words that are unique to each video. To identify the tendency of the words-appearance, the nouns and verbs in the corpus are plotted by correspondence analysis with each video, as shown in figure 2.

Figure 2 shows that the Tasmanian crab and squid videos contain a number of characteristic words. In the Tasmanian crab video, words such as Tasmania, crab,
claw, and legs seem characteristic words. In the squid videos, words such as squid, uncut, eyeball, skin, and processing are characteristic words. The feature terms, based on co-occurrence relationships (by Jaccard index) within each video are shown in Table 3.

3.3. Collocation

Although presenting only frequent or feature words may have a certain educational effect, presenting collocations may improve the qualitative aspect of word knowledge. In this section, we propose a method of presenting feature words together with collocations, using the vocabulary of the Tasmanian crab and squid videos, a unique set of 10 videos, as an example.

In this section, collocations of characteristic words in squid-video and Tasmanian club video are analyzed by listing words with two or more co-occurrences as major collocations.

Collocation in Tasmanian club video

Take a look at the collocation of feature words in the Tasmanian club video. The first characteristic word, “Tasmania,” is a proper noun and does not need to be analyzed by collocation.

The main collocations of “爪 claw” in the second place were ‘足 legs’ and ‘剥ける drop’ The ‘足 leg’ was used in the literal sense of “crab legs,” ‘Drop(ping)’ was used as a transitive verb in the sense of cutting off crab legs, claws, or fish fins. In understanding the word “claw,” one may be required to have the meta-knowledge

that in Japanese, both crab claws and human fingernails are represented by the same word, 足 ashi. In derivation, the knowledge that both foot and leg can be applied to the Japanese word ‘足 ashi’ may also be required.

The main collocations for ‘捌く/sabaku/ dress or process (a fish)’ were ‘思い think’ and ‘魚 fish’. The usage of ‘思い think’ was “思いげる思う I think I can dress it” or “思いていかたいと思う I would like to process it,” thus no particularity as a collocation was observed. The co-occurrence with ‘魚 fish’ is the expression ‘魚を捌く dress a fish.’ In Japanese, ‘捌く’ is used to describe the chopping up of fish or chicken.

“落とす drop’ is the transitive form of ‘落とる drop.’ It co-occurs with ‘頭 head,’ ‘関節 joint,’ ‘足 leg,’ and ‘爪 claw’ as objects. When processing crabs, ‘落とす drop’ is used to describe the cutting off of the legs and other parts of the crab.

Collocation in Squid video

The collocations for ‘皮 peel [noun]’ are ‘剥く/muku/ peel [verb], ‘状態 state,’ ‘柚子 yuzu,’ ‘剥く/pull,’ ‘感じ feel,’ ‘止める stop,’ ‘入れる insert’, and ‘剥げる
remove’. The regular expression to remove the skin is the phrase “皮を剥ぐ /ka\w o h\ag u peel off” or “皮を剥く /ka\w o m\uk u peel off”. A similar but less common expression, “皮を剥く /ka\w o h\ik u peel off the skin,” is used when removing the thin skin of yellowtail, squid, and other fish. Derivatively, there is also the usage of “湯引き /yu\bik i\l hot water-peeling,” for tomatoes, peaches, and so on.

In Japanese, not only human skin, but also the skin of fish, the peel of fruits such as yuzu, and the bark of trees are described as ‘皮 /ka\w al skin’. Animal skin is also ‘皮,’ and tanned skins are also pronounced ‘/ka\w al’ (spelled as革). Such metaknowledge is essential to understand the use of the word ‘skin’ as well as ‘nails / craws for爪’ in the Tasmanian Club.

The two highest co-occurring words (with at least two co-occurrences) for “剥く /m\uk u peel” were ‘皮’ and ‘風’. Of these, ‘風’ was used in all cases to be pronounced /fu/ (means way, not as /k\a\v e/ for wind), which means “こんな風に剥いていきます. I will peel in this way.”

4. Summary & Discussion

In this presentation, we propose a self-directed Japanese language learning system that extracts subtitle information from YouTube videos and presents them as learning vocabulary.

As a method of presenting learning vocabulary, I proposed a strategy to present collocation-aware information in addition to the method of creating a corpus from videos and presenting frequently appearing words.

Word usage in YouTube videos has a special frequency structure depending on the genres of the videos. The analysis suggests that while the frequent words can be simply presented, the characteristic words of each video need to be presented together with collocations and meta-knowledge on the word usage.

Future research issues are the presentation of the vocabulary according to the learner’s level, the systematization of meta-knowledge for presenting collocations, and the implementation of the system.

References


YouTube Movies

[All by “Kimagure-cook”, Titles modified]


2. 巨大イカのさばきたか？, 2019. https://www.youtube.com/watch?v=qmuxw4iZvJU.


7. 水死したエイの腹の中を縄張り掃除してさばいて料理してみた, 2018. https://www.youtube.com/watch?v=gIYbo3nN72E.

8. 育ちすぎてしまった巨大な危険生物ニシキエビ。すべてが規格外。生きたままさばいて食べた, 2019. https://www.youtube.com/watch?v=Rs_xTpxeOUQ.


Authors Introduction

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H. Fxyma received Doctoral degree from Keio University, Japan in 2018. His research domain includes application of Cognitive Science to Japanese Language Education.

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