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Abstract: The divination function of China's Yijing has led to its circulation for thousands of years. In our exploration of Yijing's characteristics using big data, we have discovered variations in results between the coin toss method and the ancient yarrow-stalk method of divination, known as "the number for the great expansion method of divination(大衍之数)". The yarrow-stalk method serves as the fundamental method of divination in Yijing and continues to hold significance in studying the essential characteristics of Yijing. Despite the complexity of yarrow calculations, advancements in computer technology and big data have simplified its application. By employing the yarrow-stalk method, we simulated changes in the 64 hexagrams, calculated probabilities and proportions of hexagram alterations, and derived fundamental characteristics and patterns of hexagrams. Additionally, we constructed the spatial representation of lines and hexagrams. Through a binary system rearrangement, we created a 64x64 matrix illustrating hexagram transformations. Subsequently, we generated 100 million random hexagrams and analyzed line and hexagram changes accordingly. Our findings indicate the following: (1) Big data analysis reveals evident asymmetry in the hexagrams obtained through the yarrow-stalk method, with a triangular fractal characteristic forming the background. (2) Each of the 64 hexagrams exhibits a distinct probability distribution when transforming into other hexagrams, which can be categorized into five types. (3)The occurrence probabilities of Laoyang, Laoyin, Shaoyang, and Shaoyin are 18.61%, 6.387%, 31.38%, and 43.62% respectively. The probabilities of Yin and Yang occurrences are nearly equal, each close to 50%. However, the probability of Laoyang is approximately three times higher than that of Laoyin. (4) Visualized and analyzed the characteristics of hexagram changes greater than 100000 times using 3D statistical maps and Sankey diagram. These results demonstrate that the yarrow-stalk method effectively unveils the characteristics and underlying patterns of the 64 hexagrams. This study provides a novel approach for scientifically exploring the internal laws governing the 64 hexagrams in Yijing.

Keywords: Yijing; 64 hexagram changes; number in the great expansion method of divination; yin-yang asymmetry; big data analysis

1. Introduction

Yijing (The Book of Changes), also known as the I Ching, is the source of China culture, and its theory of Yin and Yang is also the core content of Confucian culture in China. Over the course of thousands of years, Yijing has played a vital role in shaping Chinese civilization, but also exerted extensive influence on many disciplines such as world religion, philosophy and science. Jung once commented on Yijing: "Yijing contains the spirit and soul of China culture. The joint efforts of the great wise men in China for thousands of years have lasted for a long time, and it still shows infinite significance and enlightenment to those who understand it. No one who has direct spiritual communication with the predictive power of Yijing can ignore the fact that we have come into contact with an Archimedes point. " [1,2] It can be seen that it is still particularly important to explore Yijing. About people's views on Yijing, the literature [3] is relatively objective, that is, Yijing is a prediction system with divination as its external manifestation, simple overall world outlook as its foundation and scientific thinking mode as its reasonable core. This is a scientific analysis in the era of science. However, we believe that Yijing represents a distinct research paradigm, separate from conventional science. It proposes an evolutionary prediction paradigm based on comprehensive rules—something that cannot be fully explained by modern scientific theories and philosophies alone. Therefore,the

exploration of the Book of Changes remains crucial, as it offers profound insights beyond the scope of traditional scientific approaches.

In the second half of the 20th century, there was a significant surge of interest in oriental culture and philosophy in western countries. This interest extended to the study of Yijing (also known as the I Ching). Scholars began to explore the potential influence of Yijing on famous European philosophers and scientists, particularly Leibniz and Hegel, [4] and has been increasing day by day in recent decades. This can be seen from more and more new translations and interpretations of Yijing, including articles and even books involving divinatory symbols and their systems. For example, Joseph used a new non-standard logic to describe the interactive relationship between science, philosophy and society, and emphasized the emerging role of system theory in philosophy to solve key philosophical problems, such as the unity of knowledge and common interests. [5] However, in most cases, they interpret or annotate Yijing from one side. Up to now, there is no detailed and complete analysis of the internal rigid quantitative analysis of the divinatory symbol system itself. [6]

Exploring the mystery of the 64 hexagrams in Yijing has attracted the attention of many scholars. People explore the characteristics and laws of the changes of 64 hexagrams from many angles. For example, on the issue of "change", Chen Guoming has expounded the concept of "change" from the aspects of the nature, principle, power, form and result of change. [7,8] Some scholars think that the traditional 64-hexagram sequence in Yijing has the defect of countless symmetrical balance, and have rearranged the 64-hexagram sequence to reflect the 64-hexagram system "overlapping confrontation or yin-yang symmetry, symmetrical balance of hexagram ordinal number and symmetrical balance of hexagram number. [9] Wang Zaihua believes that a new interpretation of the eight diagrams and sixty-four diagrams is an important aspect of the innovation of the Yijing culture and an important topic in the research of the development of modern Yijing. [10] McKenna, once predicted the end of the world in 2012, was also a fractal law discovered after studying the hexagrams in Yijing, and then made a prediction model and program. [11,12] Liu Junbao suggests that the 64 hexagrams represent the evolution of "12 message hexagrams（消息卦）." [13] In a previous article, we discussed the characteristics of analyzing the 64 hexagrams and hexagram lines using methods such as the coin method and big data analysis. [14] According to the development and evolution of Yijing, there are three levels to consider. The first level consists of the eight pure hexagrams (Qian, Kun, Dui, Gen, Li, Kan, Zhen, Xun), which are composed of three lines. The second level involves the 64 hexagrams formed by combining the eight pure hexagrams. Lastly, the third level explores divinatory words and epigrams based on these hexagrams. However, the exploration of the internal mechanisms within the 64 hexagrams of Yijing remains an ongoing endeavor.

The study of Yijing (I Ching) using big data and artificial intelligence techniques can provide valuable insights into its inherent characteristics and laws. One main objective is to analyze how the 64 hexagrams in Yijing have evolved and changed according to their prescribed rules using new technical methods.

József Drasny found that up to now, it is uncertain whether the divinatory symbols in Yijing are arranged in a certain system or randomly. In order to solve this problem, they designed an "easy ball" model, which transformed the two-dimensional model of Yijing for thousands of years into a spherical model. [15] China scholars also explored similar research as early as 1989, and constructed several figures of Zhouyi's six-dimensional space.[16] There are many similar studies, for example, Shang Yiqun [17] and Chen Junlong [18] and others study the principle of Yijing as an optimization algorithm, while others design Yijing as a computer operating system. [19] Text mining techniques have been used to analyze the Yijing text, revealing the prominence of concepts such as "no blame," being prepared for danger in times of peace, extremes meeting, and the principle of profit and loss. [20]

In the process of exploring the characteristics of Yijing with the help of big data, we thought that the coin method was widely used, and some new discoveries should be made by using big data. However, when I analyzed the old yarrow-stalk method with big data, I found a different result from the coin method. This discovery became the starting point for writing this article. After a lot of

calculation and analysis, and further literature reading, it is found that the coin method is a simplification of the yarrow-stalk method. Since it is simplified, some information may be lost.

To compensate for this loss of information, we plan to simulate the ancient method of "the number for the great expansion method of divination(大衍之数)" through self-programming. This simulation aims to generate a large number of data samples, allowing for the analysis of various data associated with the 64 divinations. Through calculations, reasoning, induction, and summarization of the entire sample, researchers hope to further explore the characteristics and laws of Yijing's changes. Ultimately, this research aims to provide a scientific explanation for the prediction accuracy and results of the 64 divinations.

Here is a brief supplement to explain why the yarrow-stalk method can become the original divination tool in Yijing, and then form the yarrow divination method. Yarrow is a kind of Chinese herbal medicine, which is called "longevity grass" by people.

During ancient times, people primarily used tortoise shells for divination, examining the burn marks to determine fortunes. However, during the Spring and Autumn Period, yarrow divination, representing the Zhouyi culture, began to replace the use of tortoise shells and gained popularity. This cultural shift was partially attributed to the admiration that Confucius had for yarrow. Confucius considered it a sacred plant, leading to the abandonment of the primitive and chaotic turtle shell divination method. Unlike turtle shells, which could only be used once, yarrow can be reused, making it more convenient to obtain for divination purposes. Yarrow divination involves using the proportion of the plant, known as the "grass," as well as specific numbers, as recorded in Yijing. People sought guidance from yarrow divination as if consulting with an upright and respected old man when making decisions. Interestingly, yarrow is also referred to as "Bagua Grass" because when it is cut, it forms eight white lines, eight edges, and eight angles, reminiscent of the Bagua, a symbol associated with Chinese cosmology and divination. Additionally, it is worth noting that in Western culture, the flower language of yarrow is "comfort." Divination, in a sense, is a quest for psychological comfort, which may contribute to the appeal of yarrow-stalk divination. Therefore, the yarrow-stalk method's connection to longevity, its endorsement by influential figures such as Confucius, its convenience for repeated use, and its symbolic significance all played a role in its establishment as the original divination tool in Yijing. The origins of divination can also be traced back to the human resistance towards the irrational and the desire to find meaning and comfort in uncertain circumstances.

2. The Principle and Calculation Method of Yarrow-Stalk Method

2.1. Arranging the Sequence for 64 Hexagrams

The ranking of divinatory symbols in the Yijing was initially established by King Wen and later revised by Confucius. One of Confucius' Ten Wings is the Preface of Divinatory Symbols. There have been various interpretations and understandings of the preface of the 64 hexagrams in the Yi Jing throughout its historical inheritance and evolution. Consequently, there are multiple versions of the preface with different meanings assigned to each hexagram. [21,22,23] It is precisely because of the addition of these meanings that a unified conclusion has not really been formed so far. Many people look for external characteristics related to the content of divinatory symbols, but in vain. They also developed various sequences and binary series, and thought that there were defects in the balanced and symmetrical distribution of the number of 64 hexagrams, and corrected them. [24] The purpose is to convey some important ideas or meanings through the order of hexagrams. [25] The purpose of these endeavors is to convey important ideas or meanings through the order of the hexagrams. This paper, however, focuses primarily on the divinatory symbols themselves and disregards their implicit implications. It utilizes the Yin-Yang dichotomy (binary) method to reconstruct the order of the 64 divinatory symbols.This reconstructed order not only adheres to the Yin-Yang worldview of the Yi Jing but also aligns with the convenience of modern computer calculations. By employing the binary system, the six-hexagram units can be altered through binary addition and subtraction,

resulting in a variety of different hexagram combinations. (Refer to Table 1, and see the attached Table for further details.)

Table 1. Reconstruction of 64 hexagrams order based on binary system.

Serial number	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Binary Symbol	000 000	000 001	000 010	000 011	000 100	000 101	000 110	000 111	001 000	001 001	001 010	001 011	001 100	001 101	001 110	001 111
Serial number	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Binary Symbol	010 000	010 001	010 010	010 011	010 100	010 101	010 110	010 111	011 000	011 001	011 010	011 011	011 100	011 101	011 110	011 111
Serial number	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Binary Symbol	100 000	100 001	100 010	100 011	100 101	100 101	100 110	100 111	101 000	101 001	101 010	101 011	101 100	101 101	101 110	101 111
Serial number	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Binary Symbol	110 000	110 001	110 010	110 011	110 100	110 101	110 110	110 111	111 000	111 001	111 010	111 011	111 100	111 101	111 110	111 111

2.2. Principles and Yarrow-Stalk Method

In general, the basic principle of yarrow-stalk method for divination is based on the number for the great expansion method of divination expounded by Zhu Xi, a Neo-Confucianism scholar in the Song Dynasty. [26,27] It can be summarized into four steps: dichotomous, hanging one, tetrad and returning to the odd, producing one change. This process is repeated, transforming into different hexagrams until a total of 18 changes have been made, ultimately producing six lines and a hexagram. [28]

The specific steps are as follows (see Figure 1): Collect 50 yarrow stalks, as 50 is considered the auspicious number for divination. Take one stalk and set it aside as "A", then count the remaining 49 stalks.

(1) The calculation of line

First Calculation: Take one stalk from the remaining 49 and set it aside as "B" (indicating the first calculation). Randomly divide the remaining stalks into two groups, take one group, and arrange four stalks in a line. Finally, set aside the remaining 1, 2, 3, or 4 stalks as "C" (the remainder, no longer involved in the calculation). Take the remaining group of stalks, again arrange four in a line, and set aside the remaining stalks as "C". This completes the first calculation..

Second calculation: Combine all the stalks arranged in groups of 4, take one stalk and set it aside as "B" (indicating the second calculation). The subsequent operations are the same as the first calculation. This process will yield another remainder, labeled as "C".

Third calculation: Following the previous two calculations, the remaining yarrow stalks must be either 40, 36, or 32. Repeat the calculation process described earlier for these stalks to complete the third calculation for yarrow divination. At this point, the remaining yarrow stalks that have not been involved in the calculations should be either 36, 32, 28, or 24. The quotient obtained by dividing this number by 4 must be one of the following: 9, 8, 7, or 6. Each of these numbers corresponds to a specific line:

- $36 \div 4 = 9$. "9" represents "Laoyang" and the line outcome is "—×".
- $32 \div 4 = 8$. "8" represents "Shaoyin" and the line outcome is "--".
- $28 \div 4 = 7$. "7" represents "Shaoyang" and the line outcome is "—".
- $24 \div 4 = 6$. "6" represents "Laoyin" and the line outcome is "--○".

After completing one line (three calculations in total), combine the 49 yarrow stalks with wooden sticks and proceed to calculate the second, third, fourth, fifth, and sixth lines of hexagram.

(2) Sorting of hexagrams

The hexagram obtained is divided into six smaller lines, which are then arranged from bottom to top based on the recording method of the number for the great expansion method of divination. The sequence of lines, from bottom to top, represents the first, second, third, fourth, fifth, and last line. After 18 calculations, one of the 64 hexagrams will be obtained.

(3) Dynamic line of yarrow-stalk method

It is stipulated in the yarrow divination method that Laoyang and Laoyin are dynamic, while Shaoyang and Shaoyin are not. Extending from the rule that Laoyang corresponds to 9 and old yin corresponds to 6, people use "9" as the representative of yang and "6" as the representative of yin.

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From this, we can see that there are several possibilities in the hexagrams produced by yarrow-stalk divination method: there is no moving hexagram, or there is one moving hexagram, or there are multiple moving hexagrams. There are many situations in yarrow-stalk method, so it provides me with more choices to analyze the changes of 64 hexagrams in Yijing with big data.
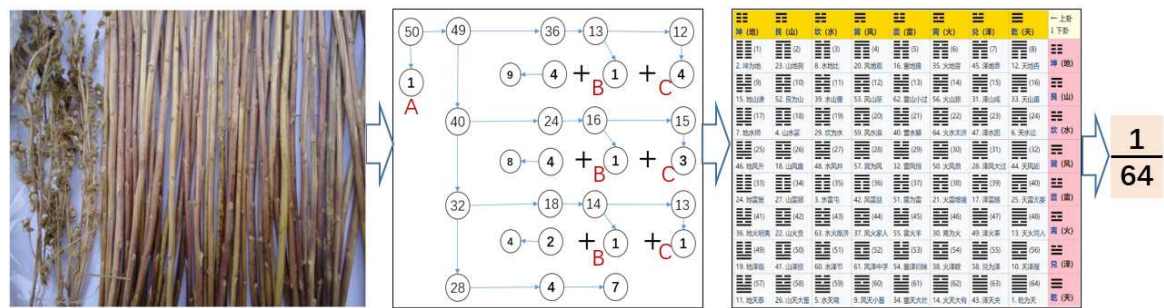

Figure 1. Schematic diagram of the principle of the yarrow-stalk method.

2.3. Rules of Change for the 64 Hexagrams

The changes of hexagrams are all due to the appearance of dynamiclines (Laoyang or Laoyin). After the above 18, it becomes a hexagram, which is the original hexagram (the main hexagram). If there is a change in this hexagram, that is, the change between Laoyang and Laoyin, the change of mind is obtained by the change of this hexagram (the main hexagram), and the Laoyin becomes Shaoyang and Laoyang becomes ShaoYin. There are many cases of changing one's mind, and each divination can have many possibilities according to the number and position of the divination. According to the arrangement and combination: there is in the case of no change. C_6^0=1, one change C_6^2 =6, and two changes C_6^2=15, three changes, C_6^3=20, four changes, C_6^4=15, five changes, C_6^5=6, six changes, C_6^6=1, from which we can get 64 kinds of original hexagram (main hexagram), 64 kinds of hexagram changes, and 4096 kinds of hexagram results. [29]

2.4. Calculation of Hexagrams and Their Transformations

The manual calculation of the yarrow-stalk method can be intricate, but with the aid of computer programming, the process becomes much simpler. Our research methodology is outlined as follows:

(1) The yarrow-stalk method is used as the way to generate the main hexagrams. The random number generator of yarrow-stalk method will generate open-range random numbers within the specified range, and ensure that each random number is generated randomly and equally.

(2) In different divination processes, the cyclic variable will increase from 10^4 to 10^8 in an equal ratio, and the cyclic variable indicates the number of divination.

(3) Record the frequency of occurrence of Laoyang, Laoyin, Shaoyang and Shaoyin in each channel and count the probability, and record the frequency of occurrence of no change, one change to six changes respectively; The probability of the main hexagrams being transformed into other hexagrams when there are different positions and times of changes. Based on the above contents, the basic characteristics of hexagram change and hexagram change are summarized.

(4) Combined with the probability distribution of each hexagram being transformed into other hexagrams, a three-dimensional map is generated by drawing tools to observe the spatial characteristics of hexagrams. Because each hexagram may have 63 scenarios of hexagram changes except itself, our main approach is to form a 64*64 matrix with 64 hexagrams, and explore the spatial distribution characteristics of hexagram changes by analyzing this matrix.

3. Results and Discussion

3.1. Asymmetry of Guabian Topographic Map: Yin and Yang All Show Their Own Characteristics on the Triangular Background

Utilizing the yarrow-stalk method to generate 100 million hexagrams, a statistical analysis of the data pertaining to the changes of these 64 hexagrams reveals an asymmetrical probability distribution (refer to Figure 2). By comparing the yin and yang attributes of the Taiji diagram, we can ascertain that the results obtained through the yarrow-stalk method align more closely with the philosophical principles of Taiji in the Yijing. Specifically, these results demonstrate the characteristics of a triangular fractal background with an asymmetric spatial structure of yin and yang.On the positive side, a greater propensity for changes of state is observed, while on the negative side, the probability of such changes is noticeably lower. Figure 2 illustrates this pattern, showcasing the hexagrams positioned predominantly on either side along with fewer than 100,000 alterations. Meanwhile, the hexagrams located along the central diagonal exhibit the highest probability of undergoing changes of state.
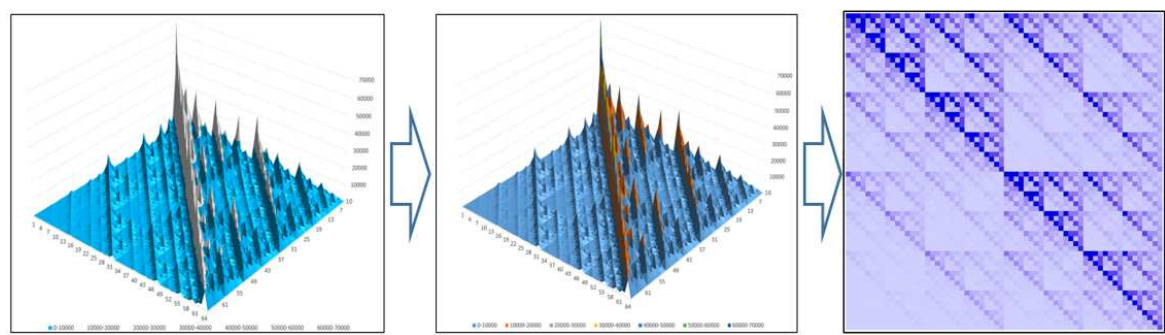
Figure 2. Spatial distribution characteristics of hexagrams from yarrow-stalk method $130^{0.}$ Description: (1) The light blue on the left is the spatial distribution with frequency less than 100,000, and the light gray is the distribution with frequency more than 100,000.(2)The spatial distribution of all the change frequency of the middle picture.(3)The diagram on the right is a planar two-dimensional diagram of the results of big data analysis, and obvious triangular fractal features can be seen.

The traditional arrangement of the 64 hexagrams in Yijing follows the law of "pairwise couple, which is either repeated or reversed" (or "pairwise couple, which is either repeated or changed"), which is also a great discovery of people studying Yijing. "Pairs of two are even, which means that 64 hexagrams are divided into 32 pairs, and each pair of hexagrams is either opposite or symmetrical. On the whole, the order of 32 pairs of hexagrams should have an inherent mathematical logic relationship, that is, it is both a yin-yang symmetrical system and a quantitative balanced symmetrical system. Such a balanced system is only a logical balance on the surface, or a symmetrical system on the principle. The calculation of big data reveals that the actual situation of 64 divination changes in Yijing is unbalanced and not completely symmetrical. The probability of positive divination changes is high and obvious, while the probability of negative divination changes is small and obvious. This result shows that the balance or symmetry of Yin and Yang in Yijing, which has been said for thousands of years, can only exist at the level of Yi theory or philosophy, while the rigid big data reveals the imbalance and asymmetry of Yin and Yang. This discovery also tells us that in the real world, the yin and yang sides of the development of things are inconsistent. For example, we talk about matter and dark matter, wave-particle duality of light and so on, which may be the asymmetry of yin and yang. This discovery may have epoch-making significance for the research and application of Yijing.

3.2. The Driving Force of the Outcome of the Change of Things Comes from the Negative Side

The results obtained from experiments conducted using the yarrow-stalk method indicate that the occurrence probabilities of Laoyang, Laoyin, Shaoyang, and Shaoyin are 18.61%, 6.387%, 31.38%, and 43.62%, respectively. The occurrence probability of yin and yang is nearly equal, each close to 50%. However, the occurrence probability of Laoyang is approximately three times higher than that of Laoyin. The probabilities of no change in a hexagram and changes ranging from one to six are 17.78%, 35.6%, 29.67%, 13.19%, 3.29%, 0.44%, and 0.03%, respectively. It is evident that as the number of changes in a divination increases, the probability of a change occurring decreases. The cumulative probability from four to six changes is merely 3.76%. Such changes typically represent extreme breakthrough situations.

While the total number of yin and yang obtained from the yarrow-stalk method is also close to 50% in both cases, Laoyang has a value of 18.61% while Laoyin has a value of 6.387%. This indicates that the positive trend of changes in phenomena is about three times higher than the negative trend. Shaoyang and Shaoyin have values of 31.38% and 43.62%, respectively, with Shaoyin being 1.4 times higher than Shaoyang. It can be inferred that, in the context of the 64 hexagrams in the Yijing, changes driven by the reverse or opposing side act as the primary impetus for transformation in affairs. The statistical outcomes derived from the yarrow-stalk method inform us that the evolution of phenomena tends to move in a positive direction, and the quantitative changes facilitating such evolution are primarily driven by negative events. Additionally, it is worth noting that the changes in hexagrams are also influenced by the intricate interaction between yin and yang. This complex and interactive mechanism of change requires further exploration.

3.3. Half of the Hexagrams are Classified as High-Frequency, and There Are 8 Hexagrams without High Probability

In the sample of 100 million hexagrams, there is an obvious probability distribution for each of the 64 hexagrams to be transformed into other hexagrams. Each hexagram can be divided into five categories when it is transformed into other hexagrams: (1) 33 hexagrams have three high-probability changes, (2) 15 hexagrams have four high-probability changes, and (3) 6 hexagrams, all of which belong to the Kun hexagram, have one high-probability change. Interestingly, there are two special cases: (4) eight hexagrams have a low probability of changing. These hexagrams are HSLv, Gou, Tongren, TZLv, Xiaoxu, Dayou, Guai, and Qian. (5) In Kun and Xiaoguo, there are more than five high-probability changes.

From Figures 3 and 4, it can be seen that the eight hexagrams with the lowest probability of changing hexagrams are mostly located in the lower right corner, where the Qian hexagram is the main one, while the hexagrams with the highest probability of changing hexagrams are mainly distributed in the upper left corner, where the Kun hexagram is the main one. Especially, Kun hexagrams have appeared 21 times in the high probability of changing hexagrams.

Figure 3. Distribution of more than 100,000 changes of mind with high probability.
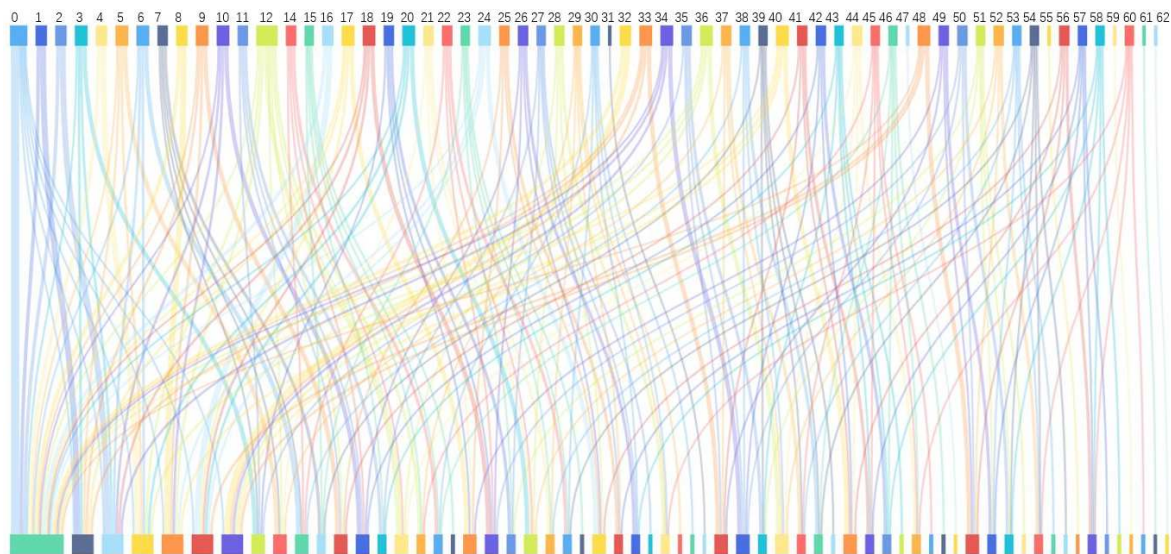
Figure 4. Sankey diagram of more than 100,000 changes of divination with high probability.
Description: (1)From left to right, there are 62 new binary hexagrams.()2Qian and TZLv didn't enter
the Sankey diagram sequence because of their less frequent changes.#

This reflects from one perspective that the saying "it's easy to get into heaven but difficult to get into the earth" is not a real existence. The actual situation should be more like "it's easy to get into the earth but difficult to get into heaven ". Human beings live on Earth, and the relationship between humans and the earth seems to be closer. Therefore, the Kun hexagram has become the most frequent occurrence of divination.

Furthermore, it is worth noting that the occurrence of high-probability changes is not always reciprocal or mutual. For example, Kun and Bo can mutually transition with a high probability, but Kun and Xiaoguo cannot mutually transition with a high probability. Dun has TZLv as a high probability transition, but TZLv does not have Dun as a high probability transition. These examples highlight the presence of a complex and non-linear interactive relationship within the realm of

extreme high-probability changes. It is of utmost importance to delve deeper into this intricate relationship for further exploration. By studying these exceptional situations, we have the potential to uncover previously undiscovered phenomena. For a visual representation, please refer to Figure 4.

4. Summary and Prospect

The Yijing is not just a divination tool but a cosmological and philosophical system deeply ingrained in Chinese culture. Its core principle revolves around the dynamic balance of opposing forces, the evolving nature of events, and the necessity of embracing change. As we move into the 21st century and beyond, Yijing will continue to endure as a timeless classic. [30] Exploring the internal mechanism of Yijing only from the perspective of philosophy, Yijing or divination can no longer meet the contribution to world civilization as a great source of culture, so it is necessary to study it from a new perspective, jumping out of the general research ideas of Yijing. Big data and artificial intelligence provide strong support for the in-depth revelation of Yijing. This paper, as a companion to the analysis of the internal change law of Yijing by big data of coin toss method, analyzes the internal change law of Yijing from big data of yarrow-stalk method. Although only big data is used for analysis, yarrow-stalk method shows us new findings different from previous studies. In particular, the asymmetric characteristics of the changes of 64 hexagrams in Yijing discovered by yarrow-stalk method inspire people to think about the problem from the original qualitative or semi-quantitative analysis of the main hexagrams and the complicated hexagrams to the full quantitative analysis of the internal mechanism of things. For example, the main power source that drives the change of things comes from the interactive dynamic process of reverse or opposite and positive. Although the sudden change of things is a small probability event, people can judge the evolution trend of things by paying more attention to the changes of negative factors among various influencing factors involved in things.

The asymmetry of yin and yang in the Yijing also imparts valuable insight into the trajectory of human society, which typically follows an upward curve. It begins with a mutation that shapes a new era and progresses through a rising stage characterized by the interaction of yin and yang, with the influence of yin gradually diminishing. Once a certain stage is reached, the positive force (or positive side) in social development weakens, while the negative force (or negative side) gradually becomes the predominant driving force propelling societal evolution, leading to a multitude of social issues and, in extreme cases, unrest. However, should societal governance exhibit self-correction, allowing the positive force to overpower the negative force, society will continue to develop along its original trajectory through the interplay of opposing forces. Conversely, if the positive force is suppressed by the negative force, a sudden change occurs, ushering in a new stage where positive forces once again assume the mantle of societal progress, creating a cyclic evolution.#

While this analysis offers a preliminary examination of the coin and yarrow-stalk methods using big data, the results remain incomplete and potentially biased. Given the plethora of divination methods within the Yijing, it is our belief that further discoveries await via big data analysis. However, regardless of the outcomes yielded by continued exploration, it is important to acknowledge that these analyses are based on limited samples. The direction for future exploration lies in how we can analyze big data utilizing rules and even incorporate artificial intelligence methods.

Appendix:

64 Hexagram Order, Conformity and Chinese and English Names

Traditional number	Binary number	Binary Symbol	Chinese name	Chinese Pinyin	English name	Traditional number	Binary number	Binary Symbol	Chinese name	Chinese Pinyin	English name
2	0	000 000	坤为地	Kun	The Receptive	24	32	100 000	地雷复	Fu	Return
23	1	000 001	山地剥	Bo	Peeling	27	33	100 001	山雷颐	SLYi	Nourishment
8	2	000 010	水地比	SDBi	Holding Together	3	34	100 010	水雷屯	Zhun	Difficulty at the Beginning
20	3	000 011	风地观	Guan	Viewing	42	35	100 011	风雷益	FLYi	Increase
16	4	000 100	雷地豫	Yu	Contentment	51	36	100 101	震为雷	Zhen	Quake
35	5	000 101	火地晋	Jin	Advance	21	37	100 101	火雷噬嗑	Shike	Bite Together
45	6	000 110	泽地萃	Cui	Gathering	17	38	100 110	泽雷随	Sui	Following
12	7	000 111	天地否	Pi	Obstruction	25	39	100 111	天雷无妄	Wuwang	No Errancy
15	8	001 000	地山谦	DSQian	Modesty	36	40	101 000	地火明夷	Mingyi	Suppression of the Light
52	9	001 001	艮为山	Gen	Restraint	22	41	101 001	山火贲	HSBi	Elegance
39	10	001 010	水山蹇	SSJian	Adversity	63	42	101 010	水火既济	Jiji	Ferrying Complete
53	11	001 011	风山渐	FSJian	Gradual Advance	37	43	101 011	风火家人	Jiaren	The Family
62	12	001 100	雷山小过	Xiaoguo	Minor Superiority	55	44	101 100	雷火丰	Feng	Abundance
56	13	001 101	火山旅	HSLv	The Wanderer	30	45	101 101	离为火	Li	Cohesion
31	14	001 110	泽山咸	Xian	Reciprocity	49	46	101 110	泽火革	Ge	Radical Change
33	15	001 111	天山遁	Dun	Withdraw	13	47	101 111	天火同人	Tongren	Fellowship
7	16	010 000	地水师	Shi	The Army	19	48	110 000	地泽临	Lin	Overseeing
4	17	010 001	山水蒙	Meng	Youthful Folly	41	49	110 001	山泽损	Sun	Diminution
29	18	010 010	坎为水	Kan	The Constant Sink Hole	60	50	110 010	水泽节	Jie	Control
59	19	010 011	风水涣	Huan	Dispersion	61	51	110 011	风泽中孚	Zhongfu	Inner Trust
40	20	010 100	雷水解	Xie	Release	54	52	110 100	雷泽归妹	Guimei	Marrying Maid
64	21	010 101	火水未济	Weiji	Ferrying Incomplete	38	53	110 101	火泽睽	Kui	Contrariety
47	22	010 110	泽水困	ZSKun	Impasse	58	54	110 110	兑为泽	Dui	Joy
6	23	010 111	天水讼	Song	Contention	10	55	110 111	天泽履	TZLv	Treading
46	24	011 000	地风升	Sheng	Climbing	11	56	111 000	地天泰	Tai	Peace
18	25	011 001	山风蛊	Gu	Ills to Be Cured	26	57	111 001	山天大畜	Daxu	Great Domestication
48	26	011 010	水风井	Jing	The Well	5	58	111 010	水天需	Xu	Waiting
57	27	011 011	巽为风	Xun	Compliance	9	59	111 011	风天小畜	Xiaoxu	Lesser Domestication
32	28	011 100	雷风恒	Heng	Perseverance	34	60	111 100	雷天大壮	Dazhuang	Great Strength
50	29	011 101	火风鼎	Ding	The Cauldron	14	61	111 101	火天大有	Dayou	Great Holdings
28	30	011 110	泽风大过	Daguo	Major Superiority	42	62	111 110	泽天夬	Guai	Resolution
44	31	011 111	天风姤	Gou	Encounter	1	63	111 111	乾为天	Qian	The Creative

Description:

(1) English names are expressed in Chinese Pinyin, and the names of nearly selected hexagrams that are not repeated do not use the first letter abbreviation of the five elements.

(2)If there are repeated hexagrams in Chinese comments, the first letter abbreviation of the five elements and the hexagrams name together form the hexagrams name. For example, No.14 Volcano Brigade and No.56 Zetianlu Pinyin are both Lv, so they are distinguished by HSLv and ZTLv. However, if there are "eight pure hexagrams" (that is, Qian, Kun, Dui, Gen, Li, Kan, Zhen and Xun) in the hexagrams with the same name, only five lines are added to the non-eight pure hexagrams to distinguish them. For example, if Kun is the land and Ze Tian is trapped, it will still be Kun only in Kun, while Ze Tian is trapped as ZTKun.

(3)There are different versions about the naming of 64 hexagrams. Expand information. See Synonyms at expand information.https://plato.stanford.edu/Entries/chinese-change/appendix.html#Appe3Name64Hexa

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