Analysis of Fabricated Character Design Methods Based on Chinese Character Composition Rules

Yuhang Yang[1] Li Gu[2]

[1,2] *Nanjing Tech University, Nanjing, Jiangsu 211816, China*
[2] *Corresponding author. Email: fishingbirds@njtech.edu.cn*

ABSTRACT

Character is an important component of anime, game, and film and television works with a fabricated worldview. A character design scheme that fits the fabricated worldview can make the setting fuller. This article mainly explores the design methods of fabricated characters based on Chinese character composition rules by analyzing the development context of Chinese characters, the characteristics of characters developed based on Chinese characters, and their design methods.

Keywords: Chinese character composition, Fabrication, Character, Design method.

1. INTRODUCTION

As the last remaining ideographic characters still in large-scale use in the world, Chinese characters boast a huge word bank that phonetic characters do not have. There are almost 3, 000 Chinese characters in daily use, or about 90,000, counting rare Chinese characters, If we include other characters based on the structure of Chinese characters, there are countless. All these Chinese characters and other characters based on the structure of Chinese characters can help us not only summarize the rules of character composition, but also analyze the cultural background of each period of their development. If this character composition method is applied to the character design of artistic works based on Chinese culture under the fabricated worldview, it can not only avoid the imperfect setting of the worldview caused by the blending of historical allusions and the fabricated world, but also integrate the setting of the fabricated worldview into the character design, making the fabricated world more vivid.

2. CURRENT SITUATION OF FABRICATED CHARACTER DESIGN

In many anime, game, and film and television works with a fabricated worldview, there are often characters that do not exist in reality, which are called fabricated characters. The common fabricated characters are designed based on Latin and other phonetic letter designs, such as the characters appearing in the Japanese animation "Violet Evergarden" (as shown in "Figure 1"). The letters in the fabricated characters correspond in a one-to-one manner with the Latin letters in reality, and the transliterated words and sentences are also words and sentences in the Latin language, that is, only changing their forms without changing their meanings. A more complex one will be based on the laws of language that exist in reality, creating a new language and designing characters for it. A representative example is the Elvish language invented by J.R.R. Tolkien, author of "The Lord of the Rings" (as shown in "Figure 2"), which has a complete historical evolution and dialects, slang, and other languages from different regions, the design of which is also quite aesthetic. There are also many fabricated characters designed based on other languages, for example, the characters used in Naraku language (as shown in "Figure 3") in "From the Abyss" are designed based on Japanese kana.

Figure 1 Characters (alphabet) appearing in "Violet Evergarden".

Figure 2 Elvish characters in "The Lord of the Rings".

Figure 3 Naraku characters in "From the Abyss".

The above examples all have one thing in common, namely, their prototype characters are all phonetic characters, while there are almost no fabricated characters based on ideographic characters, as ideographic characters require more design work and are difficult to control compared to phonetic characters, phonetic characters only need to design letter shapes and writing rules to spell words and sentences according to language rules, while ideographic characters require the design of a large number of commonly used words to form words and sentences, while also

considering the unity and differentiation of the characters. According to the laws of Chinese language, it is necessary to design at least 2,500 commonly used words to meet the basic needs and the workload is enormous. On the other hand, there are very few ideographic characters that have matured in history and represent a high level of civilization, which only include the cuneiform characters of West Asia, the hieroglyphics of North Africa, and the Chinese characters of East Asia. Currently, only Chinese characters are still in use, and the materials available for summarizing the laws of ideographic characters are very limited. However, phonetic characters can be designed by summarizing the laws of many different real-life characters, which leads to the rarity of fabricated character designs based on ideographic characters.

3. THE EVOLUTION OF CHINESE CHARACTERS

Legend has it that Chinese characters were created by the Left Official Historian Cang Jie during the Huangdi period. Archaeological discoveries have found that the earliest systematic Chinese characters can be traced back to the oracle bone inscriptions of the Shang Dynasty, and after a long period of development, different fonts and writing methods have gradually emerged.

3.1 Ancient Times

The characters used in ancient times were oracle bone inscriptions. Due to the fact that oracle bone inscriptions were in the early development of Chinese characters, there was no unified standard for the structure of characters, only aiming to express meanings. Therefore, there are many situations where several different oracle bone inscriptions correspond to the same character today. At the same time, due to the influence of information storage media and other factors, in order to facilitate lettering, the stroke order of some characters has also been affected. Overall, they summarize the shape of things, extract key points, reproduce the scene, and form characters.

3.2 Zhou Dynasty

During the Western Zhou Dynasty, bronze inscriptions appeared, mainly recorded on bronze vessels. In order to adapt to the bronze vessels and also to be aesthetically pleasing, the size of the character tended to be uniform, and the arrangement was neater and aesthetically pleasing.

Bronze iInscriptions are more rounded than oracle bone inscriptions, breaking away from simple imitation of object images and possessing a fundamental design consciousness.

3.3 The Spring and Autumn Period and the Warring States Period — Qin Dynasty

Seal script was mainly used during the Spring and Autumn Period and the Warring States Period. Due to the moral degeneration of society is getting worse in the late Zhou Dynasty, there were many powerful figures outside the capital Haojing, and differences began to appear in the characters of different states, forming a coexisting phenomenon of multiple forms of "different sounds of languages and different forms of characters". The character of this period was called large seal script. Later, the Emperor Qin Shi Huang annexed the six states and established norms for official character. The small seal script compiled by Prime Minister Li Si was used as the standard writing throughout the country. The small seal script was based on the "square character", simplifying the structural form and writing method of the large seal script. The pictographic features gradually reflected the development trend of linear and regular characters, and possessed the embryonic form of modern Chinese characters. From the beginning of simply reproducing and imitating, to multiple improvements and evolution, a mature and complete character form has been formed.

3.4 Han Dynasty — Modern Times

Since the Han Dynasty, the shape of Chinese characters has become more and more similar to those used today. Although some of their shapes are quite different, people nowadays can still recognize most of the sculptured stone documents of the Han Dynasty. During this period, Chinese characters experienced the following developmental stages: Official Script, Regular Script, Cursive Script and Running Script. According to different recording media, Typography font (mainly Song typeface), Bitmap Characters and other fonts were developed based on Regular Script; after the founding of the People's Republic of China, simplified characters were derived from traditional characters for the needs of illiteracy eradication. Generally speaking, except for artistic fonts such as Running Script and Cursive Script, the shape of Chinese characters has not changed much.

3.4.1   Official Script

Official script originated in the Qin Dynasty, and was said to be created by Cheng Miao and evolved from small seal script. Official script of Han Dynasty reached its peak during the Eastern Han Dynasty, thanks to the development of papermaking technology, which basically separated from graphical representation and made the meaning of symbols more obvious, making it more suitable for writing on paper. Compared to the square characters in seal script, the official script of Han Dynasty tended to have a flat square shape that extends horizontally, and the curve became a straight line. The overall appearance was horizontal and vertical, which was closer to the current Chinese characters.

3.4.2   Regular Script, Cursive Script, and Running Script

With the development of official script and the pursuit of aesthetics by ancient people, various types of characters emerged, such as regular script, cursive script, running script, etc., all based on the recreation of glyphs of official script. Regular script, with a square shape and straight strokes, pursues physical beauty. Cursive script is a font formed by combining the dots and strokes of characters according to a certain pattern, with a simple structure and borrowed radicals. Running script is a type of font that falls between regular script and cursive script, which is created to compensate for the slow writing speed of regular script and the difficulty in recognizing cursive script. Due to the higher legibility of Regular Script, it is usually used in government documents.

3.4.3   Print Form

Printing was invented during the Tang Dynasty and began to be widely used in the mid to late Tang Dynasty, requiring the use of wood to carve into characters for printing. In the engraving of ancient books, due to the influence of material properties, strokes that aligned with the fiber direction of wood were not easily to break during the engraving process, strokes that were perpendicular to the fiber direction of wood were usually very easy to break, and at the same time, due to the needs of engraving, wooden boards were usually cut and processed longitudinally from wood, and ancient Chinese characters were written from top to bottom, the horizontal strokes of characters were in the same direction as the wood fibers, and the vertical strokes

were perpendicular to the wood fibers. Therefore, it gradually developed Song typeface (A type of regular script) for printing, with thin horizontal strokes and thick vertical strokes, mainly pursuing practicality, followed by aesthetics.

3.4.4   Simplified Characters

Simplified characters refer to simplified Chinese characters, which are different from traditional Chinese characters and mainly originate from ancient characters, folk characters, variant Chinese characters, and regular script-ized characters of cursive script. Both the the People's Republic of China and the period of the Republic of China officially published the official simplified character list. Among them, the mainland of China published two versions of the simplified character list, commonly known as "the first round of simplified Chinese characters" and "the second round of simplified Chinese characters", and later, "the second round of simplified Chinese characters" was finally abolished because of its imperfection. Simplified Chinese characters are more convenient to read and write than traditional Chinese characters, which can greatly reduce learning costs. Someone in Taiwan once conducted a survey on the streets: The experimenter randomly stopped passersby and asked them to write down the characters "台湾忧郁乌龟" (Taiwan, blue, turtle); however, few people were able to write them because the traditional Chinese characters of these words were "臺灣憂鬱烏龜", which were quite difficult. Due to a greater emphasis on practicality, some simplified Chinese characters may not have the same aesthetic structure as traditional Chinese characters, such as the characters "宁"(peace) and "寧". But this is also the only way which must be passed in the development of Chinese characters.

3.4.5   Bitmap Font

The display of recorded characters in computers relies on individual pixels, and usually 24×24 pixels can record the vast majority of Chinese characters, while the national-standard bitmap Font within the range of 16×16 pixels can display 3,755 first-level commonly used Chinese characters. At present, the company using the least pixel is the Dinkie Bitmap Font released by 3TYPE Company in 2020 (as shown in "Figure 4"), which only requires 7×7 pixels to display commonly used Chinese characters. These bitmap characters are mainly used in electronic displays, pixel-style game works, etc., and also provide a theoretical basis for

computer character design, that is, to meet usage and aesthetic needs while saving storage space as much as possible.
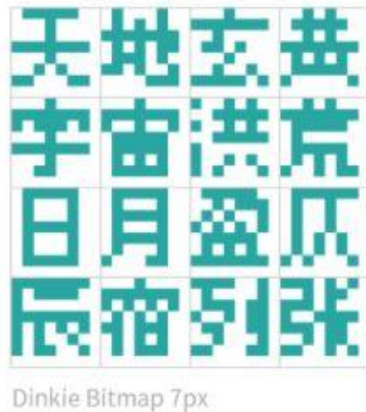

Dinkie Bitmap 7px

Figure 4 Dinkie Bitmap.

4. CHARACTER ANALYSIS BASED ON CHINESE CHARACTERS

Due to the radiating influence of ancient China on the surrounding areas, regions of East Asia have historically used Chinese characters or designed their own characters based on their structure. However, most of these characters have become dead characters, and currently, only Hangul, kana, and others are still in use.

4.1 Japanese Kana

Kana is mainly divided into two types: hiragana and katakana. Hiragana originated from the cursive script of Chinese characters and was officially used around the 9th century AD. Katakana originated from the regular script of Chinese characters and was officially used around the 10th century AD. The mainstream theory believes that katakana was created by the diplomat to the Tang Dynasty, Kibi Makibi, to simplify the regular script in Chinese characters, while hiragana was created by the studying monk into the Tang Dynasty Kukai to simplify the cursive script in Chinese characters.

It should be noted that although kana evolved from Chinese characters, it is a form of phonetic characters. A kana has a single phoneme and has no meaning in itself. Connecting different kana can form a word or represent a Chinese character in Japanese (Kanji).

4.2 Korean Hangul

Hangul is a type of block phonetic letter that draws inspiration from the square form of Chinese characters, originating from the *Hunminjeongeum*, on the request by the 15th century J Dynasty's King Sejong. Its letter design implies the idea of "three types of realms of heaven, earth, and humanity" in Chinese Taoism. Any vowels and consonants in hangul can be individually formed into a character or combined into a character by imitating the structure of Chinese characters. The form is similar to Chinese characters, but like Japanese kana, it belongs to phonetic characters.

4.3 Vietnamese Chu Nom

Chu Nom is a type of writing once used in Vietnam (as shown in "Figure 5"). Vietnam, while using Chinese characters for a long time, created Chu Nom by borrowing and imitating the principles and methods of Chinese character structure, based on the pronunciation of the gin language, which can be divided into borrowed, phonetic, and associative Chu Nom. The form of Chu Nom is to use existing Chinese characters or their components to form new characters, as a supplement to borrowed Chinese characters. Chu Nom roughly borrows 7 or 8 out of 10 of Chinese characters and adds 2 or 3 out of 10 of Chu Nom. The methods of borrowing Chinese characters include: 1. Loanwords, i.e., borrowing forms, pronunciations, and meanings; 2. Sound reading, i.e., borrowing pronunciations to change meanings; 3. Meaning reading, i.e., borrowing meanings to change pronunciations. The methods for creating new Chu Nom include: 1. Creating associative compounds, 2. Creating pictophonetic characters, and 3. Others.

Similar to the method of creating Chu Nom, there are also ancient Zhuang, Miao, Yao, square Bouyei, square Dong, Bo of Kingdom of Dali, square Hani, square Gelao, and Axi of the Yi nationality characters and so on. Most of these ethnic groups live in Southeast Asia and are culturally and linguistically close, with many characters being the same. For example, the character "你" (you) in both the Chu Nom and Yao characters is written as "眉" (The Chinese meaning is eyebrows), because their pronunciations ("may" in Chu Nom and "nej" in Yao characters) are very alike, which are similar to the pronunciation of the "眉" character in ancient Chinese, leading to a very similar formation method of these characters.

There are some Cantonese characters in the Cantonese language of Chinese dialects, and their word formation methods are very similar to Chu Nom.

Chu Nom	义	仁	乤	罘	蓏	毶	
Vietnamese	một	hai	ba	bốn	năm	sáu	
Chinese	一	二	三	四	五	六	
English	One	Two	Three	Four	Five	Six	
Chu Nom	岜	僗	尣	迻	檓	斘	兆
Vietnamese	bảy	tám	chín	mười	trăm	ngàn	triệu
Chinese	七	八	九	十	百	千	兆
English	Seven	Eight	Nine	Ten	Hundred	Thousand	Million

Figure 5 Vietnamese Chu Nom numbers.

4.4 Khitan Large Script

Khitan characters are divided into Khitan large script (as shown in "Figure 6") and Khitan small script, with large script indicating meanings and small script indicating pronunciations. The Khitan small script were transformed from the large script by Yelü Diela inspired by the Old Uighur language. The Khitan large script were created with reference to Chinese characters by Yelü Tulvbu and Yelü Lubugu under the guidance of Yelü Abaoji, the founder of the Liao Dynasty, with a total of over 3,000 characters. The way of writing Khitan large script was similar to Chinese characters, where each character represented a syllable (sometimes a few characters represented a syllable and each character was just a phoneme), following the characteristics of the Chinese characters in regular script, with horizontal and vertical strokes, as well as dots, and horizontal, vertical, left-falling, and right-falling strokes. Some Khitan large script directly borrowed Chinese characters, such as: 一 (one), 二 (two), 三 (three), 五 (five), 十 (ten), 百 (hundred), 皇帝 (emperor), 国 (country), etc. Some large script only borrowed Chinese characters to change their original pronunciations and meanings. There were also some large characters that were imitations of Chinese characters by transforming their glyphs and adding or subtracting strokes.

Khitan large script also provided a reference for the creation of Jurchen characters. The Jurchen tribe synthesized Chinese characters and Khitan large script to create Jurchen characters, and their design methods were very similar to that of Khitan large script.

Figure 6 Khitan large script, "天朝万顺 (long live the celestial empire)".

4.5 Western Xia Characters

The Western Xia characters (as shown in "Figure 7") was created by Minister Yeli Renrong, under the command of Li Yuanhao, Emperor Jingzong of the Western Xia, in the first year of Daqing, with a total of over 5,000 characters, which had square and neat forms, and cumbersome strokes. In terms of composition, they imitated the formation method of Chinese characters and borrowed the basic strokes of Chinese characters. Their basic strokes also had the same dots, as well as horizontal, vertical, left-falling, and right-falling, left-turning, and right-lifting strokes as Chinese characters, but they had no commonly seen vertical hooks in Chinese characters, and oblique strokes such as left-falling and right-falling were more commonly used. The Western Xia characters had more associative compounds than Chinese characters, there were very few pictographic characters and ideograms, and the ideographic part of the character didn't represent the object form. The Western Xia characters had a variety of strokes and complex structures, with many exceeding 10 strokes, making it difficult to recognize, remember, and write.
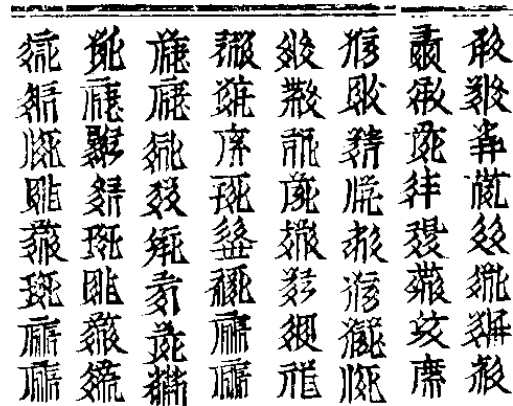

Figure 7 Western Xia character rubbings.

4.6 Jiangyong Nüshu

Jiangyong Nüshu (as shown in "Figure 8") is the only type of writing in the world that exists specifically for female. It was created during the Han Dynasty and was another form of expression of Chinese characters. Nüshu originated from square Chinese characters and was a variation of square Chinese characters. After research, there are about 1,000 basic single characters in Nüshu. The appearance and shape of Nüshu are in the form of a long diamond-shaped "多" (many) character, with a high position on the upper right and a low position on the lower left. Nüshu is italicized and slender, beautiful and thin. At first glance, Nüshu may look like oracle bone inscriptions, but there are also many familiar Chinese character traces in it.

There are 3 goals of transforming Chinese characters by Nüshu: 1. Overall tilting. 2. Transforming Chinese characters into dot strokes. 3. Transforming Chinese characters into well-balanced line strokes. There are several methods for transformation: 1. Decomposing and merging. 2. Extending and shortening. 3. Increasing and decreasing. 4. Turning to and transferring. 5. Repeating after categorization. 6. Adding components.
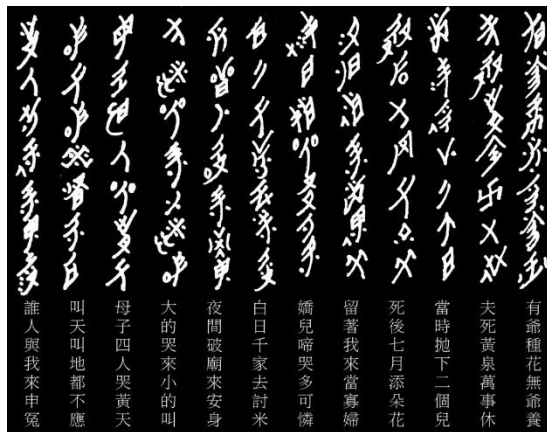

Figure 8 Jiangyong Nüshu poems.

4.7 The Second Round of Simplified Chinese Characters

The second round of simplified Chinese characters was mainly used in Chinese mainland from December 20, 1977 to June 24, 1986. During this period, it was very controversial and had a profound impact. For example, "餐" (meal) and "歺", as well as "停" (stop) and "仃" can still be seen in restaurants and parking lots today. The purpose of the second round of simplified Chinese characters

was to simplify complex Chinese characters, make them easy to read and write, and reduce the illiteracy rate of the people. However, this measure was taken too hastily and there were many unreasonable aspects in the design. The main methods for the second round of simplified Chinese characters include: 1. Homophonic substitutions, for instance, "籍"(book) is simplified as "笈"; 2. Pictophonetic characters, for instance, "酒" (wine) is simplified as "沈"; 3. Tagged characters, for instance, "貳" (two) is simplified as "弍"; 4. Outline characters, for instance, "堂" (hall) is simplified as "坣"; 5. Regular script-ized characters of cursive script, for instance, "身" (body) is simplified as "仂"; 6. Associative compounds, for instance, "矮" (short) is simplified as "仦"; 7. Symbolic characters, for instance, "割" (cut) is simplified as "刈"; 8. Simplifying radicals, etc.

4.8 Others

There were also some characters with extremely small circulation and survival rate, such as Xianju tadpole script, Cangjie script, Xia Yu script, etc., which were formed in ancient times or were created by later generations with reference to seal script, bronze iInscriptions, etc. Similar to the bird and insect seal script that was popular in southern states such as Wu, Yue, Chu, Cai, Xu, Song from the mid to late Spring and Autumn Period to the Warring States Period, although they were different from general Chinese characters, they were essentially a branch of Chinese character fonts. It's just that they were lateral branches developed separately from different stages of the development of Chinese characters, but these lateral branches were either very shortly lived or they quickly died out.

5. DESIGN METHODS FOR FABRICATED CHARACTERS BASED ON CHINESE CHARACTER STRUCTURE

From the designs of the above several types of characters, the following methods for designing fabricated characters can be summarized: 1. Radical reconstruction method; 2. Sound reading method; 3. Regular script-ized method; 4. Associative compound method. In addition, the current popular AI painting can also be used to assist in fabricated character design.

When using these design methods for design, designers need to pay attention to maintaining the standard use of Chinese characters; otherwise they

may face an awkward situation of not passing the review of relevant departments.

5.1 Radical Reconstruction Method

Similar to Korean Hangul and Jiangyong Nüshu, the design of fabricated characters can utilize existing Chinese character radicals for modification and reconstruction, while incorporating the cultural background behind the fabricated characters into the design. For example, there is such a fabricated worldview where the creatures there make a living by fishing in the sea, adept at using harpoons and fishing nets, living on ships on weekdays and rarely getting ashore. Therefore, their characters can be designed as follows (as shown in "Figure 9"):
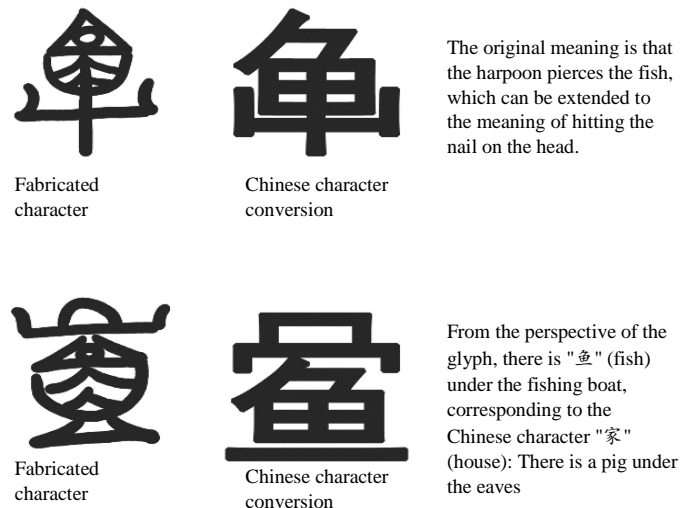

Fabricated character

Chinese character conversion

The original meaning is that the harpoon pierces the fish, which can be extended to the meaning of hitting the nail on the head.

Fabricated character

Chinese character conversion

From the perspective of the glyph, there is "鱼" (fish) under the fishing boat, corresponding to the Chinese character "家" (house): There is a pig under the eaves

Figure 9 Radical reconstruction method.

5.2 Sound Reading Method

This method is applicable to fabricated worldviews that have already designed language systems, using methods such as pictophonetic characters and homophonic substitution to design fabricated characters. However, in order to maintain the standardization of the use of Chinese characters and to facilitate the review process, when using these methods, it is necessary to avoid the occurrence of homographs with existing Chinese characters. If conditions permit, designers should try not to use the radicals of existing Chinese characters and make some changes. Generally speaking, the reading of pronunciation relying on "transliteration" is suitable for civilizations that are dependent on a powerful civilization. This type of fabricated character design should be based on the characters of that powerful civilization. If the civilization to be designed for fabricated characters is a fictional civilization in the Chinese character cultural circle, then there should be Chinese character radicals in the characters, and even Chinese characters can be borrowed.

5.3 Regular Script-ized Method

Designers can convert some existing fonts into regular script to form new characters. For example, the large seal script of the Warring States Period can be regular script-ized according to the evolution law of Chinese characters, while adding or deleting some structures to give it a sense of beauty, as shown in "Figure 10":

Large seal script

Regular script

(Boldface)

Large seal script

Regular script
(Written by hands)
fabricated characters

Regular script
(Boldface)
fabricated characters

Figure 10   Regular script-ized method.

5.4 Associative Compound Method

Associative compound refers to a new character formed by combining two or more independent characters based on their respective meanings, such as the Chinese character "武" (force), which follows "戈" (weapon) and "止" (stop). In ancient times, The character "止" was the character "趾" (toe), and "戈"

has feet (toe) under it, indicating that a person is walking with a weapon, with the intention of conquering or demonstrating force. To apply this method, a series of individual characters need to be pre-designed, and then according to the meaning of the required designed characters, the pre-designed individual characters are combined in pairs to form a new character, as shown in "Figure 11":
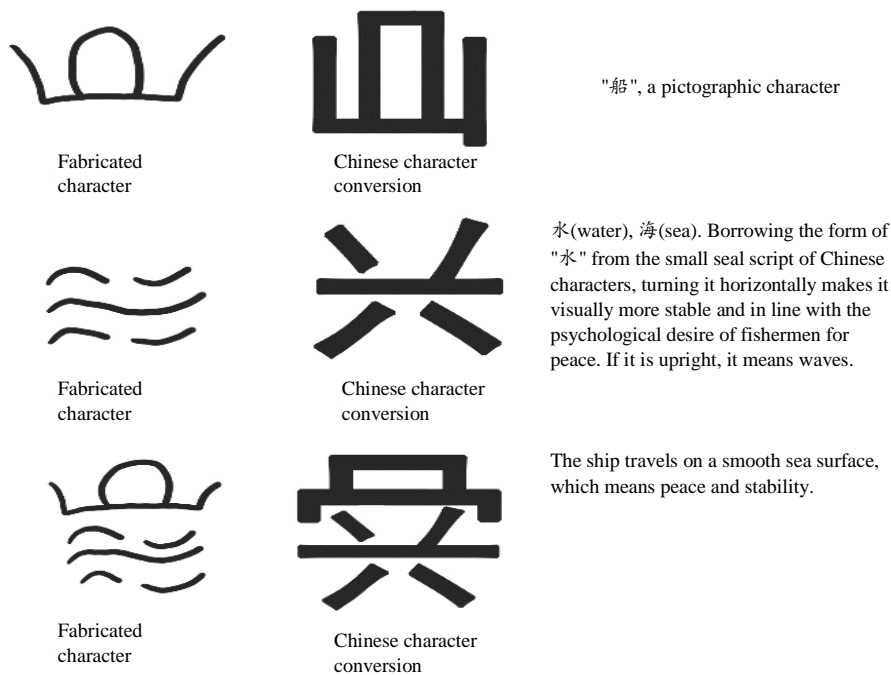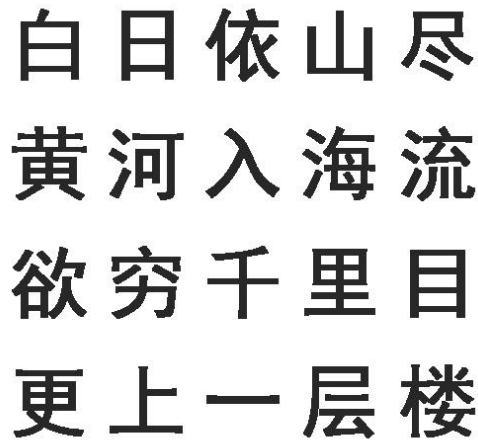

Fabricated
character

Chinese character
conversion

"船", a pictographic character

Fabricated
character

Chinese character
conversion

水(water), 海(sea). Borrowing the form of "水" from the small seal script of Chinese characters, turning it horizontally makes it visually more stable and in line with the psychological desire of fishermen for peace. If it is upright, it means waves.

Fabricated
character

Chinese character
conversion

The ship travels on a smooth sea surface, which means peace and stability.

Figure 11   Associative compound method.

5.5 AI Assisted Method

Nowadays, AI painting technology is rapidly developing. Due to the high degree of uncertainty in AI painting, it is possible to first train the model using basic Chinese characters and then use the trained model to redraw and generate new character images based on the prototype Chinese characters (as shown in "Figure 12', "Figure 13")

Figure 12   Prototype Chinese characters "登鹳雀楼" (Climbing the Stork Tower).

Figure 13   AI redrawn "登鹳雀楼" (Climbing the Stork Tower) (redrawn by 0.67).

6.   CONCLUSION

The various characters used by people are precious intangible cultural heritage belonging to humanity and there are many design methods available for learning in the characters, especially in ideographic characters. For the design of fabricated characters, these design methods are particularly valuable for learning. By utilizing the design methods summarized in this article, interesting fabricated characters can be quickly designed using or drawing on the structure of Chinese characters. This will have an undeniable role in the creation of anime, game, and film and television works based on a fabricated worldview in the future.

Due to the author's native language habits and limited knowledge of other types of ideographic characters, there are some issues that this article fails to explore, for example, how to design a set of beautiful, clear and practical characters without using Chinese radicals (mainly for the convenience of writing)? This needs to be gradually addressed in future research.

REFERENCES

[1]   Zhang Yunfeng. Exploring graphic and character design [J]. Art Education Research, 2011 (12): 62-63 DOI: 10.3969/j.issn.1674-9286.2011.12.045. (in Chinese)

[2]   Wang Yang. From Traditional Character Creation to Character Design [J]. Education Teaching Forum, 2010 (27): 143-144 DOI: 10.3969/j.issn.1674-9324.2010.27.101.   (in Chinese)

[3]   Zhang Yunfeng. Experience graphic and text design [J]. Beauty & Times (First Half of the Month), 2011 (11): 50-51 DOI: 10.3969/j.issn.1003-2592.2011.11.014.   (in Chinese)

[4]   H. A. Nie Lishan, Cui Hongfen, Wen Zhiyong. Western Xia script and Western Xia literature [J]. Journal of Guyuan Teachers College, 2006,27 (1): 64-70 5. DOI: 10.3969/j.issn.1674-1331.2006.01.017.   (in Chinese)

[5]   Hou Xueliang. A Brief Discussion on the Study of Khitan Characters [J]. Journal of Minzu University of China (Philosophy and Social Sciences Edition), 1979 (Z1). (in Chinese)

[6]   Lin Yuan.Coining Characters of Chu Num [J]. Journal of Guangxi Normal University for Nationalities, 2013 (6): 48-51 DOI: 10.3969/j.issn.1674-8891.2013.06.012.   (in Chinese)

[7] Ba Ruiqi. Analysis of the Self-created Language System in European and American Magic Movies and TV Plays — Take the Game of Thrones and the Lord of the Rings Series as an Example [J]. Journal of Xinjiang University of the Arts, 2018,16 (1): 106-111 DOI: 10.3969/j.issn.1672-4577.2018.01.016. (in Chinese)

[8] Shen Ruiqi. Research on the Development History of Chinese Characters [J]. Digital Design (Part 2), 2020,9 (5): 204-205. (in Chinese)