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Research paper

An Electronic Atlas of Colloquial Arabic Language in the Arab World

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Abstract

The Arab world needs to be researched in its entirety and not in single units such as countries. We suggest a new research unit based on colloquial Arabic language which has an important position in Arab identity. In detail, we set up research units for the Arab region based on differences in pronunciations of colloquial Arabic language. In order to do this, we collected colloquial Arabic language textbooks and broadcasting materials in various Arab countries. Based on these materials we created a database of colloquial Arabic language pronunciations for each Arab country and developed an electronic atlas based on that database. Subsequently, the electronic map was analyzed for defining new research units for area studies of the Arab region.

Keywords: *Arabic language; colloquial Arabic language; Area studies; research unit; convergence studies; Digital Humanities*

1. Introduction

In the studies of the Arab world there are different spatial units for studying and researching, but often the borders of modern national states are not a suitable unit for researching language and other cultural phenomena. Thus other spatial units for researching this area are needed.

The Arabic language is one of the six official languages set by the United Nations, it is used by about 300 million people in 27 countries around the world. The Arab League defines an Arab as a "person whose language is Arabic, who lives in an Arab Country, and who is in sympathy with the aspirations of the Arab peoples." This definition shows that Arabic language is an important element for the identity of Arab people. Arabic language has a unique linguistic phenomenon called Diglossia Phenomenon (bilingual phenomenon). The Diglossia phenomenon defined by Ferguson states that there is an upper variant of Arabic (written Arabic, Modern Standard Arabic) and a subvariant of Arabic (colloquial Arabic, spoken Arabic) that both coexist in Arabic communities and serve particular social functions. The Diglossia concept has been developed in sociolinguistics among other concepts, such as Triglossia, Multiglossia or Spectroglossia, but those concepts are based on Modern Standard Arabic (MSA, Written Arabic, اللغة العربية الفصحى) and colloquial Arabic (varieties of Arabic, spoken Arabic, اللغة الغامية).

In detail, Modern Standard Arabic refers to the modern Arabic language used in formal situations based on classical Arabic, and colloquial Arabic is a spoken language used by Arabic communities in informal situations. In the Arabic community, Modern Standard Arabic is commonly used as a standard language, and colloquial Arabic is used in various forms depending on the country, region, society, class, and gender. Research about the distribution and changes of colloquial Arabic can provide important insights for understanding the geographical location and living environment of the Arab region. In addition, it can be used in research on changes of the spoken language or for inferring changes in the language as a result of urbanization. Therefore, we created an electronic atlas of colloquial Arabic language and based on that we propose new research units for the Arab world.

2. Related previous research

Basically, there are a few studies on Arab regional research units. However, many research papers point out problems with area research units. Research about the classification of colloquial Arabic has been carried out internationally.

2.1. Previous studies in Korea

Previous studies in Korea about colloquial Arabic language are focused on Egyptian colloquialism grammar. There are a few ongoing studies about the Korean education of colloquial Arabic or about colloquial Arabic grammar. Colloquial Arabic language research in Korea is as follows.

Table 1: Colloquial Arabic Language Studies in Korea

Target Country	Frequency	Classification	Frequency
Egypt	20	Grammar	27
Jordan	3	Education	6
Morocco	2	Literature	2
Syria	2	General	7
Bahrain	1		
Saudi Arabia	1		
Yemen	1		
Iraq	1		
Palestine	1		
General	1		
Total	43	Total	42

Eun-Kyeong Yun in reference to S. Badawi's research, compared Modern Standard Arabic and Educated Spoken Arabic. In her opinion for developing the communication ability with Arabian people we should educate colloquial Arabic to students. She compared pronunciations between Modern Standard Arabic and colloquial Arabic in Egypt as well as colloquial Arabic in Bahrain. Yun also researched the concept and the features of educated spoken Arabic in Egypt focused on Arabic in Egyptian broadcasting. Yong-Su Youn carried out some research about cognizance of colloquial Arabic in Jordan. He explained the mixing phenomenon of colloquial Arabic as a result of urbanization. He also compared Modern Standard Arabic and Palestinian colloquial Arabic regarding phonology, morphology and syntax. Myung-Keun Oh has researched Egyptian colloquial Arabic's verbal tense and conjugation. Jong-Do Kim analyzed modern Saudi Arabia's Hijaz colloquial Arabic and Jin-Young Choi investigated Moroccan colloquial Arabic's phonological features and its social function.

In summary research about colloquial Arabic language in Korea is relatively fragmented and merely focused on countries.

2.2. Previous studies Overseas

Regarding colloquial Arabic language categorization research, Johnstone made a distinction of colloquial Arabic in Eastern colloquialisms and Western colloquialisms. In detail in Johnstone's classification the Maghreb (Algeria, Libya, Morocco, Tunisia and Mauritania) belongs to the Western colloquial class and the rest of the Arab world to the Eastern colloquial class. However, such a division has limitations in that it cannot properly distinguish regional characteristics of colloquial Arabic language. Another research about the classification of colloquial Arabic has been carried out by Versteegh. He categorized the colloquial Arabic language according to geographical units such as the Arabian Peninsula, Mesopotamia, Syria-Lebanon, Egypt and Lebanon. Research about Modern Standard Arabic's variation has been conducted by Mark van Mol and Ahmed Abdelali. Mark Van Mol wrote, "Until now there are, as far as we know, no empirical studies that prove the possible uniformity or regional variation within the MSA." The monograph deals with the variation in Modern Standard Arabic of radio news bulletins. Although considered as research about colloquial Arabic language, it is actually dealing with the highly edited texts of radio news which cannot be regarded as colloquial Arabic language. His result is that Arab country's Arabic used in radio news-broadcasting does not have any variation. Ahmed Abdelali carried out research about the localization in Modern Standard Arabic. He uses some computer analysis method by examining a corpus of texts from national newspapers available on websites. He found some variations among different Arab newspapers. These two research approaches tell us that the employment of computer technology is capable of discovering connections and insights that were not visible before.

Research about all Arab country's colloquial Arabic language has been carried out between 1970 and 1990. In that time many theses were produced, most of them by universities in the USA.

One of those works has been written by Twele Peter. He researched about Yemen Arab Republic's Arabic varieties. He traces the usage of particular colloquial Arabic terms to education, media, religion, travel and military service.

3. The Diglossia Phenomenon in Arabic Language

Arabic language is one of the major world languages belonging to the Semitic language family. Arabic language is prevalent in the Arabian Peninsula and other countries. Diglossia is a characteristic feature of Arabic language. Diglossia is a linguistic phenomenon in which two variants of the same language exist to perform different social functions. Ferguson defined Arabic community's sociolinguistic situation as Diglossia. In his article he wrote "DIGLOSSIA is a relatively stable language situation in which, in addition to the primary dialects of the language (which may include a standard or regional standards), there is a very divergent, highly codified (often grammatically more complex) superposed variety, the vehicle of a large and respected body of written literature, either of an earlier period or in another speech community, which is learned largely by formal education and is used for most written and formal spoken purposes but is not used by any sector of the community for ordinary conversation". He categorized Arabic variants as functional high and low variants from a sociolinguistic point of view. A. Kaye has further developed Ferguson's Diglossia concept. He did not agree with Ferguson that Arabic's Diglossia phenomenon is a conflicting, well-defined language system. He thinks the Diglossia phenomenon is more flexible and variable. For example, Egyptian colloquial Arabic language is a well-defined system, which is learned from birth at home. But Modern Standard Arabic (high-variant) is a less-defined system, which is learned later. Kaye states that a well-defined system language and less-defined system language cannot be compared or contrasted with each other. He points out that colloquial Arabic language can be accurately described, which is not the case for Modern Standard Arabic.

Since the study of Ferguson, the overarching theme on Arabic variants and layers has become one of the most important subjects of sociolinguistics and is, thus, a major research subject

4. Methodology

Colloquial Arabic language studies in Korea are mainly based on interview and survey. This research method is useful for the collection of colloquial Arabic language data used in each region. However, there are limitations to the distribution of whole colloquial Arabic language. Subject of the present paper is North Africa and the East Mediterranean Area. From this areas, we have chosen five countries

including Lebanon, Jordan, Egypt, Tunisia and Morocco. Due to the civil war in Syria, the collection of raw data from this country was not possible. We chose five countries because those countries have a colloquial Arabic language teaching institution for foreign students. Furthermore, these 5 countries are representative for the Arab region including the Maghreb (major region of northern Africa, Tunisia, Morocco), the Mashriq region (Eastern part of the Nile, Egypt) and the Sham region (Levant, Jordan, Lebanon). Historically these countries have been colonized by different European countries and the characteristics of Colonial language's dominance shows repercussions in colloquial Arabic.

4.1. Data Source

In order to build an electronic atlas on colloquial Arabic language a set of raw data is needed. We chose 20 colloquial Arabic language textbooks from major Arabic educational institutions or universities and from the Alexandria library in Egypt. The selected textbooks are used in 5 countries for teaching colloquial Arabic language to foreign students. In addition, we collected a set of locally produced, popular TV dramas from each country in order to analyze colloquial Arabic language. Since colloquial Arabic language is spoken, it would be insufficient to collect the raw data from textbooks only. We chose TV dramas dealing with contemporary issues, because historical TV dramas use Modern Standard Arabic. For understanding which TV shows are most popular in each country, we used www.imdb.com, a global ranking site for TV programs. In this year the most popular TV show in Lebanon was "Black Crows" (غرابيب سود) but it is basically a war story that makes it difficult to compare the used language with other TV dramas. The second most popular one was "Samra" (سمر) which we chose instead of "Black Crows". The most popular TV Show in Jordan was the historical TV drama "Bedouin soap opera" (مسلسلات البدوية), so we chose "Thorns of thorns" (أشواك الشوك). The most popular TV Show in Egypt was the Lebanon TV drama "Black Crows" (غرابيب سود), therefore we chose the second most popular TV drama "Grand Hotel" (جراند اوتيل). The most popular TV Show in Tunisia was "The Last Legion" from the UK. The second most popular one was "Black Gold" from Qatar. The third most popular one was "Pirate" from France. So we had to choose the fourth most popular TV Drama "Hedi" (نحبك هادي). The most popular TV Show in Morocco was mostly in the French language so we chose the Arabic language show "Dear Son" (ولدي).

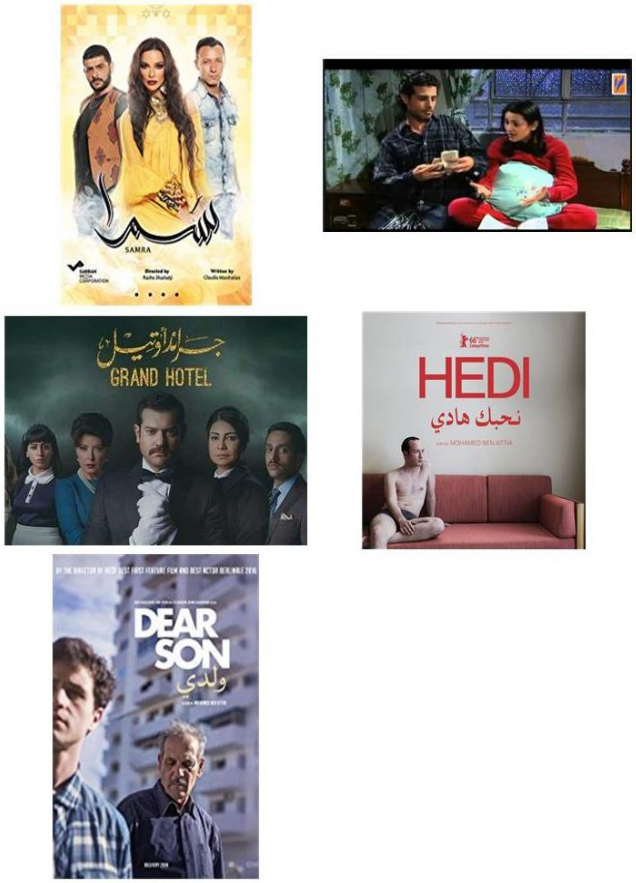

Fig. 1: Raw data TV Dramas

4.2. Data Sampling

From the above mentioned sources of our raw data, we extracted specific words for comparing their pronunciation. The words were selected due to their frequent occurrence in all raw data sets and they represent the full range of the Arabic alphabet. The chosen words are as follows.

Table 2: Chosen words for research

Chosen words	MSA
Anger	غضب
Apple	تفاحة
Big	كبير
Clean	نظيف
Cloth	ملابس

Farm	مزرعة
Fat	شحم
Father	الأب
Friend	صديق
Gift	هدية
Head	رئيس
If	إذا
Letter	رسالة
Life	حياة
Meat	لحم
Money	نقود
Plan	خطة
Room	مجال
Snow	ثلج

The international phonetic transcription of each word is shown in table 3.

Table 3: International phonetic transcription

Chosen words	MSA	Egypt	Jordan	Lebanon	Morocco	Tunisia
Anger	ɣɡˤb	ɣdb	ɣɡˤb	ɣɡˤb	ɣdˤb	ɣdˤb
Apple	ʇfʔħ	tfih	ʇfʔħ	ʇfʔħ	ʇfih	ʇfiħ
Big	kbjr	kbjr	kbjr	kbjr	kbjr	kbjr
Clean	nðˤjf	ntjf	nðjf	nðjf	ndjf	ndjf
Cloth	mʔlbs	milbs	mʔlbs	mʔlbs	milbs	milbs
Farm	mzrʕ	mzra	mzrʕ	mzrʕ	mzrʕ	mzrʕ
Fat	ʃħm	shm	ʃħm	Sħm	Shm	Sħm
Father	ʔb	ib	ʔb	ʔb	ib	ib
Friend	sˤdjq	sdjq	sdjq	sdjq	sˤdjq	sdjq
Gift	hdj	hdj	hdj	hdj	hdj	hdj
Head	rʔjs	rijs	rʔjs	rʔjs	rijs	rijs
If	ʔdʔ	idi	ʔdʔ	ʔdʔ	idi	idi
Letter	rsʔl	rsil	rsʔl	rsʔl	rsil	rsil
Life	ħjʔ	hji	ħjʔ	ħjʔ	hji	ħji
Meat	lħm	lhm	lħm	lħm	lhm	lħm
Money	nqWd	nkwd	nqWd	nqWd	nqWd	nkWd
Plan	xtˤ	xd	xt	xtˤ	xt	xtˤ
Room	mdʒʔl	mgil	mdʒʔl	mghʔl	mdʒil	mdʒil
Snow	θldʒ	tlg	θldʒ	θldʒ	thldʒ	tjldʒ

Moreover, the international phonetic transcription of the Arabic alphabets of each country is shown in table 4.

Table 4: International phonetic transcription of each Arabic alphabets

Arabic Alphabet	MSA	Egypt	Jordan	Lebanon	Morocco	Tunisia
ا	ʔ	i	ʔ	ʔ	i	i
ب	b	b	b	b	b	b
ت	t	t	t	t	t	t
ث	θ	t	θ	θ	th	th
ج	dʒ	g	dʒ	gh	dʒ	dʒ
ح	ħ	h	ħ	ħ	h	ħ
خ	x	x	x	x	x	x
د	d	d	d	d	d	d
ذ	ð	t	ð	ð	d	d
ر	r	r	r	r	r	r
ز	z	z	z	z	z	z
س	s	s	s	s	s	s
ش	ʃ	s	ʃ	S	S	S
ص	sˤ	s	s	s	s	s
ض	dˤ	d	dˤ	dˤ	dˤ	dˤ
ط	tˤ	d	t	tˤ	t	tˤ
ظ	ðˤ	t	ð	ð	d	d
ع	ʕ	a	ʕ	ʕ	ʕ	ʕ
غ	ɣ	ɣ	ɣ	ɣ	ɣ	ɣ
ف	f	f	f	f	f	f
ق	q	k	q	q	q	k
ك	k	k	k	k	k	k
ل	l	l	l	l	l	l
م	m	m	m	m	m	M
ن	n	n	n	n	n	n
ه	h	h	h	h	h	h
و	W	w	W	W	W	W
ي	j	j	j	j	j	j

The similarity between Modern Standard Arabic and Colloquial Arabic of each country is as follow.

Table 5: Similarity of MSA/Colloquial Arabic for each country

MSA	Egypt	Jordan	Lebanon	Morocco	Tunisia
100%	53%	92%	89%	67%	71%

4.3. Design of the Database

In order to construct a database of colloquial Arabic Language, the international phonetic value of pronunciation of the colloquial Arabic phonetics are required for each Arabic consonant and vowel. To indicate the location in the electronic atlas, the location name, the x and y coordinate values, which are the position information of the point object, and (x1, xy) … (xn, yn) coordinate values which are the position information of the plane object are required. This information is indispensable for displaying specific coordinate values on the atlas and layer the coordinate values of the specific Arabic consonant and vowel. Basically, in order to distinguish the phonetic identity of each colloquium, international phonetic transcription values of the consonant of each Arabic consonant and vowel, the country name for distinguishing the location, DATA ID as the foreign key and the coordinate value of the point object and plane object are needed. Based on that information, we can create metadata. Based on these metadata, we construct a database for colloquial Arabic. The detailed schema is shown in figure 2.

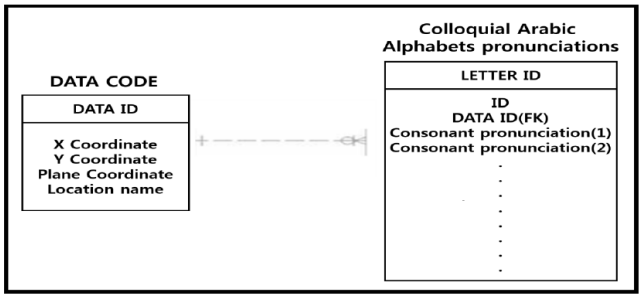

Fig. 2: Database Schema for Colloquial Arabic Language

Figure 3 and 4 show the schema of the created database. Colloquial Arabic Alphabets pronunciations Database should contain all international phonetic transcription.

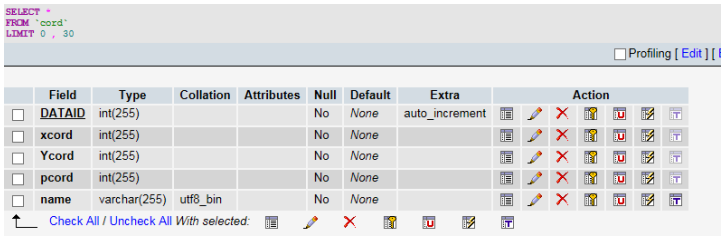

Fig. 3 Data Code Database

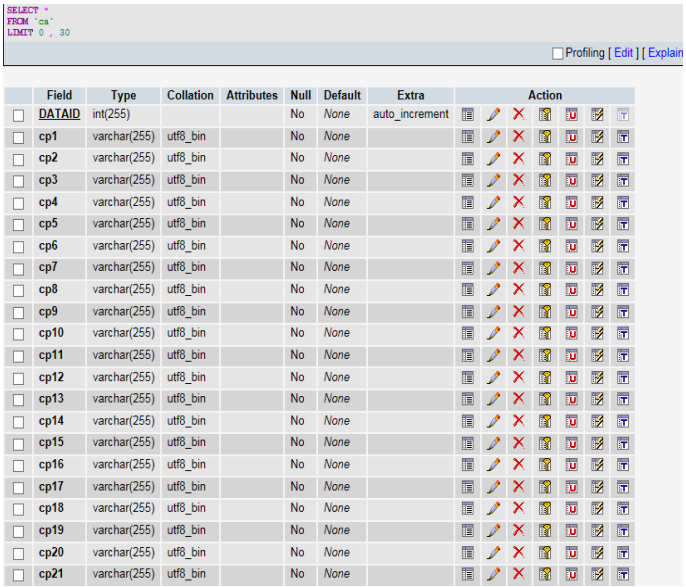

Fig. 4 Schema of the Colloquial Arabic Alphabets pronunciations Database

4.4. Interface Design

The interface of the colloquial Arabic Language electronic atlas is shown in figure 5 and 6. The pronunciation of the colloquial Arabic consonant and vowel on the atlas indicates the same area and each area is displayed on the atlas using the point and plane coordinates. The pronunciation of each consonant and vowel is set through the selection box. Depending on the selection, only overlapping parts are changing their color. In figure 5, we chose the entirety of every Arabic alphabets' pronunciation, so every country is shown in a different color.

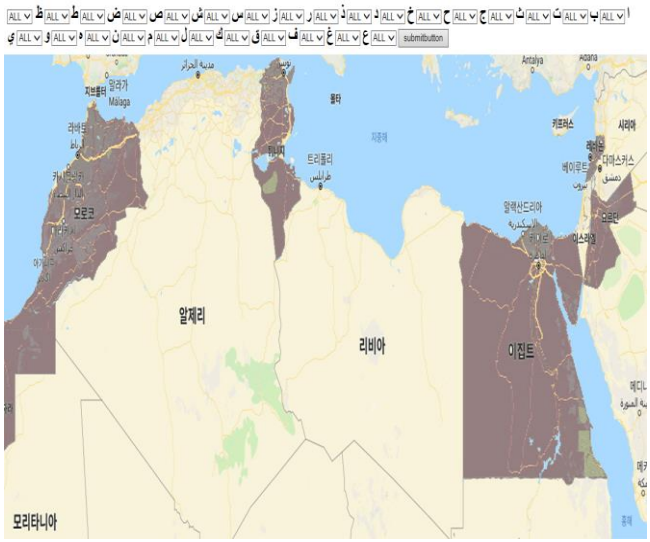

Fig. 5: Interface of the colloquial Arabic Language electronic Atlas

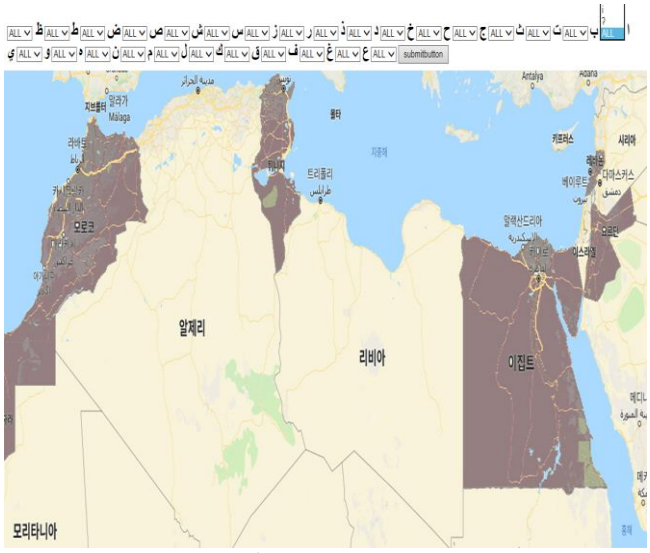

Fig. 6: " ا " select pronunciation

5. Analysis of the Colloquial Arabic Atlas

When we select the Arabic alphabet's international voice symbol. We can see in witch place the same international voice symbol is valid for the letters of the alphabet. However, because the letters ب, خ, ز, س, غ, ف, ك, ل, م, ن, ه, و, ي have the same pronunciation in every country, they are not a useful variable for analysis.

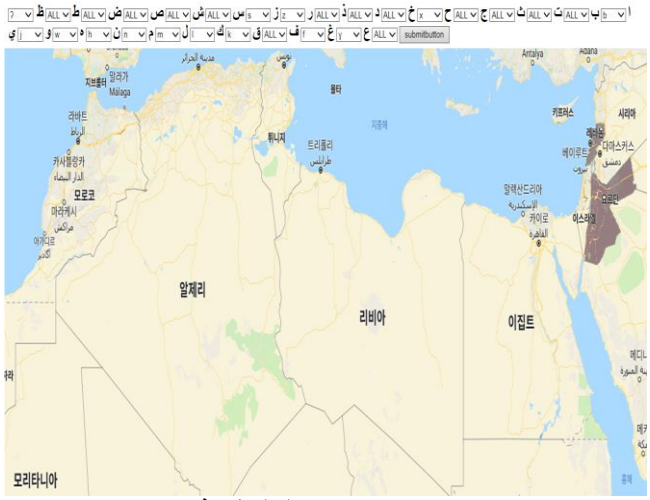

Fig. 7: " ب, خ, ز, س, غ, ف, ك, ل, م, ن, ه, و, ي " select with " ا " as "ʔ"

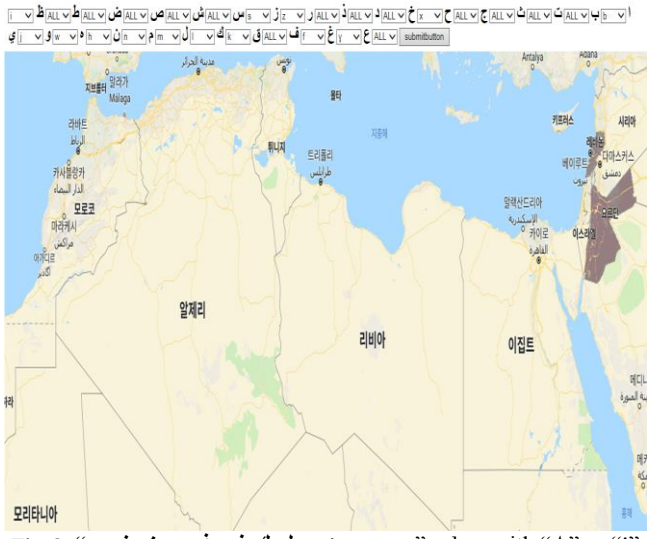

Fig. 8: " ي, و, ه, ن, م, ل, ك, ف, غ, س, ز, خ, ب " select with " ا " as "i"

Except for the letters ب, خ, ز, س, غ, ف, ك, ل, م, ن, ه, و, ي, there are 14 other characters in the Arabic alphabet, and there are many possible combinations. We cannot show all combinations. Below is a table with the frequency of pronunciations for every letter of the alphabet.

Table 5: Frequency of pronunciation differences

Arabic Alphabet Letter	Frequency of pronunciation
ا	2
ب	1
ت	2
ث	3
ج	3
ح	2
خ	1
د	2
ذ	3
ر	1
ز	1
س	1
ش	2
ص	2
ض	3
ط	5
ظ	3
ع	2
غ	1
ف	1
ق	2
ك	1
ل	1
م	1
ن	1
ه	1
و	1
ي	1

Based on the frequency of pronunciation differences we chose some combinations. By comparing figures 9, 10 and 11 we can notice that "ث" is pronounced as "t" only in Egypt.

Fig. 9: " ث " select as "t"

Fig. 10: “ ث ” select as “θ”

Fig. 11: “ ث ” select as “th”

According to this maps the Maghreb region, the Mashriq region, and the Sham region have different pronunciations of “ث”. Looking at the figure 12, 13 and 14 we can ascertain that “ذ” is pronounced in the same way as “ث”.

Fig. 12: “ ذ ” select as “t”

Fig. 13: “ ذ ” select as “ð”

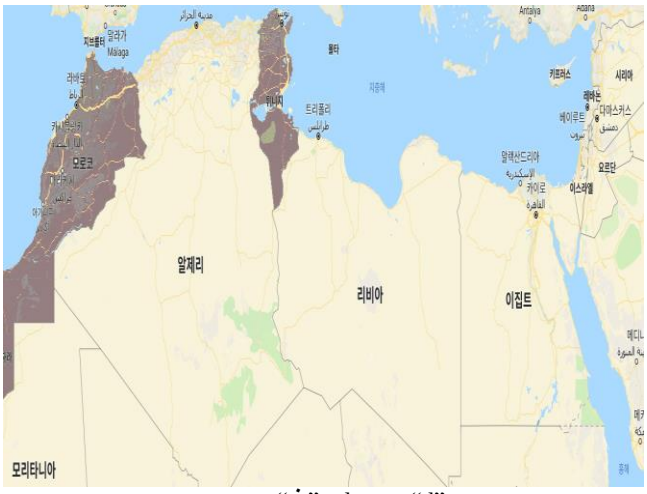

Fig. 14: " ذ " select as "d"

The distribution of the pronunciation of "ت" and "ع" show similar results (fig. 15-18).

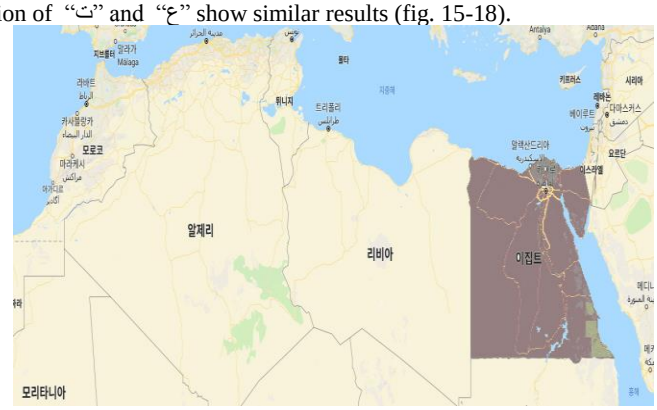

Fig. 15: " ت " select as "t"

Fig. 16: " ت" select as "t̪"

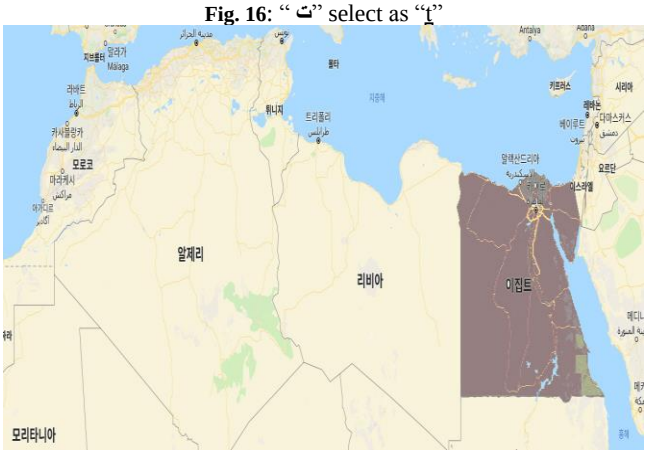

Fig. 17: " ع " select as "a"

Fig. 18: " ع " select as "ʕ"

But the pronunciation of "ج" is differing among the regions.

Fig. 19: " ج " select as "g"

Fig. 20: " ج " select as "dʒ"

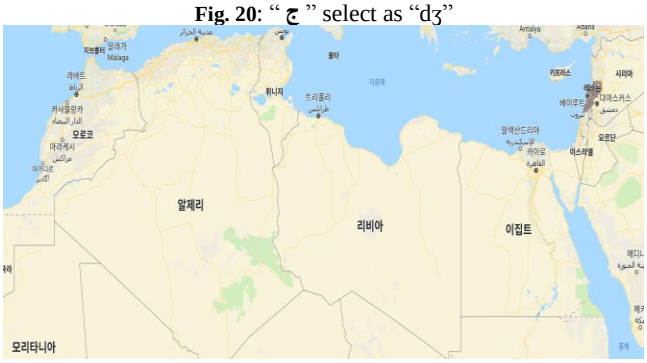

Fig. 21: " ج " select as "gh"

As we can see, Jordan, Tunisia, Morocco has the same pronunciation, but Egypt and Lebanon are different. So far we can say that Egypt has different pronunciations and even in the same region such as Sham it can differ. For the letter "ش" a different result is ascertainable.

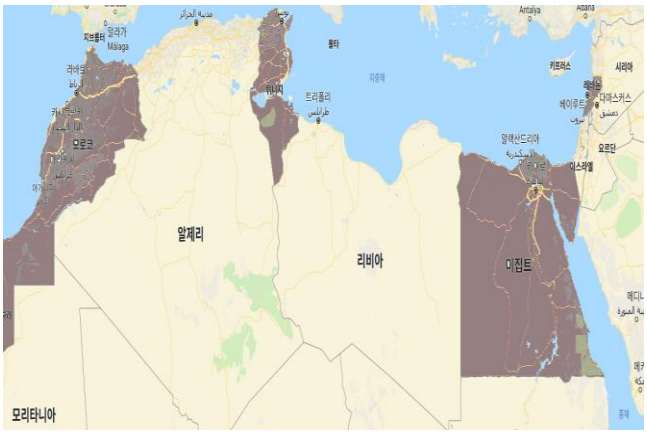

Fig. 22: "**ش**" select as "s"

Fig. 23: "**ش** " select as "ʃ"

Only in Jordan "ش" is pronounced as "ʃ" whilst the character "ق" shows another result.

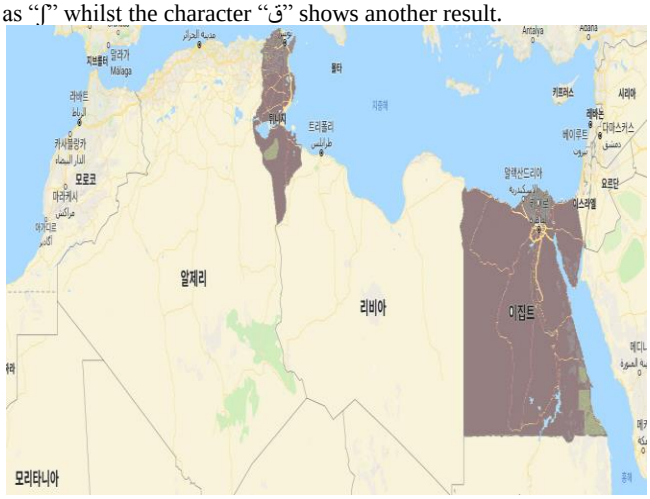

Fig. 24: "**ق** " select as "k"

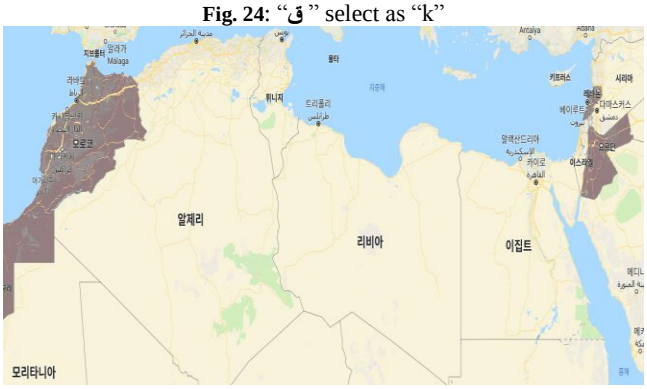

Fig. 25: "**ق** " select as "q"

In summary, Egypt and Tunisia have the same pronunciation which is also true for Jordan, Lebanon and Morocco. There are singularities, but most of the alphabet's pronunciation is as follows.

Fig. 26: "**ض**" select as "d"

Fig. 27: "**ض**" select as "ḍ"

Fig. 28: " **ض** " select as "dˁ"

Fig. 29: " **ث** " select as "t"

Fig. 30: " ث " select as "θ"

Fig. 31: " ث " select as "th"

The similarity of the alphabet's pronunciation for each country is as follows.

Table 6: Similarity of each country

Egypt	Jordan	Lebanon	Morocco	Tunisia
100%	53%	57%	64%	67%
Jordan	Lebanon	Morocco	Tunisia	Egypt
100%	89%	71%	67%	53
Lebanon	Morocco	Tunisia	Egypt	Jordan
100%	71%	67%	57%	89%
Morocco	Tunisia	Egypt	Jordan	Lebanon
100%	85%	64%	71%	71%
Tunisia	Egypt	Jordan	Lebanon	Morocco
100%	67%	67%	67%	85%

6. Conclusion

As a result of the analysis, it is possible to suggest new research areas for the Arabic speaking countries as shown in fig. 31-33.

Fig. 31: Sham research unit

Fig. 32: Maghreb research unit

Fig. 33: Mashriq research unit

However, it is not complete yet. Because of limited research capacities, we have only analyzed five countries so far. There are synonyms, homonyms and some countries use other terms for the same thing. This work has compared the pronunciations of alphabetic characters, so complete terms were not included in the examination yet. Moreover, we need to extend the range of the atlas to all Arab countries. Further verifications are also required.

Acknowledgement

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