

Conceptualizing Egyptian ritual space as networks

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1 Data

Egyptian New Kingdom (ca. 1550–1069 BCE)¹ temple decoration has been (extensively) discussed from historical, religious, art, or architectural perspectives. Among others, these include the textual evidence for Houses of Millions of Years (Ullmann, 2002), political statements in architecture and the decoration programme (Roth, 2005), the function of architectural units within a temple (Arnold, 1962) or in the context of a general overview of architecture in Egypt (Arnold, 1994). This paper examines the theoretical framework for conceptualising these ritual spaces as networks and results stemming from this approach.

1.1 The Temple of Hatshepsut at Deir el-Bahari

The base dataset of the paper is the Temple of Hatshepsut (1473–1458 BCE) at Deir el-Bahari, which dates to her co-regency as king with Thutmose III (1479–1425 BCE) (Arnold, 1994, 98). Its unique layout incorporates standard units (e.g. spaces for royal and sun cults) known from later and earlier temples of the same type, so-called Houses of Millions of Years (cf. (Arnold, 1994, 98), (Arnold, 1994, 5, 11–13) and (Ullmann, 2002, 26). The temple decoration programme features further, more unusual scenes, such as the depictions of the expedition to Punt (Taterka, 2016, 2019). In addition to reliefs with corresponding texts, statues with their own inscriptions were placed in the temple (Keller, 2005, 158–159). Elements within the Egyptian context may have multiple functions, such as decorative friezes also being readable text or readable hieroglyphs being used as part of the depiction of goddesses such as Maat or Isis (cf. (Sankiewicz, 2008, 204–210) and (Döhl et al., 2020, 16–17)). Because of the decoration programme’s scale and complexity, manual analysis is only feasible for small portions at a time. The following approach takes the diametrically opposite view analogous to distant reading for literary analysis (Underwood, 2017, 1).

1.2 Database and schema

From a practical perspective, the data is stored in a single neo4j graph database. In doing so, the data can be easily accessed and queried. The data points have

¹ All dates correspond to the Oxford History of Ancient Egypt, as published in Shaw (2000, 480–489).

been extracted from the Topological Bibliography of Egypt (Porter and Moss, 1972), which gives a broad overview of all scenes and texts. The sparsity of the descriptions means that close reading is currently not possible on the dataset. The project aims to supplement these in future by annotation, translation and incorporation of other publications. However, using the Theban temples publication as a base dataset offers two significant advantages: First, the publication uses standardised nomenclature that can be altered to fit a current, maintained standard such as the Getty Vocabulary or Iconclass. Second, the scenes have an ID number that can be referenced within the domain of Egyptology. Both facilitate the intended reuse of the data beyond the project.

The data set’s structure can be described as a multi-layer network of nested layers (Knudsen et al., 2019) with the architectural plan as a base layer. This plan is then split into rooms, walls, registers and, lastly, scenes while statues and other elements such as pillars are added accordingly. Using nested, hierarchical PART_OF-relationships, the localisation of a single element is accessible from multiple perspectives, e. g. offering tables in the context of a single scene or within a broader co-occurrence network of the room or the entire temple. Additionally, elements with partial context information, such as fragments only attributed to a wall but not a specific scene, can still be used for interpretation. Scenes are further divided up into the elements present (text, depictions of people, objects) and both interactions between these as well as their structural makeup are stored as edges. The same applies to statues and other three-dimensional objects connected to their respective positions in the temple by edges. Any text and figurative elements are modelled as PART_OF the objects or walls and linked to a conceptual node. This way, queries for specific elements, e. g. the king’s name, can be reliably carried out across the entire database while retaining the original contextualisation. Thus, the data set uses a graph model to annotate and explicate connections in the decoration programme (similarly: Kuczera (2019)). By storing these connections in a graph database, the data can then be filtered and queried.

2 Perspectives on the dataset

2.1 Multimodality

Within the framework of multimodality, connections between the architectural plan, the figurative decorations and the texts can be drawn (Kutscher (2020) *passim* for multimodal communication in the case of Egyptian monuments) – building a network of data points. Within these combinations of Modi, text-image interactions are probably the best known (Döhl et al., 2020, 11). The patterns of interaction between text and picture offer structure to the information conveyed. For the temple context, the spatial layout and placement considerations are also significant communication factors (Döhl et al., 2020, 18). Within the graph database, these connections of e. g. statues to both the floor plan and wall decoration are modelled as edges. From these spatial situations, the co-occurrence of textual and pictorial elements (most often depictions of the king) in both Modi can be observed. The embedding of the temple in the Theban sacred and natural landscape is not discussed here.

2.2 Social networks

While the network described above is undoubtedly a metaphor (Ahnert et al., 2021, 14–24), it can still provide multiple, valuable avenues of interpretation. Historical and religious messaging can be inferred from the social network of figures appearing in text, relief, and statues. However, while different persons are shown to act within the decoration programme, the network of persons in the temple is not a reflection of any real-world interactions; most of the human persons depicted remain unnamed and can therefore not be identified as discrete agents (such as in the case of Memphite tomb ownership, Herzberg (2020), or the Maya political networks, Scholnick et al. (2013)). Instead, co-occurrence within scenes shows semantic links of activities and groups within society or religion. Because direct interaction is rarely depicted, the following results from analysing the bipartite mapping of people to scenes or rooms, i.e. co-occurrence within set contexts.

Globally and for most rooms, the king, Hatshepsut, is at the centre of the network of persons depicted and named. This finding applies to closeness, betweenness and degree centrality and is exacerbated even more when the relief décor and statues are viewed in combination. In contrast, Thutmose III., at the time co-regent, is on the edge of the personal networks. Looking at co-occurrence within the relief of single rooms in the temple, he is often part of an unconnected component that has no ties to the network.

Other central nodes are the god Amun – to whom the temple is dedicated – as well as Hatshepsut’s father and predecessor Thutmose II., Hathor and Anubis in their respective architectural units. Looking at the ego networks of these gods, the neighbourhood of these nodes is comprised of either other deities or royal persons, usually Hatshepsut as reigning king but also her mother, Thutmose III. and their predecessors. In comparison, the ego networks of persons who are denoted as humans – either Egyptians or foreign dignitaries and rulers – are made up entirely of other humans and the royal family. These findings are congruent with the Egyptian religious system in which the king has relatively exclusive access to the gods and acts as a mediator between humans and gods (Schneider, 2004, 328). Thus, the network perspective offers affirmation of the distance between humanity in general and the gods as assumed in Egyptian religion of the New Kingdom, as well as the dual nature of the king as human and divine (Schneider, 2004, 323).

2.3 Co-occurrence beyond social networks

Beyond persons, both depicted in relief, painting or statues, as well as referenced in text, other objects, animals or plants are shown. These can be viewed in terms of (co-)occurrence similar to the personal networks described above.

In combination with persons, these other depictions also form a bipartite network; first, one of direct interaction, which is much more common than between figures within scenes. Second, as part of scenes where co-occurrence results in another bipartite network.

Looking at the first option, the resulting network comprises several disconnected components, which would support the thesis that direct interaction is clearly pre-defined. The second network includes fewer components, but the co-occurrence is dependent on a number of discrete groupings, as is the case for depictions of persons.

By observing the co-occurrence and association of décor and text elements, tentative semantic links can be formed on the conceptual nodes via community detection. Even

so, the incorporation of the statements from texts as semantic links, e.g. explicit declaration of relationships, offers a more reliable way to include semantic information. However, concepts within the Egyptian religious system may be inconsistent from an ontological standpoint (Görg, 2004, 433-434), meaning that automated reasoning has to take these limitations into account for this particular domain.

2.4 Architectural units and temporal networks

The architectural plan of the temple is also part of the database; rooms are conceptualised as accessible from or adjacent to other rooms. This modelling allows for structural comparison of architectural units within this temple and comparisons with other monuments. Furthermore, social networks and structures of information become comparable between different rooms or architectural units within this framework.

Graph traversals of the room sequence allow for building a network of sequentially connected decoration elements. In this context, the traversal order resembles a temporal network that expands and contracts for connections between the elements within the decoration. This finding is particularly significant when comparing distinct sequences of rooms such as the Hathor chapel, the Anubis shrine, and the temple's main axis. Especially the main axis would have been used for processions which would, in the network view, have moved along the edges discussed here (Arnold, 2005, 135). Thus, these traversals mirror a part of religious practice in this specific temple.

3 Conclusion

The conceptualisations of different networks described above within a single data set provide a basis to approach decoration within Egyptian ritual space from different perspectives. Moreover, combining and contrasting these perspectives presents the chance to connect different viewpoints. Ultimately, the results offer complementary and meaningful avenues for interpreting the interaction of space, text, image, and proposed activity even beyond Egyptian temples.

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