

Analysis of the Co-occurrence of Acupoints and Pathologies Documented in the Classical Acupuncture Literature

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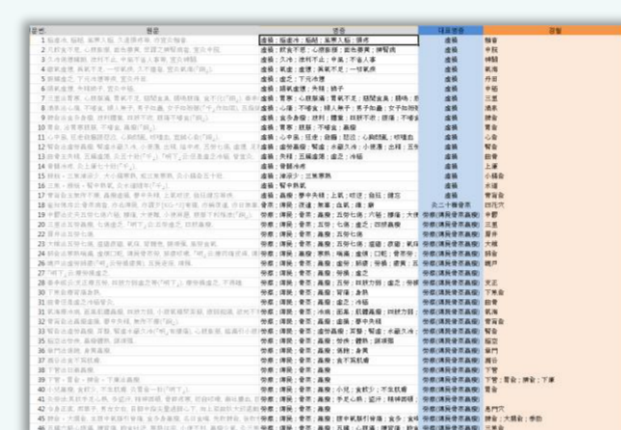
Introduction

This study aims to **analyze the co-occurrence of pathological symptoms** and corresponding acupoints as documented by the comprehensive acupuncture and moxibustion **records in the classical texts of Far East traditional medicine** as an aid to a more efficient understanding of the tacit treatment principles of ancient physicians.

Methods



The Classic of Supporting Life with Acupuncture and Moxibustion (AD 1220)



Co-occurring Pathology-acupoint Pairs (4046 sets)

The Classic of Supporting Life with Acupuncture and Moxibustion (Zhenjiu Zisheng Jing, 鍼灸資生經; here in after ZZJ), which contains the largest amount of treatment cases and left a strong impact on the Far East medical history, was selected as the primary reference book for the analysis. ZZJ was first digitized and **co-occurring pathology-acupoint pairs were extracted** and preprocessed into an analyzable format. The pathology-acupoint co-occurrence analysis was performed by applying **5 values of set-theoretic measures (weighted Euclidean distance, Canberra distance, Euclidean distance, chi-squared distance, and Jaccard similarity)**, which measure the distance between the observed and expected co-occurrence counts, and **2 values of probabilistic measures (association strength and Fisher's exact test)**, which measure the probability of observed co-occurrences. The analysis results were used for a prediction simulation in order to measure and compare the extent to which pathologies can be predicted from acupoints.

set-theoretic measures

Weighted Euclidean distance

$$d_{WED}(x, o_k) = \sqrt{\sum_{j=1}^M (x_j - o_{kj})^2 / (x_j + o_{kj})}$$

Euclidean distance

Canberra distance

Chi-squared distance

Jaccard similarity

probabilistic measures

Association strength

$$AS_{ij} = \frac{c_{ij}}{c_i c_j}$$

Relative risk

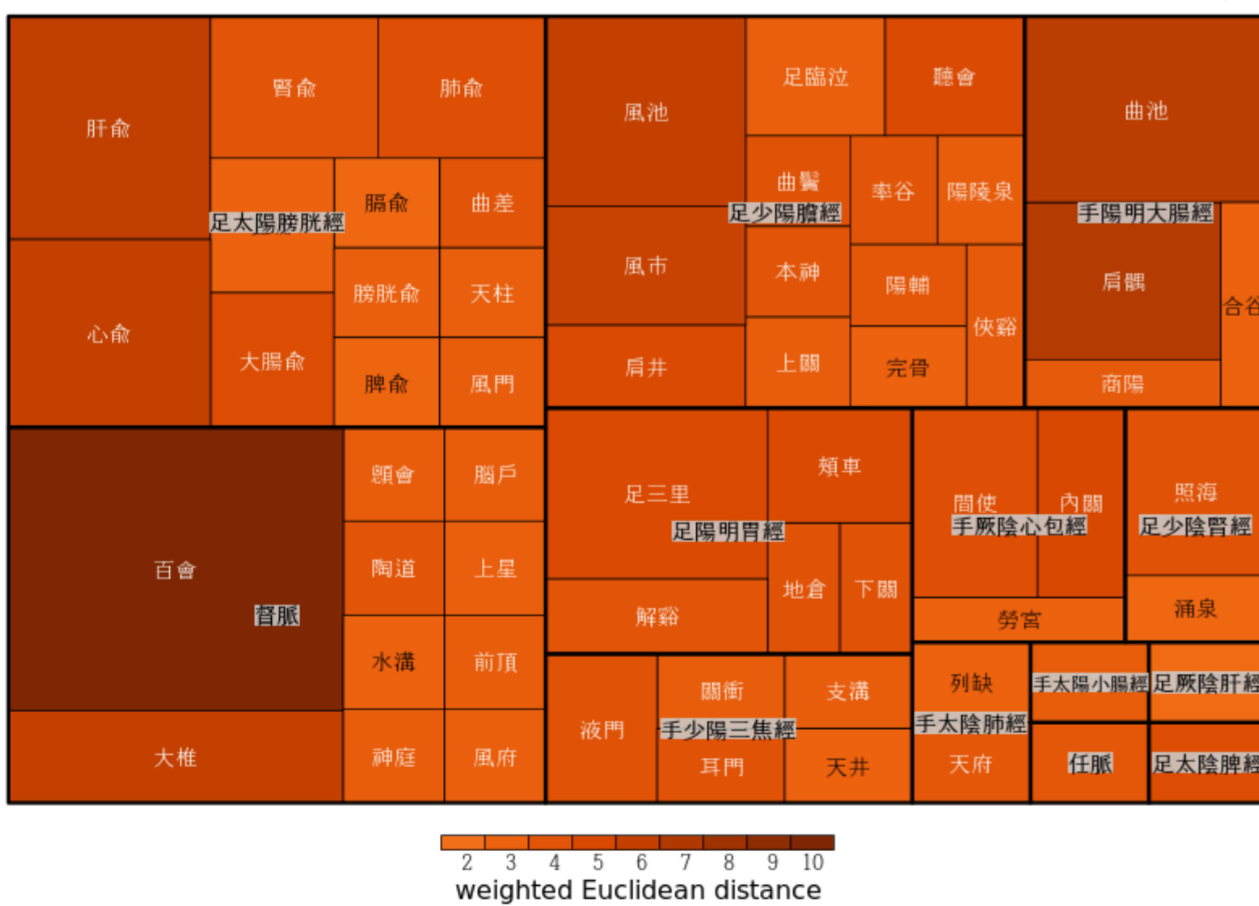
Results

The treatment records contained in ZZJ were preprocessed, which yielded 4162 pathology-acupoint sets. Co-occurrence was performed applying 7 different analysis variables, followed by a prediction simulation. The prediction simulation results revealed **the weighted Euclidean distance had the highest prediction rate with 24.31%, followed by Canberra distance (23.14%) and association strength (21.29%)**.

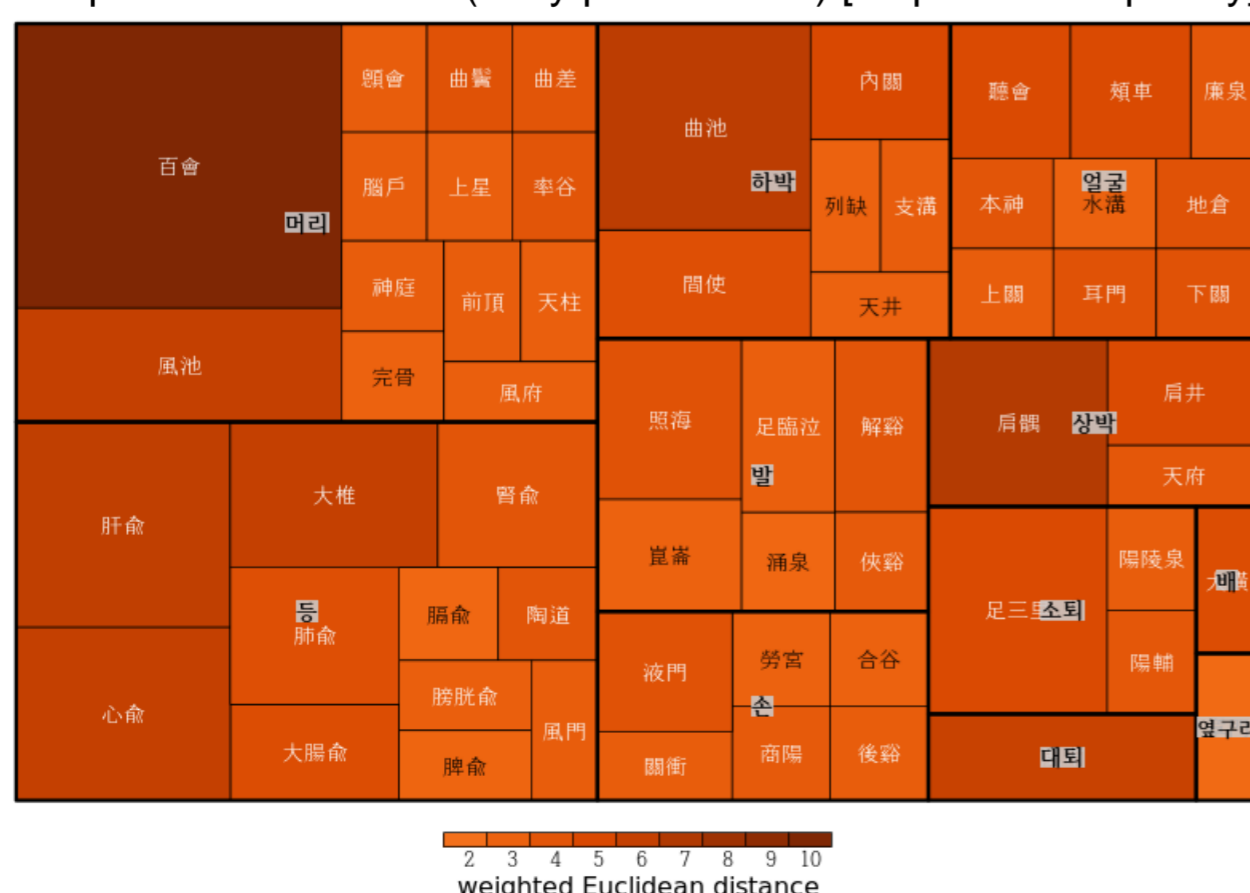
Conclusions

The weighted Euclidean distance among the set-theoretic measures and the association strength among the probabilistic measures were verified to be the most efficient analysis methods in analyzing the correlation between acupoints and pathologies found in the classical medical texts.

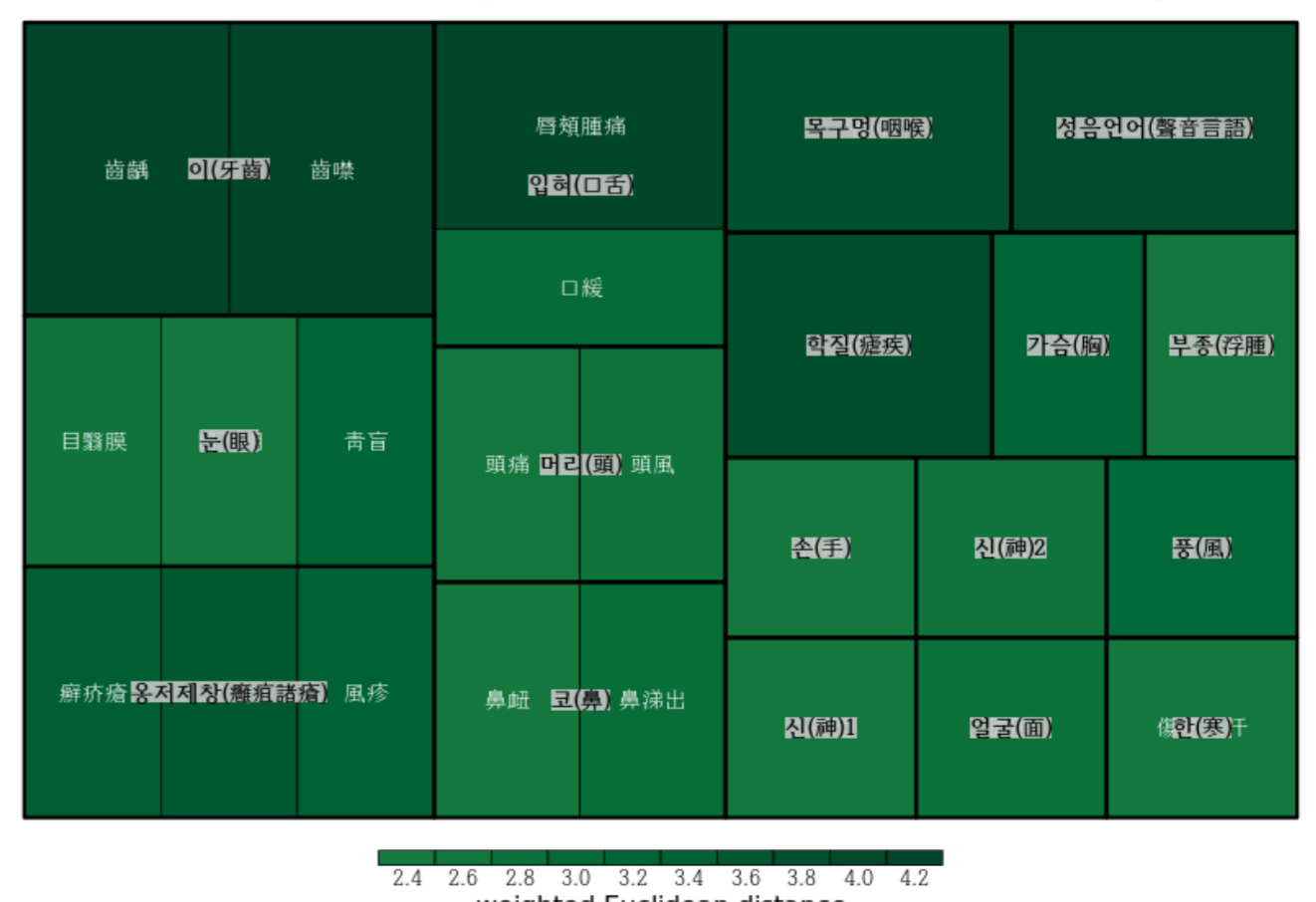
Acupuncture for Stroke (meridian cluster) [map size : frequency]



Acupuncture for Stroke (body parts cluster) [map size : frequency]



Effects of LI4 (body parts cluster) [map size : frequency]



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