Digital Transliteration of Pegon Arabic Orthography for Language Preservation in Gorontalo Manuscripts

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Abstract. The existence of Gorontalo Pegon Arabic manuscripts and their orthographic types is not widely known and is an almost extinct language and cultural heritage. The extinction of this heritage can be preserved with digital transliteration techniques to be copied, checked, and rewritten so that the manuscripts become better, clearer, and free from errors. The purpose of this study is to describe the forms of Gorontalo Arabic orthography errors, then clean, correct, and improve so that the writing becomes correct based on digital transliteration in accordance with Arabic orthography rules and Modern Standard Arabic (MSA). The results of this study show that; 1) There are nine categories of errors in the writing of Gorontalo pegon Arabic orthography in the manuscript, namely; errors in writing vowels A - I - U, diacritical marks, letter separation, and orthographic errors of alif, alif maqshurah, hamzah, ta, fa, shin, and ta marbutha. 2) The results of digital transliteration of Gorontalo pegon Arabic orthography produced a number of improvements in four aspects. a) emmandation, b) interpolation, c) declination, and d) alternation. The results of this study can be used as a standard reading book of Gorontalo Arabic orthography and teaching material in the preservation of Gorontalo's local written language so that it does not experience extinction for future generations.

Keywords: Digital Transliteration, Pegon Arabic Orthography, Language Preservation, Gorontalo Manuscripts

1 Introduction

All languages in this world have orthographic and phoneme characteristics that make them different from other languages. Arabic orthography and Arabic pegon are two script writing systems that have a similar symbol system but differ in aspects, scripts, phonemes, writing, and pronunciation. As the cultural identity of a country, the orthographic existence of the archipelago is one of the cultural heritages that are almost extinct [1]. The United Nations Educational, Scientific and Cultural Organization has issued a strong warning against the threat of extinction of this Intangible Cultural

Heritage (WBTB), both oral and written culture.,[2],[3]. UNESCO data mentions that 2,500 languages are on the verge of extinction. [4], even Indonesia is a country that has a high potential for the extinction of regional languages [5]. Data for 2019 records that more than 100 regional languages in Indonesia are categorized as extinct and almost extinct [6].

Currently, the Gorontalo language, which is part of the Austronesian family, is increasingly being spoken by less and less, so it is included in the endangered category. [7][8]. Even with the change of generations, young people seem to care less about their ancestral languages. Currently, only some people who live in rural areas and inland areas are still heard using the original Gorontalo language, [9]. Referring to the book Encyclopedia of Literary Figures of Gorontalo, it is stated that most of those who are experts at reading Arabic manuscripts of the Gorontalo pegon are old people aged 50-70 years [10].

As one of the diversity of local language knowledge in Indonesia, knowledge of the Gorontalo pegon Arabic orthography is also in danger of extinction. This of course raises concerns about its preservation. Although the Government of Gorontalo has made efforts to preserve it through Governor Regulation No. 08 concerning Regional Language and Literature and its spelling. However, this effort has not significantly impacted increasing public awareness of using local languages in all aspects of life [11][12].

This reality requires us to maintain regional languages so that they remain sustainable, alive, and used by the next generation. Among the preservation efforts is a transliteration of manuscripts [13], to be collected, copied, corrected, and rewritten, so as to produce a standard book that is free from writing errors and by the rules [14]. Robson argues that transliteration philologically bridges language maintenance between writers and readers in the past with the present and future readers. [15], because in that way an old text can be accessed, studied, and enjoyed by more readers (*making the text available*),[16]. However, there are still many special readers of the Arabic pegon orthography who are not able to read properly, because the writing and shape have a variety and must match the pronunciation of the local language.

Pegon Arabic orthography, in essence, is an Arabic script or writing that is equivalent to the regional language – the Malay Archipelago [17][18]. The Pegon Arabic orthography has several characters that do not exist in Arabic, while to read them one must understand the types of Arabic script, how to read and style them, and must understand the local language. Therefore, manuscripts written with pegon Arabic orthography have three criteria, 1) Having additional Arabic script, 2) Writing with the needs of the local language, and 3) Having a certain style and way of reading. Pegon Arabic orthography is a sub-discipline of macro-linguistics which aims to study the written script of a language that has a relationship with factors outside the language, including cultural heritage in the form of spoken and written language [19]. The results of the researchers' observations show that the rules for writing Arabic script into Arabic pegon are currently different from one region to another. These differences arise because the sounds of language and writing are always not the same, both because of the typography, phonology and other factors caused by intralingual and extra lingual [20]. In addition, there are always different

writing conventions for sound, spelling, writing and orthographic symbols, because some scripts are written but not read, some are read but the writing is different, because the language is spoken differently [21].

The uniqueness of the Malay Pegon Arabic writing method is that all orthography in every vocabulary originating from Arabic must be written according to the writing of the original language distinguish between vocabulary derived from Arabic or non-Arabic [22]. Unlike the Javanese and Sundanese Pegon Arabic, the orthographic form of the Gorontalo pegon Arabic is not used in explaining the yellow book [23], but it is also used in oral literary contests (dhikr), then copied and written down to become temporal reading material. in the form of a manuscript (handwritten) using Arabic pegon Malay script in Gorontalo language. These manuscripts were written independently, copied from generation to generation, and transformed into a book called (*kitabi lo dikili*). The *kitabi lo dikili* is read and styled in celebration of the Islamic tradition, especially on the celebration of the birth of the Prophet Muhammad, although not everyone can carry it out [24].

The manuscript of the *Kitabi Lo Dikili* is essentially a manuscript written by an unknown author (anonymous), but is owned by individuals who often practice it (*ta modikilia*) [25]. until now the author has not found the original manuscript, both in the collections of libraries in Indonesia and in Gorontalo. The author assumes that the existence of the Gorontalo pegon Arabic orthography contained in the *lo dikili* book is different, even between one manuscript and another has various signs, because the way of stylizing written text is based on the nature of language and continuum [26], so that there is not one single character, diacritical marks, and sound style.

This is where the importance of transliteration of the manuscript is important because the manuscript of the *kitabi lo dikili* is certain to have copying errors that are not even by the Arabic pegon orthographic writing rules in general. In fact, until now there has been no research that has concluded that the pegon Arabic orthography used in the Java and Sunda regions has the same shape as the Gorontalo Arabic orthography.

The significance of digital transliteration in research is part of an effort to correct, improve, correct, and revise texts that are considered important from the original text with the help of special digital tools for copying letters and orthography of Arabic pegon Gorontalo. In practice, transliteration is done by juxtaposing one text with another, then matching it again with the recording of the reading sound, and adjusting it to the standard rules for writing pegon Arabic orthography. At this stage, researchers try to copy and rewrite texts, to produce new texts that can be used by the community in religious rituals and can be used as teaching materials for maintaining and preserving local languages [27].

There has not been much work on transliterating Gorontalo manuscripts. Even today, manuscripts that read Arabic pegon have many versions, giving rise to mutual truth claims from one manuscript to another. Apart from that, because manuscripts were copied from hand to hand, it is certain that there will be many typographical errors, not least that the orthography of the pegon is written against the actual rules, resulting in misunderstandings of meaning. This is what motivates the author to find out the forms of pegon Arabic orthography errors in Gorontalo manuscripts, as well

as to try to carry out philological transliteration actions, so that this manuscript can be used as a reference by the community in learning Arabic pegon Gorontalo, and is useful in maintaining and preserving the regional language.

The purpose of this research is to transliterate Pegon Arabic orthography in Gorontalo manuscripts *(kitabi lo dikili)*, through a digital transformation process from handwriting to computer writing with apparatus criticus techniques (emandation, declination, interpolation, and alternation) so that the text is easy to read, access and use by the community.

2   Methods

2.1   Research Design

This research is qualitative research with a philological approach based on digital transliteration. Philological approach is needed to objectively perform apparatus criticus with four transliteration techniques, namely: 1) Emandation, is the act of repairing, correcting incorrect pegon Arabic orthography, so that the text becomes better. 2) Interpolation, is the act of inserting letters in a word, so that it complies with the writing rules of standard pegon Arabic orthography. 3) Declination, is the act of editing, by adding certain orthography, which is adapted to Arabic grammar, so that the word is in accordance with the original word scale, and the meaning attached to it. 4) Alternation, is an act of transliteration by replacing one or more orthographies with other orthographies in accordance with the widely used Arabic pegon rules. Alternation is also done to harmonise the writing model with the pronunciation. This approach is needed to make improvements, orthographic corrections of writing errors, using recopying following the Arabic pegon writing conventions and Modern Langauge Arabic, so that the text becomes better and produces a standard text [28].

2.2   Data Collection

The location for collecting manuscripts is in Gorontalo Province with a focus on three districts in one city. The target text under study must read Arabic pegon in Gorontalo, both written and copied by readers of the kitabi lo dikili. Sources of manuscripts were obtained from chanters and manuscript readers consisting of qadhi, imam, customary figures, traditional leaders, and as well as community groups who are used to reading manuscripts on the celebration of the birthday of the prophet Muhammad. The population of this study was 100 manuscripts, with a sample of 6 selected manuscripts.

Manuscript selection is carried out in four stages, namely: Inventory, manuscript description, and editing to produce one main text [29]. The main text is then validated by: 1) Paraphrasing and editing the manuscript following the patterns and characteristics of the Arabic Pegon font, 2) Correcting and cleaning the text from errors using the Modern Standard Arabic Language (MSA) rules,[30][31], 3) Adjustment of the manuscript with the recording results to be copied back into a standard book, and 4) Standard transliteration, because there is not a single manuscript of the dikili book, it is certain that the Arabic pegon Gorontalo orthography of the book varies and even has many errors.

Therefore, it is necessary to review manuscripts from one to another, and choose the orthography that is most widely used. Standard transliteration is also done by adjusting the style to the writing. This method is found by matching readings with writings that have many written variants, so that the correctness of the writing can be determined from all manuscripts. Data analysis techniques were carried out using digital transliteration including emmandation, interpolation, declination, and alternation [32]. To beautify the appearance of the transliteration results, the text and the contents of the text are given several diacritical marks, punctuation marks, start and stop marks, paragraph, page numbers, frames, and other artistic signs, to make it easier for the reader [33].
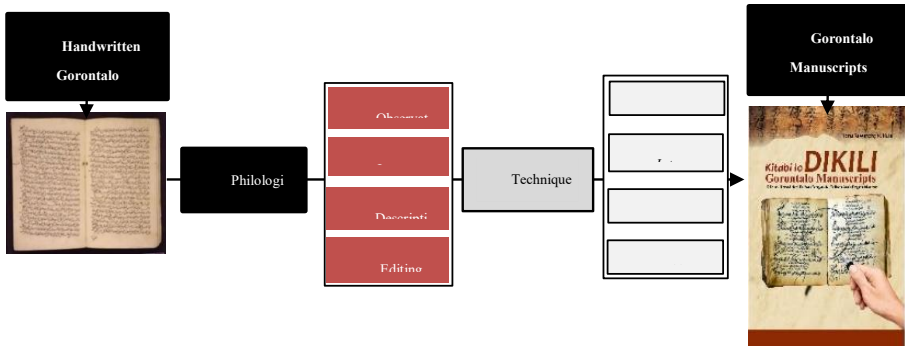

Fig. 1. Digital Transliteration Analysis Model

2.3   Digital Transliteration Workflow

The flow of digital transliteration of Gorontalo manuscripts is carried out in four stages. The first stage of the researchers was to select and adjust the type of writing, form, and sound of Arabic orthographic pegon Gorontalo, especially on letters that are not owned by standard Arabic letters (MSA), namely [c], [e], [g], [mb], [ng], [ngg], [nt], [ny], [o] and [p]. The ten orthographies are included in the font system with Arabic typesetting and pegon Jawi fonts.[34]

The next stage is to copy and scan manuscripts for examination, compare one manuscript with another, and produce one standard manuscript to be read and recorded. The recording stage is carried out by experts who understand how to read the book of *dikili*. The recordings were then matched with manuscript writing. If there are discrepancies and errors in writing, research conducts apparatus criticus by correcting, correcting, inserting, adding, and replacing, so that the book manuscript is represented to be more correct and clear.

The writing stage is carried out after all orthography, words, and the Arabic orthographic phonemization system pegon Gorontalo is checked correctly. The rewriting was carried out by the team with strict inspection, then recorded and the file digitized in PDF form.
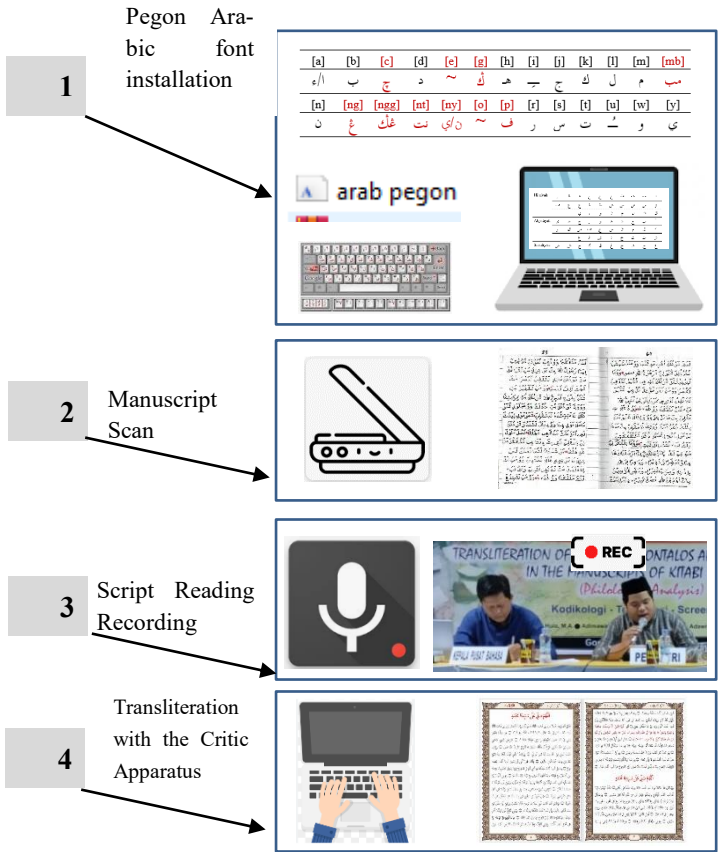
Fig. 2. Digital Transliteration Workflow

3   Results and Discussion

3.1   Results

There are six Pegon Malay Arabic scripts, which are not found in standard Arabic scripts in general, namely [چ – ف – ذَ – ی – کِپ – غْ]. This pegon script is a consonant letter before it is coupled with vowels and other letters. Based on the act of editing the manuscript with four transliteration techniques, the manuscript on *kitabi lo dikili* which reads the Arabic pegon orthography consists of 3237 words, 6 chapters, 12 paragraphs, 14 pages, and 7 chapters. To produce manuscripts that are free of errors, the researcher performs digital transliteration with four critical apparatuses, namely emendation, interpolation, declination, and alternation.

Table 1. Emandation Transliteration of Diacritical Signs

Orthography	Wrong Arabic Punctuation	Apparatus Criticus	Spelling Correction	Digital Transliteration
دُ	أَلـمَوْلُوْدُ	Emandasi Kasrah	Al-Mauludi	أَلـمَوْلُـوْدِ
دِ	يَا مَعْبُوْدِ	Emandasi Dhummah	Ya Ma'budu	يَا مَعْبُوْدُ
ذَ ا	مُحَمَّدُ الـرَّسُوْلُ الله	Emandasi Dhummah	Muhammadur	مُحَمَّدُ رَّسُوْلِ الله
لُ	يَا رَسُوْلُ الله	Emandasi Fathah	Ya Rasulallah	يَا رَسُوْلَ الله

Table 1 above shows that there are four errors in the aspects of *dhummah*, kasrah, *fahataini*, and *dhummah* diacritical marks, this is adjusted to the rules for writing Arabic diacritic marks. 1) The word (أَلْمَوْلُوْد) is transliterated into (أَلْمَوْلُوْد) with *kasrah*, because it is influenced by the *jar* particle in the previous word (اَللَّهُمَّ بِحُرْمَةِ هٰذَا) .2) The word (يَا مَعْبُوْد) is transliterated to (يَا مَعْبُوْد) because the particle (يَا) is meant for *isim nakirah maqshudah*. 3) The word (مُحَمَّدُ الرَّسُوْلُ اللهِ) is transliterated as (مُحَمَّدُ رَّسُوْلِ اللهِ) because this word should be *syakal dhummah* with the law of *marfu'*, and *mudhaf/kasrah* to the word after it because there is no particle that influences it to become *fathah*. 4). The word (يَارَسُوْلُ اللهُ) is transliterated as (يَارَسُوْلَ اللهِ), because this phrase begins with the particle *ya nida'* which functions to *fathah* the next word *syakal*.

Table 2. Transliteration of Emmandations in Syllables

Orthography	Syllable Errors	Apparatus Criticus	Syllables Correction	Digital Transliteration
م – ي	فَهُمَ يَامِي	Emmandattion	Fohumaya mayi	فَهُمَيَامَـيْ
ب – ي	لَـتَمْبِ يُـلُمَىَ	Emmandattion	Lotombilu Mao	لَـتَمْبِيْلُ مَىٰ
ت – ي	بَـوْمَـتُثُ يُـهِيْ	Emmandattion	Bomotutuhiyo	بَـوْمَتُثُيُهِيْ
ف – ئ	هِفَتْ نُدَ	Emmandattion	Hipopouda	هِفَتْنُدَ
ل – م	وَلِ مَـقْـلِبْ	Emmandattion	Walingoliyo	وَلِـمَقْلِبْ
ف – هـ	غْفَ هِيَّ	Emmandattion	Ngopohiya	غْفَهِيْ
ل – م	تَـمُلّ مُلّـوْل	Emmandattion	Tomulomulolo	تَـمُلَمُلْوْل
ل – ل	لْ تَـمْبِـيْلُ	Emmandattion	Lotombilu	لَـتَمْبِـيْلْ
ل – ع	لْ عَبْدُ أَلـمُطَّلِب	Emmandattion	Liabdul Muttalib	لِـعَبْدُ أَلـمُطَّلِب
ل – م	لِ مُبُوْءِ	Emmandattion	Limbuo	لِـمُبُوْءِ
ل – م	آلِ مُبُوْءِ	Emmandattion	Olimbui	آلِـمُبُوْءِ

و – م	أيـلـنـثـوَمُ	*Emmandattion*	*Uyilunthuwamu*	أيـلـنـثـوَمُ
ي – ل	دِيْ لَـتَا	*Emmandattion*	*Diylata*	دِيـلَـتَا
م – ب	لَـهُوْهُمْبُتَ	*Emmandattion*	*Lohuhumbuta*	لَـهُوْهُمْبُتَ
ت – م	تِ مُحَمّدِ	*Emmandattion*	*Timuhammadi*	تِمُحَمّدِ
ت – هـ	فِلَـتِتِهُل	*Emmandattion*	*Pilotitihuli*	فِلَـتِتِهُل
ا – ت	مَوْلَـڠَّا تَـلُـهِيّ	*Emmandattion*	*Molanggataluhiyo*	مَوْلَـڠَّاتَ لُـهِيّ
ف – و	فِلَّفَ وُلْ	*Emmandattion*	*Pilopowuli*	فِلَّفَوُلْ

The data in table 2 above shows that out of 3237 words, 18-word writing errors were found which were separated from one orthography to another so that from the aspect of writing syllables, it was not by the standard pegon Arabic orthography rules. Another error was also caused by the inconsistency of writing one word with two written variants. Therefore the transliteration action is carried out by connecting the writing so that it matches the sound of the syllables and the characteristics of the Arabic pegon orthography which has two forms, namely 1) Twenty-two Arabic orthography that can be connected and assembled with the orthography before and after it, (ب – ت – ث – ج – ح – خ – س – ش – ص – ض – ط – ظ – ع – غ – ف – ق – ل – م – ن) 2 (- ي - هـ –) Six Arabic orthography that cannot be connected with the following orthography is in one syllable, (ا – د – ذ – ر – ز - و).

Table 3. Emmanded Transliteration in Orthography *ha* (ه)

Orthography	Writing Errors	Apparatus Criticus	Writing Correction	Digital Transliteration
ه	حَلِيْمَهْ	*Emmandattion*	*Halimah*	حَلِيْمَةْ
ه	امِـنَه	*Emmandattion*	*Aminah*	أمِيْنَةْ
ه	تِحَلِيْمَةُ	*Emmandattion*	*Tihalimah*	تِحَلِيْمَةُ
	الـسَّعْدِيَّه		*al-Sa'adiyah*	الـسَّعْدِيَّـةُ
ه	ضُمْرَہ	*Emmandattion*	*Dhummrah*	ضُمْرَةُ
ه	أقِيَـامَهْ	*Emmandattion*	*Uqiyamah*	أقِيَـامَةْ
ه	حَلِيْمَهْ	*Emmandattion*	*Uqiyamah*	حَلِيْمَةْ

Orthography (ه) in phonology is a glottal-shift orthography, and has the characteristic al-Hams, meaning that the sound of this letter is hissing (breathing) or faint, when it is pronounced. Besides that, the way to read orthography (ه) sounds the same as orthography (ة) when it is read waqf/stop. In Table 3 above, researchers performed transliteration actions by changing five words that read (ه) into *ta marbutah* (ة), because it follows the original form of standard Arabic orthographic writing in the form of *mu'annats*. Another reason is that the rules say that not all Arabic orthography has to be read as it is written (مكتوب غير منطوق). The word (حَلِيْمَةُ ـ أَمِيْنَةُ ـ السَّعْدِيَّةُ), all three

of which are words of the *mu'annats haqiqi* type, while the word (ضُمْرَةُ) is of the *mu'annats majazi* type, and the word (أَقِيَامَةُ) is of the original *mu'annats* type. Therefore the five words are emanated according to the types of words, the conventions of writing, and the popularity of these words used in all Arabic writings.

Table 4. Emmanded Transliteration of Hamzah's Orthography (ء – ئ – أ)

Orthography	Hamza orthography error	Apparatus Criticus	Writing Correction	Digital Transliteration
ء	ءٕءي	*Emmandattion*	*iiy*	ءٕئى
ء	مَافِلُدُءَة	*Emmandattion*	*Ma piluduao*	مَا فِلُدُنَـىّٰ
ء	آ ءُءُدَء	*Emmandattion*	*Ouudaa*	آنُـُدَء
ء	أ اِلُنْثُغ	*Emmandattion*	*Uilund'ungi*	أَئِـلُنْثُغ

Hamzah (أ) and alif (ا) orthography, is an orthography that is often problematic in writing. Besides that, the *hamzah* in writing is distinguished by seven conditions, namely the *hamzah* at the beginning, in the middle, at the end of the word, the *hamzah* stands alone (ء), the *hamzah* above the orthography waw (ؤ), the orthography above ya' (ئ) and alif (أ), and *hamzah* under the alif (إ). *Hamzah* is different from *alif* because the function of alif is generally a *mad*/long sign in the sound of A.

The emendation transliteration data above can be analyzed as follows; 1) The three words (ءٕءي), (مَافِلُدُءَة), (آ ءُءُدَ) are transliterated as (ءٕئى), (مَا فِلُدُنَـىّٰ), and (آنُـُدَ) because two hamzahs are consecutive and close to each other, so one *hamzah* must be written together next. 2) The word (أَلُنْثُغ) is transliterated into (أَئِلُنْثُغ) by changing the first and second alifs to become loose *hamzah qatha'* and the second *hamzah* is connected with the lam orthography because it is in the middle of the word.

Table 5. Interpolated Transliteration of Vowel A

Orthography	Vowel Writing Error A	Apparatus Criticus	Writing Correction	Digital Transliteration
ا	هُـنَلِيّ	*Interpolation*	*Hunaliyo*	هُـنَـالِـيّ
ا	ثُـوَو	*Interpolation*	*Tuwawu*	ثُـوَاوُ
ا	تَـدُوْثُـوَ دُوْثُـوَلِـيّ	*Interpolation*	*Todutuwa² liyo*	تَـدُوْثُـوَ ا دُوْثُـوَ الِـيّ
ا	نُـدَـنَـوَمَل	*Interpolation*	*Udaawamola*	نُـدَ انَـوَمَل
ا	هِـنَمْبُوَ	*Interpolation*	*Hiambuwa*	هِـنَمْبُوَ ا
ا	هُثُـوَ	*Interpolation*	*Hutuwa*	هُثُـوَ ا
ا	تَـنَلُ	*Interpolation*	*Totalu*	تَـنَـالُ
ا	رَمِسِيَانْثَ	*Interpolation*	*Rahasiyand'o*	رَمَاسِيَانْثَ

Table 5 above shows that nine words were transliterated using the interpolation technique. The interpolation way is done with two edits; 1) Comparing one text to another, then eliminating the inappropriate text and selecting the one that is deemed

by standard Arabic orthographic rules and Arabic pegon. 2) Adjusting the writing with the reading obtained from the recording results on the text reader on Kili. From the results of comparisons between texts and reading adjustments, interpolation techniques on words; 1) (تُو) is transliterated by adding an alif orthography in the middle of the word to (تُواُ), and four other words namely; *lopotuwawu*, (لَقُتُواُ), *tuwawu mao* (تُواُمَئ), *tuwawu heyi* (تُواُهِي) *tutuwawu*, (2 .(تُوتُواُ) Transliteration is also done at the end of the word, by adding *alif* orthography on (هِنَمْبُوَا), (هُنُوَا), and (تَغْكَا).

Table 6. Interpolation Transliteration on Vowel I

Orthography	Vowel Writing Error I	Apparatus Criticus	Writing Correction	Digital Transliteration
ي	أَلِهُ	*Interpolation*	*Alihu*	أَلِيْهُ
ي	مَلا مَغْهِ	*Interpolation*	*Mola mongohi*	مَلا مَغْهِي

Table 6 above shows that two words are transliterated by adding orthography (ي) both in the middle and at the end of the word. Both words (أَلَيْهُ) and (مَلَا مَغْهِي) are adjusted to the elongated reading of the *dikili* recording, so it is appropriate to interpolate with orthographic (ي).

Table 7. Interpolation Transliteration of the U Vowel

Orthography	Vowel Writing Error U	Apparatus Criticus	Writing Correction	Digital Transliteration
و	تت لِـبـتت	*Interpolation*	*Tutu liyotutu*	تُـثُوْ لِـبَـثُثْ
و	مَدُ هقْا	*Interpolation*	*Moduhenga*	مَدُوْ هڠْا
و	وَءُ	*Interpolation*	*Wau*	وَنُـو

Table 7 above shows that two words are transliterated with orthography (و) as an extended U sound sign. The word *tutu liyotutu* in four manuscripts has three forms, the first without the waw in the word tutu (تت), the second with the waw in the middle of the word *liyotutu*, (لِيوتت), the third with the waw at the end of the word *liyoyuyu* (ثُثْ لِيُثُو). Interpolation is done by choosing the majority of its use and the accuracy of how it is read, to be (تُثُوْ لِيَثُثْ). Likewise, the word (مَدُ هڠْا) is written with spaces, so it is interpolated by adding an orthography (و) so that it fits the style. The word (وَءُ) is adapted to the standard MLA orthographic rules which apply additions at the end of words.

Table 8. Transliteration Declination in Arabic word patterns

Orthography	Word pattern scale error	Apparatus Criticus	Writing Correction	Digital Transliteration
ا	سَقَـيْـتَنَ	*Declination*	*Saqaitana*	سَقَـيْـتَـنَـا

I	مَـدُعَ	*Declination*	*Modu'a*	مَـدُعَا
I	اسلم	*Declination*	*Isilam*	إسلاَمُ
I	أُمِـيـنْ	*Declination*	*Aminu*	أُمِـيـنْ
I	مَـلَـئِـكَةِ	*Declination*	*Malaikati*	مَلآئِكَةِ

There are five words in the category of declension 1) The word (سَقَيْتَنَ) is transliterated by adding the orthography of the alif, it becomes (سَقَيْتَنَا), because of the pronoun *nahnu*/plural (2 .(نَا). The word (مَدُعَ) is transliterated by adding an alif, it becomes (مَدُعَا) because the root of this word comes from the word (دعا - يدعو - دعوة - دعاء) which means, "pray, invite, call and call". 3) The word (اسْلُم), is written in two variants, without *hamzah* and *alif* after the lam orthography. These two words are transliterated by adding a hamzah below the *alif* and adding an *alif* after the lam to become (إسلاَم) because this word is by the word scale/*wazn*, in the form of *mashdar* which comes from the word (4 .(أسلم – يسلم - إسلاما). The word (أُمِيْنُ) is written with a *hamzah* above the *alif* and does not use a long (ـ) sign, to avoid being read O. Similarly, the word (مَلَئِكَةِ) is transliterated into the plural form (مَلآئِكَةِ) by adding an orthographic alif after lam in writing. This word comes from the words (مَلَكٌ) "strength" and (الألوكة - مألكة) "task and mission", with scales (مَفْعَلٌ) with *mim zaidah*. This word in this popular term is used for God's creatures who have certain positions and tasks in accordance with God's decrees and orders and are endowed with full power to carry them out.

Table 9. Transliteration Alternation in Orthographic Replacement pattern *Fa* (ڤ) becomes *Pa* (ف)

Orthography	Orthographic Errors (Fa and Pa)	Apparatus Criticus	Writing Correction	Digital Transliteration
ف – ڤ	دِيْڤ	*Alternation*	*Dipo*	دِيْف
ف – ڤ	أُڤِـل	*Alternation*	*Upilo*	أُفِـل
ف – ڤ	تَـهِـيْـلَڤ	*Alternation*	*Tohilopo*	تَـهِـيْـلَف
ف – ڤ	هِڤَقَـنُْـدَ	*Alternation*	*Hipopouda*	هِڤَقَـنُْـدَ
ف – ڤ	لَـهڤَ	*Alternation*	*Lahipa*	لَـهف
ف – ڤ	لَـڤَـكَيُْـغِـلـي	*Alternation*	*Lopangeyangili*	لَـفَـكَيُْـغِـلـي
ف – ڤ	دُڤَ دُڤْڤَ	*Alternation*	*Dupodupopo*	دُف دُفَف

Table 9 above, shows that there are seven words written with fa (ڤ) orthography and transliterated by alternation with pegon (ف) orthography. The nature of the *fa* (ف) orthography is labiodentals-sliding, so the resulting sound is a blow, a hiss from the lips and teeth. Unlike *pa* (ڤ), this orthography is correct for all p-sounding words that erupt on two lips. This shows that Gorontalo pegon Arabic orthography does not recognize the orthography (ڤ). All words that sound (f or p) are always read (p), while the orthographic symbol is *fa* (ف) not (ڤ). This is very different from the use of Malay pegon letters.

Table 10. Transliteration Alternation in Orthographic Replacement pattern Sin (س) becomes Syin (ش) and Ta Maftuha (ة) becomes ta maftuhah (ت)

Orthography	Orthographic Errors (Syin and Ta Marbitha)	Apparatus Criticus	Writing Correction	Digital Transliteration
س – ش	قُـرَيْس	*Alternation*	*Qurai**syi***	قُـرَيْش
ة – ت	أُوﺔ يـت	*Alternation*	*Uwi**to** yito*	أُويْـﺘ يـت
ة – ت	لَـصَلَـوَة	*Alternation*	*Loshalawa**ti***	لَـصَلَـوَ اﺗ

Three words must be transliterated. 1) The word (قُرَيْس), orthography (س) is altered with orthography (ش) because the original form of writing refers to a tribe in Arabia or the name of one of the surahs in the Quran "al-Quraish". 2) The word (أُوﺔ) is alternated with (ﺘ) because the orthography of *ta marbuthah* (ة) is used more for words that denote feminism/*mu'annats*. 3) The word (لَصَلَوَةِ) which reads *ta marbuthah* (ة) is altered with *ta maftuhah* (ت) because it shows the plural and means blessings.

3.2   Discussion

The existence of Pegon Arabic writing scattered in several parts of Indonesia attracts attention to analyse its orthography. Orthography etymologically means "correct script writing".[35] The above definition shows that orthography is related to the system of symbolisation, form, pattern and spelling of letters, including parts of diacritical marks, punctuation, attributes, spelling that characterise a particular language.[36]

Arabic pegon orthography is also a subdiscipline of macro linguistics that aims to study the script writing of a language that has a relationship with factors outside the language, including cultural heritage in the form of spoken and written language. The results of the researcher's observations show that the method of writing Arabic script into Arabic pegon currently differs from one region to another. These differences arise because the sound of the language and its writing are always not the same, either because of the form of typography, phonology or other factors caused by intralingual and extralingual. In addition, the sound, spelling, writing and orthographic symbols always have different writing rules, because there are characters that are written but not read, some are read but the writing is different, because of the different language of speech.[37]

In the Malay Pegon Arabic writing method, all orthographies that exist in every vocabulary derived from Arabic must be written according to the writing of the language of origin, however, in the current Gorontalo Pegon Arabic writing method, all vocabulary is written according to its consonant phonemes without distinguishing between vocabulary derived from Arabic or non-Arabic. This contrasting difference causes that between these three languages, there are fundamental similarities, as well as other differences in terms of orthography, phonemisation, spelling and the symbols

that represent them. The characteristics of Gorontalo and Malay pegon Arabic that are used as the basis for digital transliteration are presented in the following table:

Table 11. Characteristics of Gorontalo Arabic Pegon

[a]	[b]	[c]	[d]	[e]	[g]	[h]	[i]	[j]	[k]	[l]	[m]	[mb]
ا / ء	ب	چ	د	~	ڠ	ﻫ	ـِـ	ج	ك	ل	م	مب

[n]	[ng]	[ngg]	[nt]	[ny]	[o]	[p]	[r]	[s]	[t]	[u]	[w]	[y]
ن	غ	غڠ	نت	ن/ي	~	ف	ر	س	ت	ُ	و	ي

Table 12. Characteristics of Malay Arabic Pegon

Malay	[ha]	[na]	[ca]	[ra]	[ka]	[da]	[ta]	[sa]	[wa]	[la]
Pegon	ا – ﻫ	ن	چ	ر	ك	د	ت	س	و	ل

Malay	[pa]	[dha]	[ja]	[ya]	[nya]	[ma]	[ga]	[bha]	[tha]	[nga]
Pegon	ڤ	ڎ	ج	ي	ي	م	ݢ	ب	ط	غ

Tables 11 and 12 above show that these two types of Pegon Arabic, besides having similarities, also have differences. Gorontalo Pegon Arabic orthography has 28 characters and does not recognise 5 characters, namely [f] [q] [v] [x] and [z]. While the characteristics of Gorontalo Pegon Arabic orthography have five characteristics, namely; [mb], [ng], [ngg], [nt] and [ny]. The Malay Pegon generally uses the jawi script known as Hanacaraka. The number of Malay pegon Arabic characters is 20 orthographies, but some call it 21 orthographies, if the characters ha (ﻫ) and a (ا) are separated. Some add it with the script (ۏ) pronounced 'va'.[38] There are generally six Malay pegon Arabic scripts, which are not found in the Modern Standard Arabic (MSA) script, namely; [چ – ڤ – ذ – ي – ڮ – غ]. The pegon script is a consonant letter before it is combined with vowels and other letters.

There are many handwritten religious texts in Gorontalo, but the most familiar of these are the *dikili* and *me'eraji* texts. These two books are often read, chanted at events commemorating the Prophet's birthday (*maulid*) [39] and *isra' mi'raj*. The speciality of these two manuscripts is that they are written in Pegon script in Gorontalo language, so it is important to carry out philological actions through manuscript observation, inventory, description and repair.

Researchers conducted manuscript observation to collect and directly check the existence of manuscripts in four districts. Dikili books are rarely found and stored in regional libraries, and are only owned by people who have expertise in reading dikili

books. As a result of this observation, the researcher found 6 collections of *dikili* books that are widely used as references by the Gorontalo community to be written and copied.

Furthermore, the researcher conducted an inventory for coding each manuscript to be described. The results of the description of the Dikili manuscript have three parts, namely; (a) parts 1-18 contain 25 narratives in Pegon Arabic, (b) parts 1-8 contain narratives in Indonesian, and (c) parts 9-18, contain narratives in Gorontalo, so that the total number of narratives is 50 parts. [40]. The 18 chapters of the *dikili* book, written in pegon Arabic, have the following themes:

Table 13.   Description of *Kitabi lo Dikili* Theme

Theme	Description	Early Editorial
Falakam Lahu	*About Orphans*	فَلَكَمْ لَهُمِنْ آيَةٍ مَشْهُوْرَةٍ
Fatharaqu	*The story*	فَطَرَقُ ٱلْوَصْلِ اَضْحَتْ مُسْتَقِيْمَةً
Ta'allama	*Journey*	تَعَلَّمَ لِئْنُهُ ٱلْغُصْنُ ٱلْقَوِيْمُ
Man Mitsilu	*Parable*	مَنْ مِثْلُ أَحْمَدَ فِى ٱلْكَوْنَيْنِ نَهْوَاهُ
Ya Maulidan	*Born*	يَا مَوْلِدًا قَدْ حَوَى عِزًّا وَ إِقْبَالاً
Shalla ilahu	*Prayer advice*	صَلَّىَ الإِلَهُ عَلَى النُّوْرِ الَّذِي ظَهَرَا
Ta'allau Bina	*Obedience*	تَعَالَوْا بِنَا نَصْطَلِحْ فَبَابُ الرّضَا قَدْ فُتِحْ
Tammal Mauludu	*Cover/Perfect*	تَمَّ ٱلْمَوْلُوْدُ الشَّرِيْفُ بِحَمْدِ اللهِ بِعَوْنِهِ
Falakam Lahu	*About Orphans*	فَلَكَمْ لَهُمِنْ آيَةٍ مَشْهُوْرَةٍ

The next step is editing and transliterating the text using the grounding method. This method is done to obtain an authoritative text and to free the text from all kinds of errors that occurred at the time of copying so that the text can be read clearly and easily understood its meaning. The way to achieve this goal is to perform Apparatus Criticus with four types, namely emmandation, interpolation, declination, and alternation. These four types are useful for correcting all kinds of errors, replacing writing, inserting, adjusting writing that does not match the reading, adding writing, and or reducing excessive writing. All steps of Apparatus Criticus are based on conformity with pegon Arabic rules, Standard Arabic writing rules, syllables, grammar, and word meanings attached to each word according to the articulation and phonemisation of Gorontalo pegon Arabic.

The transliteration results show that generally the dikili book contains four forms of errors, namely 1) Arabic writing errors in the aspects of punctuation, hamzah letters, vocal A/I?U, 2) Errors in Pegon Arabic writing in the aspect of syllable separation, 3) Errors in orthography [ha], [shin] [sin] [ha] [ta] and [ta marbuthah] 3) Errors in the use of punctuation marks, 3) Errors between the reading, langgam, and the writing, and 4) Errors in the writing of verses, hadith or grammatical errors.

After digital transliteration was carried out, the Gorontalo *kitabi lo dikili* manuscript was emanated/improved, interpolated/added, declined/reduced, and altered/replaced in Arabic orthography adapted to the pegon and Standard Arabic writing and reading techniques. Several changes in the appearance of the manuscript

after being transliterated are, 1) Each paragraph is limited by the sentence *shalawat* (أَللّٰهُمَّ صَلِّ عَلَى سَيِّدِنَا مُحَمَّدٍ) which is written in red ink, 2) All body text uses the Arabic typesetting font, and is written in black, 3) Each paragraph begins marked in bold as a starting point taken from the words at the beginning of each paragraph 4) Each end of a sentence is marked with ⭗ as a stop marker. 5) The addition of artistic features in the form of frames, page numbers, word corners, and chapter markers, are placed outside the text to add completeness of information to each page.

Produce a valid manuscript transliteration, is carried out in five stages. First, comparing plural texts and having one text that is closer to the truth of the writing. Second, ensuring the correctness of writing with both standard Arabic orthography and Standard Pegon orthography, and Third, matching the text with audio text readings. Fourth, do manual rewriting (handwriting) with the *Naskhi style*. Fifth, carry out digital transliteration, by retyping the manuscript with computer aids and choosing a font that is compatible with Arabic pegon. The difference in visualization before and after transliteration was carried out in the Gorontalo pegon Arabic manuscript, as shown in Figure 3.

Fig. 3. Visualization of the Gorontalo Manuscript after Digital Transliteration

4   Conclusion

There are quite a lot of Gorontalo manuscripts written with the Arabic Pegon orthography. However, from one manuscript to another, the writing differs. Because the manuscript was copied and written by hand, it certainly has a variety of forms of writing, so it affects the way of reading and the meaning of words. Because the characters that make up words and sentences, which are written not by the phonemes and spelling of pegon Arabic and Standard Arabic, will make the script even more difficult for the whole community to learn. The transliteration action with philological analysis is essentially aimed at making the orthographic writing in each manuscript correct, correct, and according to the rules. Therefore, manuscripts that have been transliterated in the right way can be used as a guide as well as a reference in studying intangible heritage texts, so that they are always sustainable, survive extinction, and can be accessed by future generations. Considering that the activists and readers of the manuscripts that read the Arabic orthography of Pegon Gorontalo have very little interest and are only dominated by parents. The results of this research are very useful for the wider community, especially for activists and readers of Gorontalo manuscripts, traditional leaders, religious leaders, the younger generation, and local governments who have been trying to preserve the cultural heritage, language, and literature of the area which are threatened with extinction. Thus, the presence of the Gorontalo manuscript which has been copied with the modern digital script, and written according to the correct Arabic pegon orthography, is expected to become a standard book in learning the variants of the Archipelago script.

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