Cartography and the production of royal space in late imperial China: Yangshi Lei Archives as a Knowledge Base

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The absence of a traditional context has led to extreme research paradigms on ancient Chinese architecture that are either purely spiritual or purely material - both lacking the social practice perspective that bridges the two. However, the pictorial and textual information on the Qing-Dynasty Yangshi Lei Archives 样式雷图档 used for analysis, decision-making and design presentation, represents rich knowledge dimensions of practices of ancient Chinese architecture, namely a systematic epistemology to the complex and evolving relationship between the social spatial practices, the symbolic knowledge that conveys information, and the implicit mental models.Therefore, this project aims to describe, extract, and analyse the developmental interactions among the material -social-mental triad implicit in Yangshi Lei drawings to demonstrate social history of knowledge of spatial production in traditional China.

This project aims to reconstruct relevant knowledge from social spatial practice, visual psychology, iconography, and semiotics by digitally describing and analyzing pictorial and textual information on these drawings through techniques of ontology modeling, knowledge graph, and cognitive computing. The research is divided into two stages, the first of which will reconstruct the association of images with the external open world, and the second of which explores the role of images in the external world.

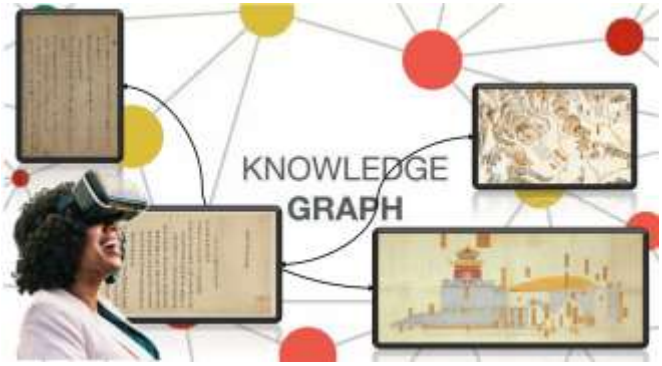

Fig.1 Project schematic

The ongoing first phase reuses and extends the knowledge framework of CIDOC CRM, a generic ontology model for the cultural heritage domain, to build the knowledge framework of the Yang Shi Lei ontology (ysl), thus combining image content with engineering events and material entities external to the image. Knowledge extraction is then performed on existing studies to further refine the concepts and relationship types of the ysl ontology. By using the archives of the Ding Mausoleum project, a knowledge graph has been constructed for returning the archives to their spatial practice context in which they were produced, used, and circulated.

Based on this built ontology about the association of images with the external open world, the second stage will then apply knowledge inference, statistical learning, and eye-tracking to mine the systematic nature of cartographic symbols and their specific roles in different engineering stages and for different readers, thus exploring the interplay between cartographic knowledge and external spatial practices.

By reconstructing the relationship between architectural drawings and the external world, the study develops the evolution of practical spatial knowledge with cartographic knowledge at its core in the context of Sino-Western exchanges between the 18th and 20th centuries. The research focuses on both Chinese and Western cartographic knowledge and their worldviews in terms of their place and utility in the knowledge system of Chinese royal spatial practices, thus providing a microscopic but comprehensive view of human epistemological circulation at the time. A context-rich semantic descriptive framework for images helps integrate socio-historical evidence into the knowledge structure of visual evidence such as maps and paintings, forming a cartographic-centered paradigm for the study of "knowledge evolution". The data infrastructure and digital interaction can also contribute to further understandings of Yangshi Lei Archives by scholars and the public.