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.
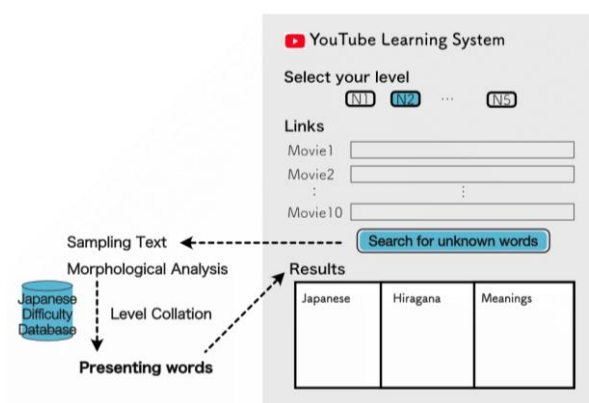

Figure 1 The outline of the self-learning system with YouTube (web application).

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).

Table 2

Tokens	18,502
Types	2,800
Sentences	1,952
Paragraphs	1,845
H1 (Movies)	10

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

Table 1

	Words	Trans.	Freq.		Words	Trans.	Freq.		Words	Trans.	Freq.
1	はい	(int.)	94	34	買う	buy	15	68	ゲソ	geso	10
2	入る	enter	78	35	半分	half	15	69	トラフグ	tiger puffer	10
3	思う	think	70	36	味	taste	15	70	一緒	together	10
4	食べる	eat	66	37	じゃあ	then	14	71	簡単	easy	10
5	感じ	feel	63	38	出る	come out	14	72	撮れる	you can take	10
6	今日	today	55	39	水	water	14	73	食材	food	10
7	入れる	enter	52	40	来る	come	14	74	猫	cat	10
8	ええ	Yes (int.)	43	41	ありがとう	Thank you	13	75	1本	(num.)	9
9	言う	say	38	42	状態	condition	13	76	カニ	crab	9
10	持つ	have	33	43	イセエビ	spiny lobster	13	77	ノーカッ	I no-cut	9
11	皮	skin	31	44	剥く	peel	13	78	違う	No	9
12	美味しい	delicious	29	45	本当に	really	13	79	皆さん	everyone	9
13	ああ	ah (int.)	27	46	本日	today	13	80	肝臓	liver	9
14	見る	see	27	47	綺麗	clean	13	81	帰る	go home	9
15	作る	make	27	48	きれい	clean	12	82	巨大	huge	9
16	包丁	knife	27	49	めちゃくちゃ	crazy	12	83	終わる	finish	9
17	えっ	(int.)	26	50	タスマニア	Tasmania	12	84	洗う	wash	9
18	大きい	Big	26	51	火	fire	12	85	太い	thick	9
19	頭	head	25	52	結構	pretty	12	86	ねえ	Hey (int.)	8
20	今	now	23	53	処理	processing	12	87	はぁ	huh? (int.)	8
21	次	next	23	54	人	person	12	88	タコ	octopus	8
22	イカ	squid	21	55	切る	cut	12	89	音	sound	8
23	取る	take	21	56	足	foot	12	90	加える	add	8
24	動画	video	21	57	あっ	Ah! (int.)	11	91	岩	rock	8
25	落とす	drop	21	58	ほら	Here (int.)	11	92	強い	strong	8
26	魚	fish	19	59	下	down	11	93	好き	like	8
27	行く	go	19	60	取れる	(can) get it	11	94	子	child	8
28	骨	Bone	19	61	醤油	soy sauce	11	95	手	hand	8
29	うん	(int.)	17	62	爪	claw	11	96	上げる	raise	8
30	使う	use	17	63	普通	normal	11	97	生きる	live	8
31	身	meat	17	64	目玉	eyeballs	11	98	多い	many	8
32	フグ	blowfish	15	65	たくさん	a lot	10	99	待つ	wait	8
33	捌く	dress a fish	15	66	よいしょ	Yum! (int.)	10	100	大さじ	tablespoon	8
				67	わあ	Wow! (int.)	10			(int.): interjection, (num.): numeral	

on verbs and nouns.

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,
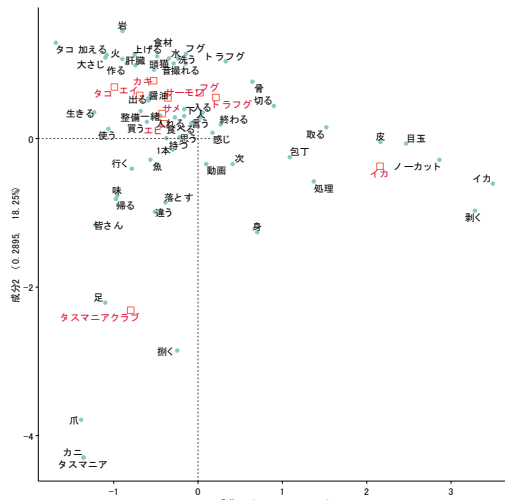
Figure 2. Correspondence analysis of nouns and verbs (frequency over 8) appeared in 10 videos.

Table 3. Characteristic words of each video

エビ		エイ		フグ		イカ	
整備	.069	思う	.034	水	.060	イカ	.054
今日	.054	照り焼き	.028	フグ	.054	皮	.053
思う	.046	大さじ	.027	皮	.042	剥く	.034
入る	.035	肝臓	.027	食べる	.040	取る	.028
大きい	.034	今日	.026	思う	.039	包丁	.027
頭	.028	行く	.025	入る	.038	半分	.025
持つ	.027	作る	.024	悪い	.035	ノーカッ	.020
言う	.026	見る	.024	言う	.028	目玉	.020
固まる	.025	簡単	.020	毒	.028	耳	.017
お願い	.025	猫	.020	多い	.027	身	.017
カキ		サーモン		サメ		タコ	
言う	.033	入れる	.048	魚	.046	タコ	.050
岩	.032	感じ	.047	フライ	.042	入れる	.050
今日	.030	思う	.037	今日	.042	作る	.044
バーベキ	.028	入る	.033	フカヒレ	.034	強い	.042
きれい	.022	今	.027	ソース	.033	使う	.033
野菜	.018	サーモン	.024	持つ	.027	食べる	.031
焼く	.018	上げる	.024	思う	.027	刻む	.029
洗う	.018	動画	.022	マヨネー	.025	頭	.025
買う	.018	作る	.022	買う	.023	美味しい	.024
今	.017	加える	.019	作る	.021	元気	.021
タスマニアクラブ		トラフグ					
タスマニ	.054	入る	.064				
爪	.053	骨	.054				
捌く	.052	感じ	.053				
カニ	.043	食べる	.048				
思う	.041	トラフグ	.045				
足	.037	頭	.042				
落とす	.035	入れる	.041				
美味しい	.034	腎臓	.034				
食べる	.033	思う	.034				
感じ	.029	撮れる	.033				

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 '落とす 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, 爪 */tsume/*. 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 '思う think' and '魚 fish'. The usage of '思う think' was "捌けると思う I think I can dress it" or "捌いていきたいと思う I would like to process it," thus no particularity as a collocation was observed. The co-occurrence with '魚' 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 '落ちる *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', '引く pull', '感じ feel', '止める stop', '入れる insert', and '剥ける

remove'. The regular expression to *remove the skin* is the phrase "皮を剥ぐ /*kawa o hagu*/ *peel off*" or "皮を剥く /kawa o muku/ *peel off*". A similar but less common expression, "皮を引く /*kawa o hiku*/ *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 /*yubiki*/ *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 /*kawa*/ *skin*'. Animal skin is also '皮,' and tanned skins are also pronounced '/*kawa*/ (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 /*muku*/ peel" were '皮' and '風'. Of these, '風' was used in all cases to be pronounced /fu/ (means *way*, not as /kaze/ for *wind*), which means "こんな<u>風</u>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

1. Albantani, Azkia Muharom, and Ahmad Madkur. 2017. "Musyahadat al Fidyu: YouTube-Based Teaching and Learning of Arabic as Foreign Language (AFL)." *Dinamika Ilmu*, 291–308.

2. Aprianto, Dedi. 2020. "To What Extent Does YouTube Contents-Based Language Learning Promote an English Proficiency?" *Journal of English Language Teaching and Literature (JELTL)* 3 (2): 108–26.

3. Riswandi, Diki. 2016. "Use of YouTube-Based Videos to Improve Students' Speaking Skill." In *Proceeding of the International Conference on Teacher Training and Education*, 2:298–306.

YouTube Movies
[All by "Kimagure-cook", Titles modified]
1. 1匹17万円！世界最大のカニ『タスマニアキングクラブ』をさばいて食べてみた！, 2019.
https://www.youtube.com/watch?v=DpK6vo4_sX4.
2. 巨大イカのさばきかた, 2019.
https://www.youtube.com/watch?v=qmuxw4iZvjU.
3. 【一人BBQ】市場で見つけた　ばけものサイズの『岩牡蠣』炭火と生牡蠣で食いまくる！, 2020.
https://www.youtube.com/watch?v=D4Qz0Vscm0o.
4. 元気過ぎて台所をかけまわるマダコをしめて。ぶったぎりにしてワサビで漬け込む料理。, 2020.
https://www.youtube.com/watch?v=I_HX9dW49BU.
5. 全身『水』のフグのお腹の中身が・・・。こんなん食べてるの！？, 2019.
https://www.youtube.com/watch?v=_nvAfEov9pY.
6. 巨大トラフグさばいてみた!, 2018.
https://www.youtube.com/watch?v=zRbV08ykKTM.
7. 水死したエイの腹の中を綺麗に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=Rx-xTpxeOUQ.
9. 200キロのサメをさばいたらお腹の中がすごかった, 2018. https://www.youtube.com/watch?v=W-y-rONjNTc.
10. 【衝撃映像】キングサーモンのお腹の中身がイクラまみれだった, 2018.
https://www.youtube.com/watch?v=HQEaFT7Q0nk.

Authors Introduction

Hiroki Fxyma (Ph.D)

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