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Arabeasy: A Readable and Typable Arabic Transliteration System, and Its Application in Learning Arabic Online

Liam Hahne, University of Tokyo, Japan
info@arabeasy.net

Abstract

Mastery of Arabic script represents a steep learning curve to any student of the language. By bypassing this step with the aid of a romanised system mapping to Arabic in a one-to-one, reversible way, i.e. transliteration not transcription, learning of the Arabic language and spelling further down the track can be facilitated.

A readable, typable and usable mapping, named Arabeasy, which is optimised for easy input on smartphones and Western keyboards is proposed. Automatic conversion tools that render content of the Arabic language web "visible" to Roman alphabet natives are presented, including some practical applications and didactic workflows.

Key words

Arabic, romanisation, transliteration, transcription, learning process, vocabulary, visual memorisation, didactic methods, foreign language teaching, readability, input method, smartphone

Introduction

The standard student of Arabic directs most of his or her effort to learning Arabic script at the start of their language study. For some students, the barrier of Arabic script hampers vocabulary memorisation, and access to stimulating cultural web content that is often a significant motivator in language acquisition.

Most romanisations of Arabic that are used for teaching new students are transcriptions, which add vowels that are voiced, but not written, in Arabic. While this helps by indicating phonetics, it introduces ambiguity because the transcriber chooses from among several different ways to represent these missing vowels, e.g. "o", "ou" or "u", "al" or "el", Mohammed/ Muhammad/Mohamed/Mahomet (Whitaker, 2002). For an extensive treatise on the complexities involved in transcribing Arabic, the reader is invited to consult Gorgis (2009). Furthermore, many systems use two Roman letters for one Arabic letter, e.g. "sh" for the Arabic letter "sheen", which adds further confusion, as one does not know whether this represents "sh" or "s" followed by "h".

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A new system is put forward, which also fulfils criteria of readability and typability on smartphones and Western keyboards. An argument is also made for the use of transliteration in the learning process, instead of the traditionally used transcription.

Method

Criteria of the desired romanisation system:

Readability: The transliterated word provides some cognitive correspondence to the way the word sounds. Nevertheless, this depends on which regional or colloquial dialect is used, so no system can be perfect.

Reversibility: One can recover the original Arabic text from the romanised text (this also implies no ambiguity and also teaches Arabic spelling), i.e. a transliteration and not a transcription, one letter per Arabic letter.

Typability: Frequently used letters should be non-numeric, non-symbol (e.g. not * or &) and easily typed on standard Western keyboards and smartphones. All letters must be standard 8 bit ASCII letters (also known as Windows-1252 or ANSI) not UTF-8 or other Unicode letters (e.g. not ḥ or ṣ), and again one letter per Arabic letter.

Usability: XML friendly, i.e. does not include < or > characters. Also copy/paste friendly, i.e. does not include apostrophe, single quote, left quote or right quote which are often used as a diacritic symbol in other mappings. These symbols are particularly problematic as they are often transformed automatically during copy/paste into another symbol, and are visually very hard to differentiate from each other. Copy/paste issues also plague non-standard ASCII or Unicode letters, and in the online age, this must be taken into account.

What about the existing Arabic romanisation systems?

See Appendix I for a table of comparison for Arabic romanisation systems. None of the existing systems meet the above criteria. The SATTS (Standard Arabic Technical Transliteration System) and Buckwalter systems are the best candidates providing the desired characteristics of a 1-for-1 substitution, which introduces no more phonetic information than the original Arabic orthography (ISO 233:1984; see table Pedersen, 2008). The downside of SATTS is its readability for the ASCII version, which uses : ; ? and " and these letters are neither readable nor easy to enter on some smartphones. The non-ASCII version is more readable, but uses letters such as "h̲" that are even harder to input and require keyboard remapping or shortcuts. This disadvantage is also present in the Hans Wehr system (Wehr, 1961). A system that can be typed on a smartphone and standard Western keyboard with no extra setup required was

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sought. The Buckwalter system performs very well according to the criteria, except for the use of ' $ ~ and *, and non XML-friendly < and >.

Many other systems such as Qalam (Heddaya, 1985) use two keystrokes for one Arabic letter, this detracts from typability and introduces ambiguity e.g. do th and sh represent two separate Arabic letters or one single one?

The case for transliteration in Arabic studies

To learn correct spelling, a direct one-to-one mapping to Arabic letters removes confusion about how to write the missing vowels. These are highly regionally dependent, and probably a factor preventing the easy adoption of any single romanisation system. By leaving out unwritten vowels altogether and transliterating Arabic directly as it is written, not how it sounds, a simpler uniform result is obtained, which also enables efficient searching (e.g. one search mHmd instead of Mohammed/Muhammad/Mohamed/Mahomet).

The Arabeasy mapping

Arabeasy is the name given to the system found to best meet the desired criteria. A play on the word Arabizi which is another word for Arabic chat, it is intended to be easy to type and help learners of Arabic write in a consistent, uniform way, minimising that nagging ambiguity of "Is this the best way to write this word?" that inevitably comes when using traditional transcription systems.

Arabeasy uses a case sensitive solution to represent Arabic letters as follows:

ا ب ت ث ج ح خ د ذ ر ز س ش ص ض ط ظ ع غ ف ق ك ل م ن ه و ي ى** ء ة آ أ ؤ إ ئ

a b t v g H x d z r j* s c* S D T Z w* G f q k l m n h u i y p* e* 4* A* o* E* Y

Legend:
* novel mapping, also shadda = - fatha = a), damma = u) kasra = i)
گ = K, چ = X, ژ = J, پ = P, and ڤ = V

**In Egypt, Sudan and sometimes other regions, the final form is always ى (without dots).

Rationale behind mapping

For backward compatibility and ease of learning, novel mappings were minimised. The hamza ء is represented as p, not 2 and ain ع as w, not 3 as often done in Arabic chat, as numbers mixed with letters can be off-putting and slower to input on smartphones. w also resembles the letter ain ع rotated 90 degrees. ز

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is likewise mapped to j for visual similarity, and to avoid the use of z' (z with diacritic). An exception to not using numbers is made for آ as 4 looks visually similar to A and is much less frequent than hamza and ain. v is used to map to theh ث ala Qalam (Heddaya, 1985), and c was used for sheen ش as it is close to ch which is used by some existing systems. Hyphen (-) is used for shadda, and a) for fatha u) for damma and i) for kasra as they visually imply their function (respectively doubling and explicitly including the preceding letter). i is prefered for yeh ي instead of y, as it is visually simpler. y is used for ى because although it usually has the "a" sound, it also represents the "y" sound in some regions. Upper-case i was deliberately not used to avoid confusion between upper-case i (I) and lower-case l (l), as was the pipe symbol (|).

Letter frequency

Madi (2010) analyses letter frequency from general Arabic sources, which was also taken into consideration by attributing more frequent letters to lower case when both were used (h H a A z Z s S e E t T d D).

Arabic letters in order of frequency: a 13%, l 12%, n 7%, m 7%, i 6%, u 6%, h 5%, b 5%, r 4%, w 4%, A 3%, f 3%, q 3%, d 3%, t 3%, s 2%, k 2%, H 2%, e 1%, y 1%, g 1%, S 1%, E 1%, z 1%, v 1%, x 1%, c 1%, j 1%, T 1%, D <1%, G <1%, p <1%, Y <1%, Z <1%, 4 <1%, o <1%

Before arriving at this mapping, many different combinations were tried and this is the current stage of the evolution.

Unusual letters and use beyond Arabic

Propositions for less frequent letters (note all upper-case) are: گ = K, چ = X, ژ = J, پ = P, and ڤ = V. Ideally this system could be extended to be used for Persian and Urdu, though that ambition is beyond the scope of this paper.

Evaluation against criteria

Readability

Being a native user of the Roman alphabet implies certain preferences for a particular transliteration scheme and a specific set of aesthetics and cognitive associations. One notices straight away that Arabeasy is very compact and uncluttered to read compared to some schemes. The first paragraph of the Declaration of Human Rights appears as follows:

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يولد جميع الناس أحراراً متساوين في الكرامة والحقوق، وقد وهبوا عقلاً وضميراً وعليهم أن يعامل بعضهم بعضاً بروح الإخاء

iuld gmiw alnas AHrara mtsauin fi alkrame ualHquq, uqd uhbua wqla uDmira uwlihm An iwaml bwDhm bwDa bruH alExap

All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood.

Here is part of an article in Arabic from aljazeera.net automatically converted to Arabeasy:

كانت الإخفاقات في الرياضات الجماعية والفردية على حد سواء العنوان الأبرز للرياضة التونسية خلال عام 2013، وهو أمر أرجعه البعض للأوضاع الأمنية والسياسية غير المستقرة في البلاد، والتي ألقت بظلالها على مردود الرياضيين وساهمت في تردي النتائج.

kant alExfaqat fi alriaDat algmawie ualfrdie wly Hd suap alwnuan alAbrj llriaDe altunsie xlal wam 2013 alzi iDw Aujarh alium, uhu Amr Argwh albwD llAuDaw alAmnie ualsiasie Gir almstqre fi alblad, ualti Alqt bZlalha wly mrdud alriaDiin usahmt fi trdi alntaYg.

وشكل خروج منتخب تونس من تصفيات كأس العالم إثر الهزيمة المذلة أمام نظيره الكاميروني 4-1 في إياب الدور الحاسم للتصفيات، صدمة للجماهير التونسية التي لم تستسغ فشل "نسور قرطاج " في التأهل لأكبر محفل رياضي عالمي بتلك الطريقة.

uckl xrug mntxb tuns mn tSfiat kAs alwalm Evr alhjime almzle Amam nZirh alkamiruni 4-1 fi Eiab aldur alHasm lltSfiat, Sdme llgmahir altunsie alti lm tstsG fcl "nsur qrTag " fi altAhl lAkbr mHfl riaDi walmi btlk alTriqe.

وفتحت خيبة تصفيات المونديال أبواب الخلافات على مصراعيها بين اتحاد الكرة ووزير الرياضة طارق ذياب الذي طالب بضرورة استقالة الاتحاد، واصفا نتائج الكرة التونسية بالفضيحة الكبرى خصوصا أن زملاء عصام جمعة ودعوا أيضا كأس أمم أفريقيا 2013 بجنوب أفريقيا من الدور الأول.

uftHt xibe tSfiat almundial Abuab alxlafat wly mSrawiha bin atHad alkre uujir alriaDe Tarq ziab alzi Talb bDrure astqale alatHad, uaSfa ntaYg alkre altunsie balfDiHe alkbry xSuSa An jmlap wSam gmwe udwua AiDa kAs Amm Afriqia 2013 bgnub Afriqia mn aldur alAul. (Al Jazeera, online)

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For comparison with other systems, the following table (from Romanization of Arabic, online) may be consulted:

Arabic	أمجد كان له قصر	المغربية المملكة إلى
Arabic with diacritics (normally omitted)	أَمْجَد كَانَ لَهُ قَصْر	إِلَى الْمَمْلَكَة الْمَغْرِبِيَّة
IPA	/ʔamdʒad kaːna lahu qasˤr/	/ʔila l mamlaka al mayribijja/
DIN 31635	Amğad kāna lahu qaṣr	ʾIlā l-mamlakah al-Maġribiyyah
Hans Wehr	amjad kān lahu qaṣr	ilā l-mamlaka al-maġribīya
ALA-LC	Amjad kāna lahu qaṣr	Ilá al-mamlakah al-Maghribīyah
UNGEGN	Amjad kana lahu qaşr	Ily al-mamlakah al-maghribiyyah
BATR	amjad kaana lahu qaSr	ilaaa almamlakat' almagribiyyat'
ArabTeX	am^gad kAna lahu qa.sr	il_A almamlakaT alma.gribiyyaT
Arabeasy	Amgd kan lh qSr	Ely almllke almGrbie
English	Amjad had a palace	To the kingdom of Morocco

Typability and usability

Once the novel features of Arabeasy are assimilated, all of the advantages of this mapping can be appreciated. It can be argued that systems using non-ASCII letters are more readable, but they are less typable and problems arise from copy/paste, hence an ASCII solution is considered the best trade-off between readability, typability and usability.

Advantages of Transliteration vs Transcription

- learners are forced to listen to Arabic, to remember which vowels are missing, which results in good pronunciation (this could also be considered a disadvantage);
- less visually cluttered texts, compact and faster to read/type;
- one uniform way to write a word, which facilitates searching, e.g. Mohammed/Muhammad/Mohamed/Mahomet can only be written one way, mHmd, hence all possible combinations no longer need to be searched for;

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- vowels a, u, i can be explicitly inserted if desired (followed by ");
- teaches Arabic spelling, easing the transition to reading and writing Arabic script.

Disadvantages of Transliteration

- exact pronunciation cannot be deduced from text alone (the same with written Arabic);
- some words are identical, this is also the same with Arabic.

A final point should be made that the use of Arabeasy is not intended to replace Arabic script, but rather to facilitate rapid immersion into the Arabic language by enabling its "visualisation" or easy recognition in one's native alphabet. Cultural, news and entertainment content online is often a stimulus to new students of a language to keep going, so by making this more readily "visible" to new students via automatic tools, a valuable incentive to persevere with the language study is created. Arabeasy also eases the eventual transition towards Arabic script, as it is a pure one-to-one transliteration.

Practical applications

Automated Arabeasy Conversion of Arabic webpages

A useful Firefox add-on, Transliterator (Benenson, 2007) already has the Arabeasy mapping configured for use. Once installed, a hotkey shortcut can transliterate any selected Arabic text on a webpage. Another hotkey shortcut toggles between normal keyboard input and Arabeasy Arabic input.

For Chrome, an extension exists for transliterating Arabic webpages into Arabeasy (Hahne, 2013). It currently leaves the original Arabic in place in case the learner wishes to translate any words or sentences using extensions such as Quick Translate or Nice Bubble Translate, as there is currently no translator extension that converts Arabeasy into English. This is also helpful for students learning Arabic script. For both web browsers, an Arabeasy script exists (userscripts.com) which converts Arabic webpages with the ALT-A combination, and converts with some translations added using ALT-C.

Integration of Arabeasy into Arabic study workflow

Writing and regularly consulting lists of vocabulary in Arabeasy reinforces memorisation visually, and by writing or typing one is forced to reproduce the word. Furthermore, one usually replays the sound in one's mind as one writes or types. By using Arabeasy, which is a direct map to Arabic, one learns the correct spelling of a word from the start as it is written in Arabic.

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Automatic Arabeasy transliteration of webpages enables instant "visualisation" of the latest news or articles of interest to the learner in their native alphabet (for those whose native language uses the Roman alphabet). Any unknown words or sentences can be translated by selecting the Arabic text and using a translation add-on or extension such as Quick Translator for Firefox or Nice Bubble Translate for Chrome.

The importance of pronunciation

As Arabeasy does not contain complete phonetic information, which is exactly the same situation as with Arabic, listening to spoken Arabic while reading the corresponding Arabeasy transliteration should be an integral part of the didactic workflow. This can be achieved in several ways:

Vocab Lists

By adding a new word to a vocabulary list when it is heard (not read), the word is associated more strongly with its correct pronunciation. For new words encountered in reading, translate.google.com can be used to hear the word as it is spoken by clicking on the speaker button for text-to-speech, which pronounces the Arabic text aloud.

Subtitles

Arabic subtitles for many Arabic movies can be found on the website opensubtitles.org, and they can be automatically converted from Arabic to Arabeasy as instructed on the arabeasy.net website. Movies in Arabic can then be watched with Arabeasy subtitles, aiding memorisation of how words are voiced and which vowels are missing from the written form. The same can be done for movies or series in one's own language to increase vocabulary.

Transcripts

Some websites such as alarabiya.net provide online Arabic transcriptions and translations of video news journals and interviews. These transcriptions converted into Arabeasy can be read while watching or listening to the Arabic original, again strengthening the connection between how the word is written and how it sounds.

Song Lyrics

Using songs with their lyrics is an entertaining and extremely helpful way to enhance language learning. The structure of many Arabic songs repeats each verse twice with exactly the same lyrics, making them an excellent reinforcement tool for memorisation. A pleasant voice or melody to the ears of the listener also motivates learning and encourages repeated exposure to the same song and

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vocabulary. There is a youtube channel that has some Egyptian songs with Arabeasy lyrics (http://www.youtube.com/user/talkegypt/videos).

Inserting missing vowels

Missing vowels can even be inserted manually for learning purposes, if desired. The Arabeasy convention is to follow the vowel (a, u or i) by a right parenthesis ")". Arabic also has this function with the fatha "a)", damma "u)" and kasra "i)" symbols, which are used for learners, and to disambiguate some words.

Typing Arabic script using Arabeasy keyboard mapping

As shown above, typing Arabic text using the Arabeasy mapping for input is currently possible in Firefox with the Transliterator add-on. Once Arabeasy is mastered, using its keyboard map to input Arabic script is an excellent way to learn Arabic letters.

Conclusion

The ultimate test of this system is its adoption and popularity for non-native Arabic speakers. As it fulfils criteria of readability, typability and usability for users more comfortable or familiar with the Roman alphabet, it enables easy and uniform writing and memorisation of vocabulary, teaches Arabic spelling, facilitates access to online Arabic web content and provides immediate visual knowledge of Arabic language structures and patterns.

By postponing the task of studying the Arabic writing system and with the availability of automatic transliteration tools, Arabic web content, transcripts and subtitles become "visible" to natives of the Roman alphabet, further stimulating and maintaining the language learner's motivation by relatively easy exposure to Arabic entertainment and culture.

Arabeasy letters were chosen to be easy to input, and either 1) visually representative of the underlying sounds, 2) similar to a pre-existing mapping, or 3) visually similar to the Arabic letter.

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Contact

Liam Hahne, M.Eng.
19 Lascelles Ave,
Beaumont SA 5066, Australia
info@arabeasy.net

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APPENDIX

Arabic Romanisation comparison table

(modified from http://en.wikipedia.org/wiki/Romanization_of_Arabic#Comparison_table retrieved 27 December 2013)

	Unicode	Name	IPA	UNGEGN	ALA-LC	Wehr	DIN	ISO	SAS	-2	BATR	ArabTeX	Arabeasy	chat
ء	621	hamzah	ʔ	’			’	ʾ, ʼ, ˌ	’	’	e	'	p	2
ا —	627	alif	a:	ā				ʾ	ā	aa	aa / A	A	a	a/e/é
ب	628	bāʾ	b	b										
ت	062A	tā’	t	t										
ث	062B	thā’	θ	th		ṯ			ç	ṯ	c	_t	v	s/th
ج	062C	jīm	ʤ ~g~ʒ	j			ǧ		ŷ	j	j	^g	g	j/g/dj
ح	062D	ḥā’	ħ	ḥ	ḥ						H	.h	H	7
خ	062E	khā’	x	kh		ḵ	ḫ	ḥ	j	x	K	_h	x	kh/7'/5
د	062F	dāl	d	d										
ذ	630	dhāl	ð	dh		ḏ				đ	z'	_d	z	z/dh/th
ر	631	rā’	r	r										
ز	632	zayn/zāy	z	z									j	z
س	633	sīn	s	s										
ش	634	shīn	ʃ	sh		š					x	^s	c	sh/ch
ص	635	ṣād	sˤ	ṣ	ṣ						S	.s	S	s/9
ض	636	ḍād	dˤ	ḍ	ḍ						D	.d	D	d/9'
ط	637	ṭā’	tˤ	ṭ	ṭ						T	.t	T	t/6
ظ	638	ẓā’	ðˤ~zˤ	ẓ	ẓ					ḏ	Z	.z	Z	z/dh/6'
ع	639	‘ayn	ʕ	‘			‘			ř	E	`	w	3
غ	063A	ghayn	ɣ	gh		ḡ	ġ		g	ǧ	g	.g	G	gh/3'
ف	641	fā’	f	f										
ق	642	qāf	q	q										2/g/q/8
ك	643	kāf	k	k										
ل	644	lām	l	l										
م	645	mīm	m	m										
ن	646	nūn	n	n										
ه	647	hā’	h	h										
و	648	wāw	w, u:	w	w; ū					w; o	w; uu	w; U	u	w; o; ou/u/oo
ى —	064A	yā’	j, i:	y	y; ī					y; e	y; ii	y; I	i	y; i/ee; ei/ai
ة	622	alifmaddah	ʔa:	ā	ā, ’ā		ʾā	ʾâ	ā	ʿaa	eaa	'A	4	2a/aa
ى	629	tā’marbūṭah	a, at	h; t		—; t	h; t	ẗ	—; t	ŧ	ŧ'	T	e	a/e(h); et/at
ى	649	alifmaqṣūrah	a:	y	á	ā		ỳ	à		aaa	_A	y	a
ال		alif lām	var.	al-				ʾal	al-	al-; ál-	Al-	al-	al	el