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Exploring Zheng He's Travels (1400-1433): A Computational Approach

Keywords: Mao Kun Map, Zheng He, Cartographic Heritage, Digital Humanities, Ma Huan, Yingya Shenglan

Summary: The Mao Kun Map (茅坤图, also known as Zheng He's Navigation Chart 郑和航海图) and Ma Huan's travel account *Yingya Shenglan* (《瀛涯胜览》) are two primary extant sources of evidence for Zheng He's seven ocean expeditions between 1400 and 1433. On the web-based Engineering Historical Memory (EHM) research platform, the map and the travel account have been parsed, mapped, and visualised in an interactive analytical environment supported by computational algorithms. EHM offers georeferenced digital representations of the original artefacts alongside transcription, English translation, annotations, and commentaries. In real-time, the EHM system dynamically searches and aggregates secondary multi-media references, including related scholarly publications, images, and videos, supplying supplementary information for an enhanced learning experience. Notably, the platform allows users to explore these historical Chinese materials in conjunction with their contemporary Afro-Eurasian cartographic and textual resources published digitally on EHM. Examples include Fra Mauro's Map of the World dated 1462, the 1457 Genoese World Map, and Marco Polo's and Ibn Battuta's travel accounts. This feature allows researchers to make cross-references and compare medieval maps and manuscripts across regions, opening opportunities for new knowledge discovery. This paper aims to unfold the above in detail and demonstrate EHM's cross-disciplinary research process and methodologies, using the Mao Kun Map and *Yingya Shenglan* as showcases. We explain how integrating historical and computer sciences can facilitate insightful scholarly research and inspire fresh perspectives.

1. Introduction

The Mao Kun Map (茅坤图, also known as Zheng He's Navigation Chart 郑和航海图, ca 1422–1433) and Ma Huan's travel account *Yingya Shenglan* (《瀛涯胜览》, The Overall Survey of the Ocean's Shores, ca 1416–1451) are the two primary extant sources of evidence for Zheng He's seven ocean expeditions between 1400 and 1433. On the web-based Engineering Historical Memory (EHM) research platform, the map and the travel account have been parsed, mapped, and visualised in an interactive analytical environment supported by computational algorithms. This paper unfolds this decode-encode process and demonstrates how EHM's interdisciplinary research approach facilitates insightful scholarly research and inspires fresh perspectives.

Zheng He (1371–1433) and his seven ocean expeditions (1405–1433), which took place during the Ming dynasty of China, were of great significance with historical, cultural, diplomatic, and religious impacts in Southeast Asia, the Indian Ocean, Western Asia, and East Africa (Chen 2017; Chia and Church 2012; Wang et al. 2005). These grand voyages can be traced in the Mao Kun Map (ca 1422–1433), collected by Mao Yuanyi (1594–1640) and published in *Wubei Zhi* (《武备志》, A Record of Military Affairs) in the early 17th century (Ma et al. 1970: 241–242). Often considered the earliest sailing chart of China (Hsu 1988: 97), the seven-meter-long strip map has illustrated landmarks, including islands, ports, temples, bridges, rivers, forests, mountains, and sailing routes and stellar diagrams with about 500 place names indicated, from the imperial court in Nanjing to today's Kenya on the East coast of Africa (Mao and Xiang 1961; Singapore National Library Board 2005). Moreover, the map does not adopt a fixed scale or orientation, which varies across different sections (Ma et al. 1970: 246–247). However, it is visually evident

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that the chart follows a path along the ocean and near the shore. It offers a first-person perspective and a helpful navigation aid for those aboard the fleet.

In addition to the Mao Kun Map, Ma Huan (ca 1380–1460), the official translator who travelled with Zheng He on three maritime voyages (i.e., the fourth:1413–1415, the sixth:1421–1422, and the last, the seventh:1431–1433), recorded their overseas encounters in his book *Yingya Shenglan* (Ma and Wan 2018: 3). The book includes detailed depictions of the culture, traditions, rituals, climate, currencies, wildlife, and local produce of approximately 20 states visited by the fleet, from Champa (Central Vietnam) in the East to Mecca in the West (Ma et al. 1970; Ma and Wan 2018). These accounts provide valuable first-hand information about Zheng He's ocean expeditions.

In 2020, the international research initiative EHM commenced the digital transformation of the Mao Kun Map and Ma Huan's *Yingya Shenglan*, aiming to enhance the research and learning experiences of these important Chinese primary sources. The idea of "Engineering Historical Memory (EHM)" was first conceptualised by Andrea Nanetti in 2007, drawing inspiration from Umberto Eco and Antonio Carile's theories and methodologies (Nanetti 2022: 14–15). EHM's primary goal is to offer unrestricted and trustworthy online access to primary historical materials, leveraging computational technologies. Since its establishment, EHM projects have engaged over 130 international scholars and provided training opportunities for numerous undergraduate and graduate students (Nanetti 2022: xxi). Over the years, the EHM team has launched over 30 interactive web applications, including two dedicated to the Mao Kun Map and Ma Huan's travel accounts (Cui et al. n.d.; Nanetti n.d.; Nanetti et al. 2024).

In general, the EHM approach follows a decode-encode process. The research team first decodes the knowledge and values embedded in primary historical sources by transcribing, translating, interpreting, and organising the retrieved information into machine-readable databases. Subsequently, the team collaborates with software engineers and web developers to encode these datasets into interactive web applications hosted on the EHM platform (Nanetti 2022: 10; Nanetti and Cui 2023: 134). This platform has been designed and programmed to support knowledge aggregation, information visualisation, georeferencing, and sentiment analysis and is augmented with multi-modal and multimedia references. These functions enable users from diverse backgrounds to intuitively and credibly explore primary historical sources, overcoming potential language and cultural barriers often encountered when dealing with historical materials.

The following sections illustrate the above process using the Mao Kun Map and Ma Huan's *Yingya Shenglan* as a case study.

2. The Mao Kun Map

The development of the Mao Kun Map on EHM went through three main steps: 1) Digital image reconstruction of the map, 2) Database development, and 3) Development of the web application. We address each step in the subsections below.

2.1 Digital image reconstruction of the map

The Mao Kun Map was published in the book *Wubei Zhi* (Figure 1) across 44 folios (*Wu Bei Zhi* n.d.). It was intended to be browsed from right to left as a long scroll map. To reconstruct the map in its traditional format, the EHM research team conducted digital image re-composition, stitching the 44 pages into a single image using Adobe Photoshop. This image stitching process involves six general steps, which are: 1) inserting the photograph as Smart Object, 2) desaturating and matching brightness, 3) cleaning up images, 4) combining into a new Smart Object, 5) masking and aligning image, and 6) creating a seamless

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transition. Andrea Nanetti, Davide Benvenuti, and Andree Hansen Wibowo explained this process in detail in a video tutorial (Benvenuti 2021). This composite image also served as the foundation for subsequent database development.

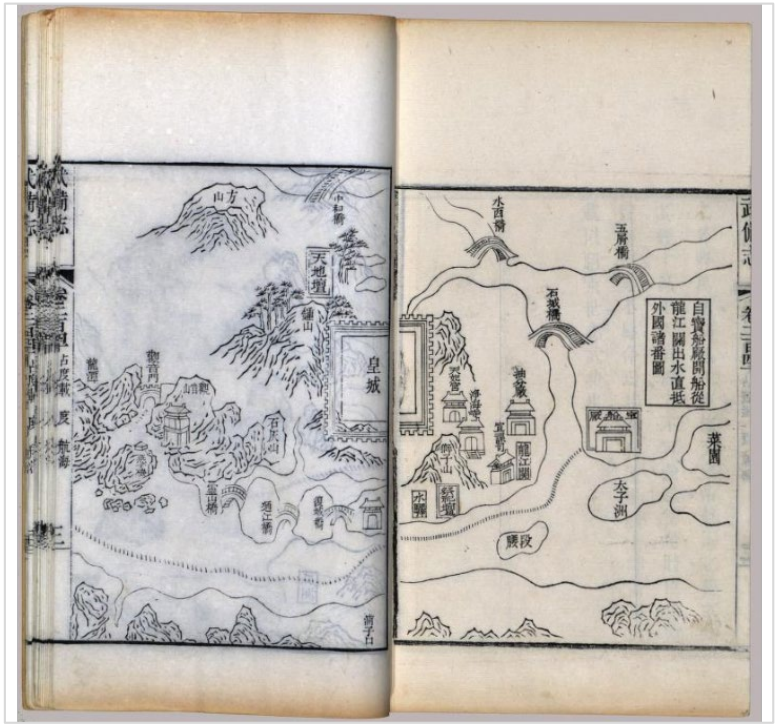

Figure 1 The first two folios of the Mao Kun Map in *Wubei Zhi*

2.2 Database development

Establishing machine-readable databases is crucial for EHM projects because it allows computer algorithms to effectively read and transform these datasets into dynamic web-based applications. For the Mao Kun Map, EHM researchers from Singapore and China collaborated to parse the map and develop a structured, computer-processable database in a spreadsheet format. Each row in the spreadsheet corresponds to an item on the map, with columns dedicated to specific types of information about the respective items. Essential information includes 1) pixel coordinates, 2) transcription, translation, interpretation, and remarks of the items, and 3) the items' contemporary names and geo-location.

Pixel coordinates - One of the main tasks was to gather the coordinate data for the over 500 miniatures depicted on the map. The diverse shapes of the illuminations pose challenges for automated tracing software, therefore requiring manual tracing effort. Partnering with software engineers, we developed a digital tracing tool which allowed us to outline each item using connected dots and obtain the pixel coordinates of the item's location on the map (see Figure 2 for an example).

Transcription, translation, interpretation, and remarks – The Chinese texts on the map are written in traditional Chinese characters. Apart from listing the transcription of the text in the spreadsheet, the team also included the same text in simplified Chinese characters, Pinyin, and Wade-Giles (as used in J. V. G. Mills' monograph). We chose Mills' seminal book *The Overall Survey of the Ocean's Shores* as the primary scholarly source and integrated his comments into the database.

Contemporary names and geo-location – Using Mills' book and other secondary references, the team identified the (most likely) names and locations of almost all items in today's context. The contemporary coordinates of these places were obtained from Google Maps and added to the database.

In addition to the above spreadsheet, the team has separately developed an itinerary dataset based on the sailing routes described on the map, indicated along the dotted lines (examples in Figure 3). Texts written

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from right to left depict the outbound trip, while texts written in the opposite direction correspond to the inbound journey back to China. These descriptions provide detailed instructions on how to navigate between places along the coast, through straits, or among islands.

Figure 2 The EHM coordinate tracing device

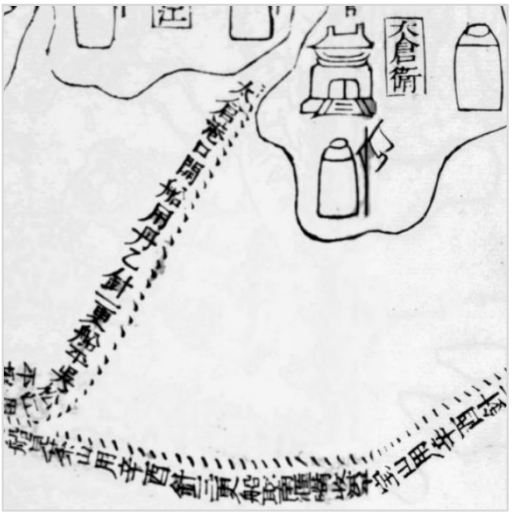

Figure 3 Description of sailing routes written along the dotted lines on the Mao Kun Map (image extracted from EHM)

2.3 Web application development

In collaboration with web developers, the abovementioned database has been programmed into an interactive web application on EHM (Figure 4). The homepage of the application opens by first showing the right end of the map (accessible via https://engineeringhistoricalmemory.com/MaoKunMap.php). Users can zoom in and out and navigate the map by dragging the mouse. A long scroll of the chart is positioned at the bottom of the application, featuring a blue box highlighting the respective zoomed-in section. Dragging the blue box also allows users to move within the map.

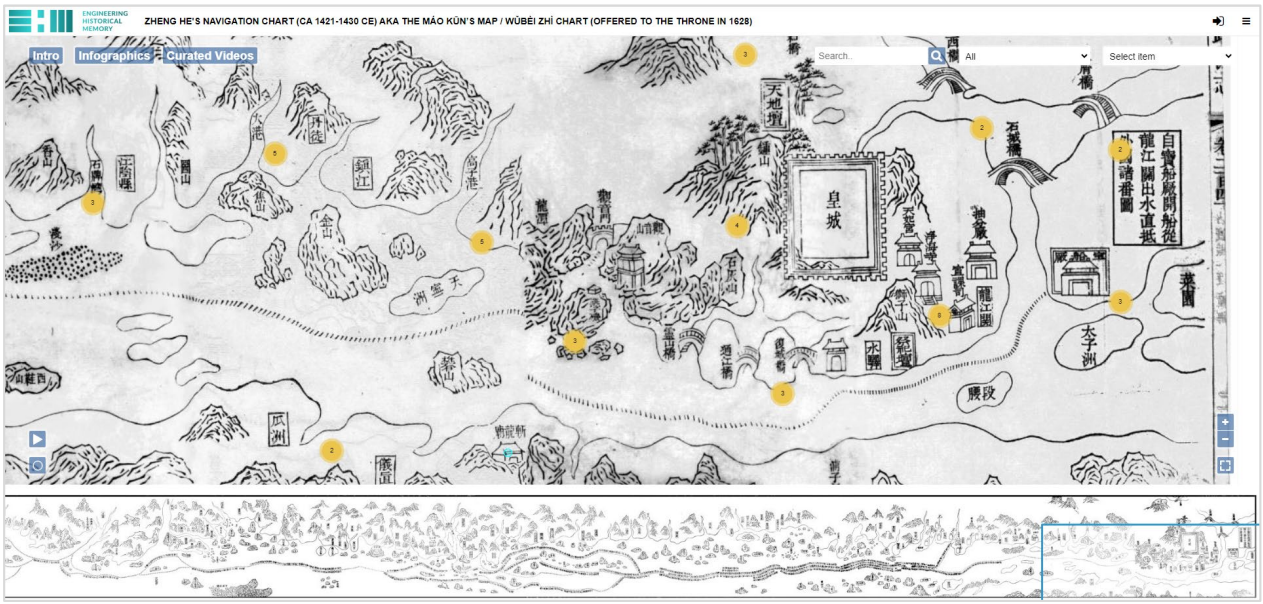

Figure 4 The Mao Kun Map Application on EHM (Nanetti et al. 2024)

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The application offers a series of functions to support interactive and dynamic exploration of the chart and the associated scholarship, including:

1) Deep zooming and three display modes where depicted items on the map are highlighted by a blue circle, polygon, or left unmarked.
2) Searching for items by their names on the map (via the Search bar on the top right) or their current place name (via the Infographics button on the top left).
3) Filtering items by geographic or architectural features (e.g., city, island, mountain, temple) via the filter bar on the top right. Users can also filter by Ma Huan's book, i.e., places described in Ma Huan's travel accounts will be highlighted on the map once this category is selected.
4) Streaming curated videos related to the Mao Kun Map and Zheng He's travel.
5) Clicking on a miniature on the map to unveil the transcription, translation, and interpretation of the item, its corresponding today's geo-location, and additional multimedia secondary references (scholarly papers, images and videos) automatically retrieved from established online data repositories via API, empowered by the EHM search function.
6) Seven analytical viewing options are available via the Infographics button, including Satellite View, OpenStreetMap, WebGL Satellite View and WebGL Street View, Radial Tree, Treemapping, and Force-Directed Graph. The first four offer flexible display modes to present the geolocation of places depicted on the map, while the latter three help reveal the relationships and connections between these geographic locations. These diverse viewing options provide users with accessible and structured visual representations of the large amount of seemingly unordered information encompassed by the map.

Furthermore, the EHM team is working on implementing several enhancements to the Mao Kun Map application. These include visualising the itineraries of Zheng He's maritime excursions using the above-discussed dataset, linking places on the map with Ma Huan's accounts, and integrating a game experience developed using Minecraft.

3. Ma Huan's *Yingya Shenglan*

While the original manuscripts of Ma Huan's *Yingya Shenglan* are lost, Wan Ming has noted that at least 17 hand-written or block-printed copies have survived from the Ming and Qing dynasties (Ma and Wan 2018: 13–14). Based on these extant historical copies, scholars have compiled, edited, and annotated complete versions of *Yingya Shenglan* in Chinese, English, and Japanese over the past century. For our database development, we selected two scholarly editions: Mills' book, published in 1970, which provides an English translation of Ma Huan's accounts based on Feng Chengjun's edited Chinese version, first released in 1935, and Wan's latest publication in 2018. Wan's annotated *Yingya Shenglan* in Chinese was primarily based on five surviving hand-written editions from the Ming dynasty, supplemented by other Ming dynasty block-printed copies and additional primary historical sources of the same period (Ma and Wan 2018: 1). We have obtained clearance from the publishers and copyright owners for Mills and Wan's books. In the following sections, we will discuss the database and web application development.

3.1 Database development

The first phase of database development, which started in 2020, focused on indexing and cataloguing Mills' English edition. We employed Optical Character Recognition (OCR) to extract editable text from Mills' book, generating 46 .txt-format documents. These texts, including footnotes, were checked manually for accuracy. They were then segmented and organised by paragraphs and topics, forming the foundational structure of the database. Mills' commentaries corresponding to each paragraph were also added

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to the spreadsheet. Additionally, we linked the places mentioned in *Yingya Shenglan* to their present-day names and geographic coordinates. We tagged the commercial goods and historical events discussed by the author for categorisation purposes. The current web application accessible on EHM (https://engineeringhistoricalmemory.com/MaHuan.php as of 2 July 2024) was primarily based on this database version. As part of our ongoing research effort, the EHM team has recently completed parsing Wan's edition, structured similarly to the above. The next step will involve merging and integrating the two datasets (Mills' and Wan's) into one to facilitate correlated and comparative viewing of the English and Chinese editions on the EHM platform.

3.2 Web application development

The EHM web application for Ma Huan's *Yingya Shenglan* features a four-window interface (Figure 5). The layout allows for the interactive retrieval and exploration of multiple sources of information simultaneously, facilitating comparison and cross-referencing without cluttering the content or requiring users to navigate between separate web pages.

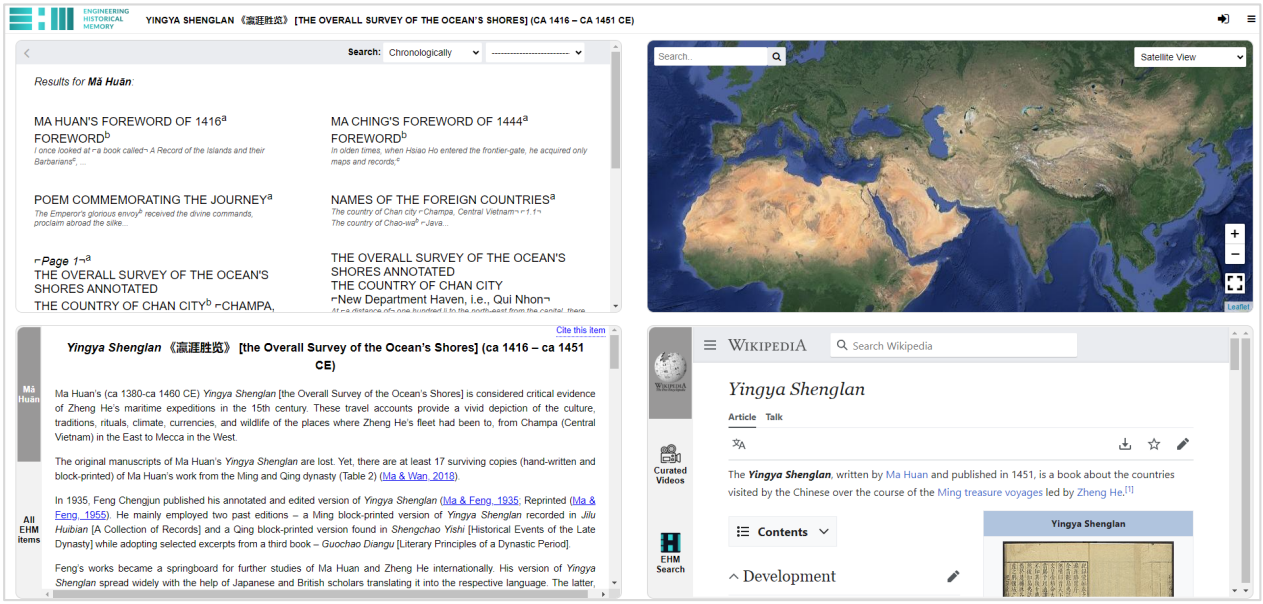

Figure 5 Home page of the *Yingya Shenglan* application on EHM (Cui et al. n.d.)

The first quadrant of the application (top left window) curates the catalogue of Mills' English edition of *Yingya Shenglan*, where the paragraphs are also searchable by goods and events using the Search bar at the top. Upon completing the database integrating Mills' and Wan's editions, the application will be updated, displaying both English and Chinese paragraphs side-by-side in the top left window. This enhancement will enable comparative analysis between these copies and languages.

The first quadrant of the application is also integrated with a novel feature – Sentiment Analysis. Sentiment analysis is a field of natural language processing (NLP) that helps to identify and evaluate subjective information in text (Oneto et al. 2016). While sentiment analysis is traditionally used for monitoring social media posts, customer feedback, and brand reputation, scholars can also benefit from it to gain a quick overview and a better understanding of primary historical sources' social and cultural context. Its algorithm helps historians recognise feelings, emotions, and their intensities, effectively processing large amounts of text without involving manual analysis (Nanetti et al. 2023).

In the EHM *Yingya Shenglan* application, users can select a paragraph in the top left window and click on the sentiment analysis button to get an instant analysis of the content, promptly retrieving key concepts,

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subjectivity, polarity, intensity, and emotions of the respective passage. Figure 6 gives an example using the sentiment analysis plug-in to evaluate a paragraph from *Yingya Shenglan* describing Ceylon (modern-day Sri Lanka). Here, the tool identifies a strong sense of positivity (75/100), characterised by feelings of ecstasy and delight. Moreover, it summarises key concepts and aspect categories within the same interface.

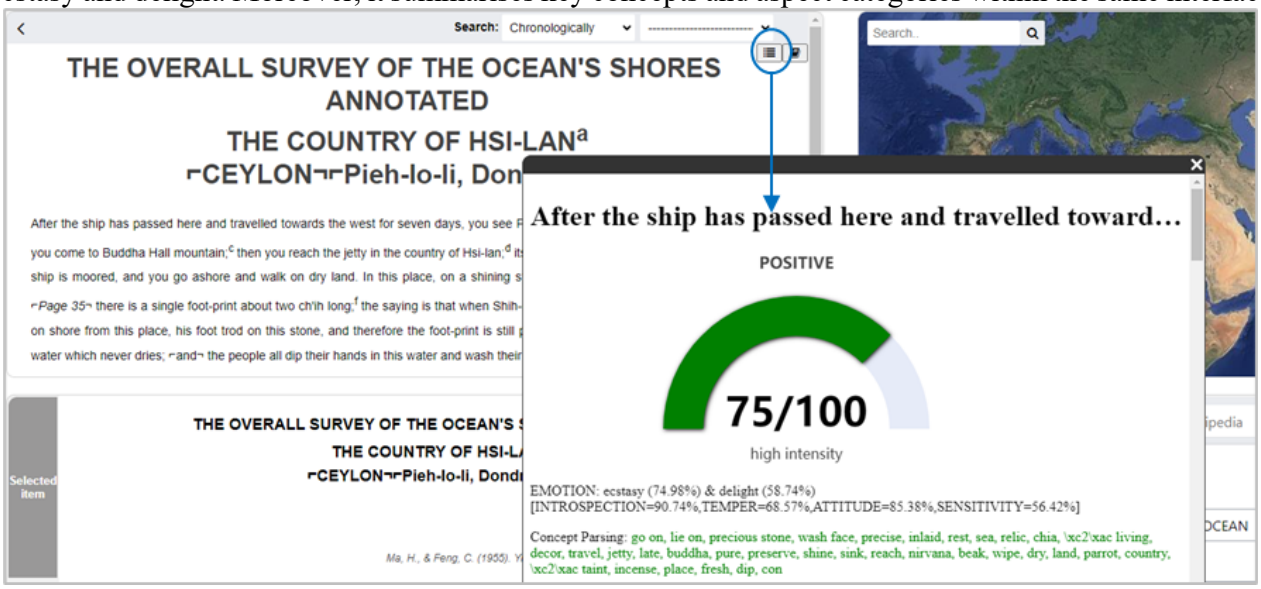

Figure 6 Sentiment analysis of a paragraph in the *Yingya Shenglan* application on EHM

The second quadrant of the application (top right window) showcases geographical information by displaying the geo-locations of places mentioned in the book. This window also supports searching for places using their modern names – when the system identifies a match between the contemporary name entered in the Search bar in the top right window and a place referenced in the book, the corresponding *Yingya Shenglan* paragraphs will be listed promptly in the top left window. Like the Mao Kun Map application, the second quadrant offers seven viewing options: Satellite View, OpenStreetMap, WebGL Satellite View and WebGL Street View, Radial Tree, Treemapping, and Force-Directed Graph.

The third quadrant (bottom left window) introduces this application, Ma Huan's *Yingya Shenglan*, and the different scholarly editions. Additionally, this window lists relevant references and provides an APA citing option for users interested in quoting the application or specific paragraphs.

The fourth quadrant serves as a resource library providing additional referential materials featuring the functions addressed above in the Mao Kun Map application, such as the EHM Search. This window auto-retrieves secondary sources of information in written, visual, and audio-visual forms from diverse online repositories (e.g., Wikipedia, Europeana, Gallica, Taylor & Francis, Scopus-Elsevier, Google Images, Bing Images, YouTube, Vimeo, and I-Media) (Nanetti 2022: 17).

4. The Interoperability of EHM

EHM's mission is to provide open access and reliable exploration of primary historical sources, focusing on Afro-Eurasian pre-modern history. By aggregating multilingual and multimodal primary and secondary sources on a unified platform, EHM supports interoperability—defined as "the ability of two or more software components to cooperate despite differences in language, interface, and execution platform" (Wegner 1996: 285)—which advances scholarly research beyond national historiographies and fosters greater intercultural understanding.

The pre-modern historical maps, chronicles, and travel accounts published on EHM are designed for interactive exploration in an analytical environment. For example, users can access the Mao Kun Map and

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Ma Huan's *Yingya Shenglan* in conjunction with other contemporary sources such as Fra Mauro's Map of the World (dated 26 August 1460), the Genoese Map of the World (1457 CE), Marco Polo's *Le Devisement dou monde* (c. 1300), and Ibn Baṭṭūṭa's *Riḥla* (1325 - 1354 CE). Notably, two EHM web applications–Maps of Afro-Eurasia (1100-1460 CE) (Nanetti et al. 2024) and Chronicles and Travel Accounts of Afro-Eurasia (1205-1533 CE) (Nanetti and Vu n.d.)–integrate these maps and written texts within the same interface, enabling cross-references and comparison of atlases and manuscripts across regions, opening opportunities for new knowledge discovery.

In the meantime, the EHM research team continues to investigate established and emerging computational technologies such as Agent-based Modelling and Simulation (AMBS), Metaverse, Generative Artificial Intelligence (GAI) and Image Search. These experiments aim to provide novel perspectives for historical studies and unleash the potential of primary historical documents.

5. Summary

This paper demonstrates the EHM team's interdisciplinary research processes and methodologies to develop the digital representations of the Mao Kun Map and Ma Huan's *Yingya Shenglan*, thereby enriching the scholarly research and understanding of Zheng He's maritime expeditions. By integrating historical and computer sciences, the interoperability of the EHM platform offers an enhanced and interactive learning experience for researchers and individuals from diverse backgrounds to access, examine, compare, and interpret medieval maps and texts. The EHM platform will continue to evolve, incorporating new features and datasets, and remains committed to providing unrestricted and credible access to primary historical materials.

References

Benvenuti, D. (Director). (2021). *Zheng He's Navigation Chart: Reconstructing the scroll format of the map* [Animated documentary]. https://ehm-video-private.s3.ap-southeast-1.amazonaws.com/Maokun%20Reconstruction.mp4?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Date=20240702T011920Z&X-Amz-SignedHeaders=host&X-Amz-Expires=3600&X-Amz-Credential=AKIATTPTHH3QX2JKVHA5%2F20240702%2Fap-southeast-1%2Fs3%2Faws4_request&X-Amz-Signature=5cc1ec592259ac2cbf5999262d96896bb1e0c5573995a37d918e82b2b446b665

Chen, Z. (2017). *走向多元文化的全球史: 郑和下西洋(1405-1433)及中国与印度洋世界的关系 Zou xiang duo yuan wen hua de quan qiu shi: Zheng He xia xi yang (1405-1433) ji Zhongguo yu Yindu yang shi jie de guan xi (Toward a multicultural global history: Zheng He's maritime voyages (1405-1433) and China's relations with the Indian Ocean world)* (Beijing di 1 ban., 北京第 1 版.). Sheng huo, du shu, xin zhi san lian shu dian.

Chia, L. S. and S. K. Church (2012). *Zheng He and the Afro-Asian world*. Melaka Museums Corporation PERZIM and International Zheng He Society.

Cui, Y., A. Nanetti, K. Vu (n.d.). *Mă Huān's Yíng-yái sheng-lăn (The Overall Survey of the Ocean's Shores) (ca 1416 – ca 1436 CE)*. Engineering Historical Memory (EHM). Retrieved June 26, 2024, from https://engineeringhistoricalmemory.com/MaHuan.php

Hsu, M.-L. (1988). Chinese Marine Cartography: Sea Charts of Pre-Modern China. *Imago Mundi*, *40*, 96–112.

Ma, H., C. Feng, J. V. G. Mills (1970). *Ying-Yai Sheng-Lan:'The Overall Survey of the Ocean's Shores'(1433)* (J. V. G. Mills, Ed. & Trans.; Vol. 42). Cambridge University Press.

Ma, H. and M. Wan (2018). *Mingben "Yingya Shenglan" Jiaozhu*. Guangdong People's Publishing House.

Conference Proceedings, ISSN 2459-3893
Editors: A.Tsorlini, C. Boutoura
AUTH CartoGeoLab, 2024

Mao, Y. and D. Xiang (1961). *Zheng He hang hai tu, Xiang Da zhengli [Zheng He's Navigation Chart, organised by Xiang Da]* (Di 1 ban., 第 1 版.). Zhonghua shu ju.

Nanetti, A. (n.d.). *Engineering Historical Memory*. Engineering Historical Memory (EHM). Retrieved July 3, 2024, from https://engineeringhistoricalmemory.com/

Nanetti, A. (2022). *Computational Engineering of Historical Memories: With a Showcase on Afro-Eurasia (ca 1100-1500 CE)*. Routledge. https://doi.org/10.4324/9781003310860

Nanetti, A., and Y. Cui (2023). Computational Engineering of Historical Memories. New Epistemologies for Non-Linear Historiographies. *History of Historiography*.

Nanetti, A., P. Falchetta, K. Vu (2024). *Maps of Afro-Eurasia (1100-1460 CE)*. Engineering Historical Memory (EHM). https://en.wikipedia.org/w/index.php?title=Afro-Eurasia&oldid=1231874568

Nanetti, A., J. Pavlopoulos, E. Cambria (2023). *Sentiment Analysis of Primary Historical Sources*. 767–772. https://doi.org/10.1109/ICDMW60847.2023.00104

Nanetti, A., C. Ping, Y. Cui, K. Vu (2024). *Zheng He's Navigation Chart (ca 1421-1430 CE) aka The Máo Kūn's Map / Wǔbèi Zhì Chart (offered to the throne in 1628)*. Engineering Historical Memory (EHM). https://engineeringhistoricalmemory.com/MaoKunMap.php

Nanetti, A., and K. Vu (n.d.). *Chronicles and Travel Accounts of Afro-Eurasia (1205-1533 CE)*. Engineering Historical Memory (EHM). Retrieved July 3, 2024, from https://engineeringhistoricalmemory.com/AfroEurasia.php?vis=sat

Oneto, L., F. Bisio, E. Cambria, D. Anguita (2016). Statistical Learning Theory and ELM for Big Social Data Analysis. *IEEE Computational Intelligence Magazine*, *11*(3), 45–55. https://doi.org/10.1109/MCI.2016.2572540

Singapore National Library Board (2005). *Zheng He and maritime Asia = Zheng He yu hai yang Yazhou.* The National Library Board.

Wang, T., K. Xu, M. Wan (Eds.) (2005). *郑和远航与世界文明: 纪念郑和下西洋 600 周年论文集 Zheng He yuan hang yu shi jie wen ming: Ji nian Zheng He xia xi yang 600 zhou nian lun wen ji* (Di 1 ban., 第 1 版.). Peking University Press.

Wegner, P. (1996). Interoperability. *ACM Computing Surveys*, *28*(1), 285–287. https://doi.org/10.1145/234313.234424

Wu bei zhi (n.d.). Library of Congress. Retrieved July 1, 2024, from https://www.loc.gov/resource/g7821rm.gct00058/?sp=1&st=gallery