



Word population analysis and other evidences indicate that *Shiji* was amended by Liu Xiang



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HIGHLIGHTS

- *Shiji* by Shima Qian is the most important and influential historical book in China.
- *Shiji* contains 10 amended parts starting with the sentence “Mr. Chu said”.
- Such amended parts were widely considered to be written by Chu Shaosun.
- We develop a statistical method useful to solve authorship dispute problem.
- We use our method and other evidences to find that the amended parts were by Liu Xiang.

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ABSTRACT

Shiji prepared by Shima Qian in Western Han Dynasty (202 BC–9 AD) was the most famous historical book in historical China. The current version of *Shiji* contains 130 chapters, including 10 chapters which contains some parts starting with the sentence “Mr. Chu said . . .”; such parts were considered to be written by Chu Shaosun by Chang Yen in the Three Kingdoms Period (220–280 AD), which was widely accepted. We have analyzed the word population in *Shiji* and books written by Liu Xiang (77 BC–6 BC) in Western Han Dynasty, who was a member of the royal family. Our results and other evidences indicate that the parts of *Shiji* starting with the sentence “Mr. Chu said . . .” were prepared by Liu Xiang. The other evidences include (1) The ending year of the events mentioned in “Mr. Chu said...” was considered to be 47 BC, the second year of Emperor Yuan (as Emperor in 48 BC–32 BC) of Western Han Dynasty, and in the same year Liu Xiang was put into a jail, then left power center for many years. Such coincidence suggests that Liu Xiang wrote the parts “Mr. Chu said . . .” in *Shiji*. (2) Liu Xiang’s education, interest, and writings are quite consistent with the parts with “Mr. Chu said . . .” in *Shiji*. On the other hand, one cannot find such a connection with Chu Shaosun, who did not have any other identified writings for comparison.

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1. Introduction

Historical China contains following dynasties or periods: Xia dynasty (c. 2100 BC–c. 1600 BC), Shang dynasty (c. 1600–1046 BC), Zhou dynasty (1046–256 BC), Spring and Autumn period (722–476 BC), and Warring States period (476–221 BC).

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In the Warring States period, there were seven strong states, including Qin in the West, and Chu in the South. In 256 BC, Qin eliminated Zhou dynasty. In 221 BC, Qin eliminated all of other states in the Warring States period and established Qin dynasty (221–206 BC) as the first unified dynasty in Imperial China, which was followed by Chu-Han warring period (206–202 BC), Western Han Dynasty (202BC–9 AD), Xin Dynasty (9–23 AD), Eastern Han Dynasty (23–220 AD), Three Kingdoms Period (220–280 AD), Jin period (280–420 AD), Southern and Northern Dynasties Period (420–589 AD), Sui dynasty (589–618 AD), Tang dynasty (618–907 AD), Five Dynasties and Ten Kingdoms (907–960 AD), Song, Liao, Jin, and Western Xia dynasties (960–1279 AD), Yuan dynasty (1271–1368 AD), Ming dynasty (1368–1644 AD), and Qing dynasty (1644–1912 AD). The history from Xia dynasty to Ming dynasty was recorded in Twenty-Four Histories (*Erh-shih-szu shih*), including Records of the Grand Historian (*Shiji*) compiled by Sima Qian in about 91 BC, Book of Han (*Hanshu*) compiled by Ban Gu in about 82 AD, Book of Later Han (*Houhanshu*), compiled by Fan Ye in about 445 AD, Records of the Three Kingdoms (*Sanguozhi*) compiled by Chen Shou in about 289 AD, ..., and History of Ming (*Mingshi*) compiled under supervision by Zhang Tingyu in 1739 AD.

Historical China had accumulated many historical records (e.g. Twenty-Four Histories), literary works, philosophy writing, etc. Many of such classic records have been digitalized and can be found in the Scripta Sinica database (SSD) [1]. SSD project of Academia Sinica in Taipei began in 1984. The aim of this project is to digitize all documents essential to research in traditional Sinology. SSD contains almost all of the important Chinese classics, especially those related to Chinese history. Until present, Scripta Sinica is the largest Chinese full text database to encompass an enormous breadth of historical materials of this scale. SSD has very strong search function. One can easily search all records about a historical person (e.g. Sima Qian).

Shiji prepared by Shima Qian in Western Han Dynasty is the most famous historical book in historical China and is the first of Twenty-Four Histories. *Shiji* became a model for following historical books in Twenty-Four Histories. The current version of *Shiji* contains 130 chapters. Among such 130 chapters, chapters 13, 20, 48, 49, 58, 60, 104, 126, 127, and 128 contains a part starting with the word “Mr. Chu said ...”. Such parts were considered to be written by Chu Shaosun by Chang Yen in the Three Kingdoms Period (220–280 AD). However, when one use “Chu Shaosun” in SSD to search records about Chu Shaosun in books about Western Han Dynasty, one can only find one item in Chapter 88 of *Hanshu*, which states that Chu Shaosun was an expert on The Lu Poetry and was a student of Wang Shi. Treatise on Literature (*Yiwenzhi*) in *Hanshu* listed writings by people up to the time of Ban Gu (32–92 AD). However, *Yiwenzhi* does not contain any item by Chu Shaosun. On the other hand, *Yiwenzhi* contains many items (*Xin Xu*, *Shuo Yuan*, *Lie Nu Zhuan*) by Liu Xiang, *On Salt and Iron* by Huan Kuan, and *Fa Yan* by Yang Xiong. Liu Xiang, Huan Kuan, and Yang Xiong were scholar of Western Han Dynasty.

We have analyzed the word population in *Shiji* and books written by Liu Xiang (77 BC–6 BC), Huan Kuan, and Yang Xiong in Western Han Dynasty. Our analysis and other evidences indicate that the parts of *Shiji* starting with the sentence “Mr. Chu said ...” were prepared by Liu Xiang. The other evidences include (1) the ending year of the events mentioned in “Mr. Chu said ...” was considered to be 47 BC [2], the second year of Yuan Emperor (as Emperor in 48 BC–32 BC) of Western Han Dynasty, and in the same year Liu Xiang was put into a jail, then left power center for many years. Such coincidence suggests that Liu Xiang wrote the parts “Mr. Chu said ...” in *Shiji*. (2) Liu Xiang’s education, interest, and writings are quite consistent with the parts with “Mr. Chu said ...” in *Shiji*. On the other hand, one cannot find such a connection with Chu Shaosun, who did not have any other identified writings for comparison.

The paper is organized as follows. In Section 2, we briefly review the analysis method used in this paper. In Section 3, we apply such methods to analyze *Shiji* and writings by Liu Xiang, Huan Kuan, and Yang Xiong to construct the minimal spanning tree (MST). Our results suggest that the parts of *Shiji* starting with the sentence “Mr. Chu said” were prepared by Liu Xiang. In Section 4, we summarize and discuss our results. We also present some evidences from historical records which support that the text “Mr. Chu said” in *Shiji* was amended by Liu Xiang. In the Appendix, we briefly introduce Shima Qian, *Shiji*, and Liu Xiang.

2. Calculation methods

There are N texts written by M authors with $N > M$. The problem is to define appropriate quantities for N texts so that one can use such quantities to classify N texts into M authors. For this purpose, one can calculate dissimilarity or distance for every pair of texts.

2.1. Distance between two texts

The aim of this study is to classify each text into correct author catalogs by identifying author’s special writing style, no matter what topic the text is about. The writing style of a writer may show from how the writer composes a sentence, how long the sentence is, and how the sentences be composed to a paragraph. A common sentence usually carries a subject (or a pronoun), a verb, an adjective and so on. The subject and the verb of the sentence are usually related to the topic of the text, but pronoun is not. Since the conjunctions may be used to link two sentences, the distribution of conjunctions is one of a writer’s style. In brief, the distribution of pronouns and conjunctions will be the key of writing style. The distribution of adjectives, adverbs and verbs also shows the authors style. This study modifies a rank-frequency text classification method introduced by Yang, et al. [3] by introducing a cutoff for the ranks of words.

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