NASA Vitalis Project

Sample Outputs: Concept Mapping and Structural Patterns

The following samples illustrate representative outputs of the analytical pipeline described in the accompanying technical evidence and methods documents. These outputs are intended to demonstrate how expert knowledge structures are rendered and examined, rather than to report exhaustive results.

1 Sample 1: Concept Mapping Visualization

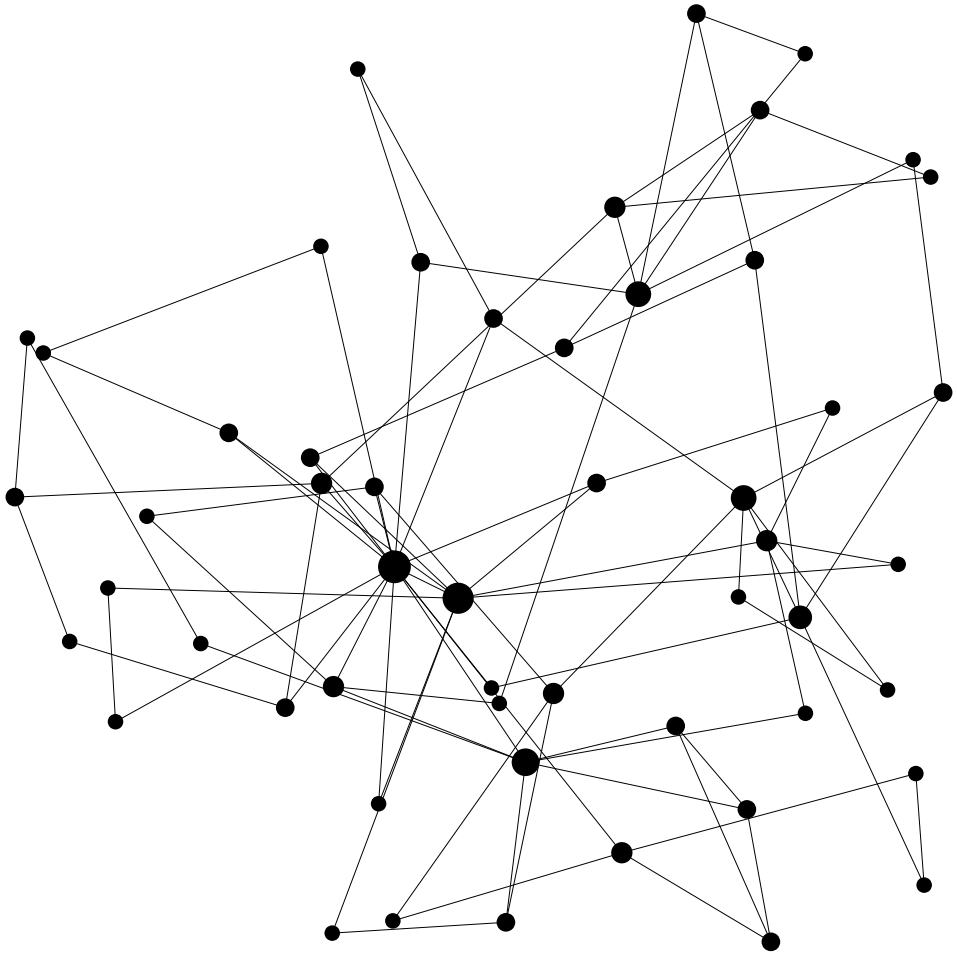

Figure 1: Concept graph derived from a representative expert-authored scientific paper. Nodes represent semantically coherent text segments, with edges indicating inferred conceptual relationships. The graph exhibits a densely interconnected core with peripheral specialization, reflecting the hierarchical organization characteristic of expert knowledge representations.

2 Sample 2: Structural Comparison Between Expert and Learner Texts

Table 1: Illustrative comparison of structural properties observed in expert-authored texts and learner misconception models. Differences reflect organizational patterns rather than content accuracy.

Structural Feature	**Expert Texts**	**Learner Texts**
Conceptual connectivity	Higher, hub-centered	Lower, evenly distributed
Structural spread	Broad, less compressed	Narrow, highly compressed
Local coherence	Moderate	Elevated (redundant clustering)
Conceptual organization	Hierarchical	Repetitive and shallow

Learner texts exhibit elevated local clustering due to repeated use of a small set of concepts, whereas expert texts distribute conceptual relationships across a broader hierarchical structure.

3 Sample 3: Aggregate Structural Pattern Across the Expert Corpus

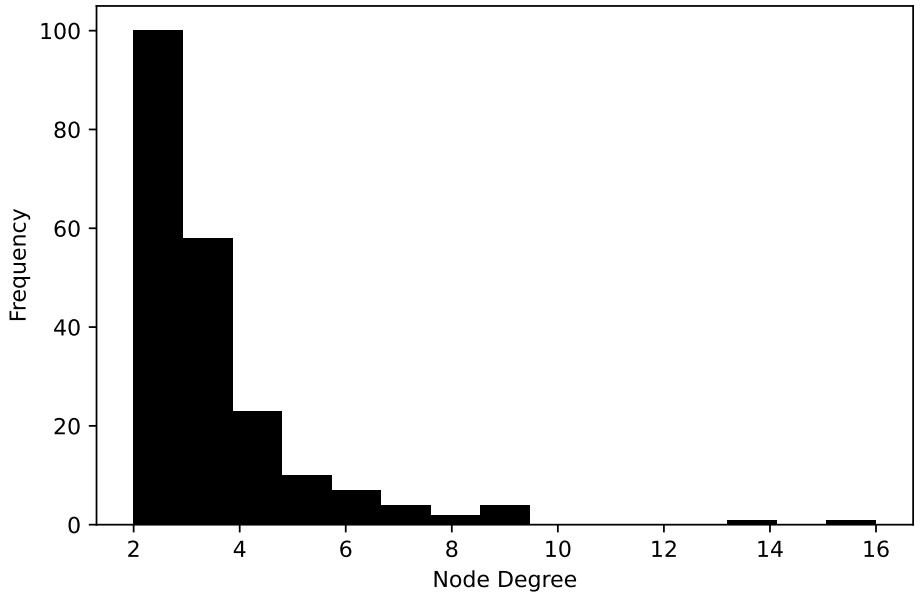

Figure 2: Aggregate structural pattern observed across the expert corpus. The distribution of conceptual connectivity exhibits a small number of highly connected core concepts alongside a large number of peripheral concepts, reflecting a stable core–periphery organization in expert knowledge representations.

These samples are illustrative rather than exhaustive and are intended to provide concrete reference points for the structural analyses discussed in the project's methodological documentation.