

Peer Review

Review of: "Quo Vadis, Artificial Intelligence? A Neuro-Symbolic Approach to Artificial Intuition"

Roberto Confalonieri¹

1. Department of Mathematics, University of Padua, Italy

The manuscript presents a neuro-symbolic framework aimed at modeling human intuition through a combination of semantic knowledge graphs, intuitive vs. factual edges, and a path-scoring mechanism balancing plausibility and innovation. The topic is timely and interesting, and the attempt to formalize intuitive reasoning is commendable. The distinction between factual and intuitive knowledge, as well as the use of innovation/propagation indices, is promising.

However, in its current form, the manuscript is underdeveloped for publication. The conceptual framing is promising, but the methodological description lacks sufficient depth and reproducibility. Many critical aspects of the implementation, especially around the construction and traversal of the knowledge graph, remain too vague. As a result, the work reads more like an extended concept note than a full research article.

My recommendation is a reject and send/major revision required before the paper can be considered for publication.

Below are major and minor comments intended to help strengthen the manuscript.

Major Comments:

a) The methodology needs substantial expansion.

- Each stage of the proposed pipeline would benefit from a much more detailed description.
- Knowledge graph construction: The paper does not explain how sentences are parsed, how lemmas are extracted, how relationships are derived, or what heuristics were used to classify edges as factual vs. intuitive. Without these details, reproducibility is limited.
- Multi-hop exploration: The idea that the system performs multi-step reasoning is central to the paper,

but the description is too high-level. Important missing details include the graph traversal algorithm used, constraints on path length, branching factor and pruning strategy, whether traversal is breadth-first, depth-first, or heuristic-guided, and computational complexity considerations.

- Semantic similarity and conceptual focusing: The manuscript states that spaCy embeddings are used, but the exact procedure for selecting the top similar nodes, handling synonyms, or resolving ambiguity is not described.

b) Factual vs. intuitive knowledge.

- While the conceptual distinction is compelling, it is unclear how intuitive knowledge edges are extracted or labeled during graph construction. Key questions include:

- What linguistic cues define 'associative' or 'intuitive' edges?

- Are these labels manually validated or fully automated?

- How are causal vs. correlational relationships distinguished?

This is critical because the Innovation Index hinges on the reliability of this classification.

c) The path scoring formula requires more justification.

- The scoring mechanism is central to the methodology, yet several aspects remain unclear:

- Why were the weights chosen as 0.7 and 0.3? Are these tuned, learned, or ad-hoc? How sensitive is the model to these weight choices?

- What is the formal definition of the Propagation Index?

- How is 'plausibility' quantified beyond path length?

d) A comparison to baseline symbolic or neural approaches would also strengthen the argument.

e) Experimental validation is too limited.

- The paper provides only a few example queries without quantitative evaluation or systematic testing.

- Experimental validation should be extended with clarity on dataset size and corpus type, quantitative metrics (e.g., accuracy relative to ground truth, novelty measures), ablation studies (removing intuitive edges, adjusting weights), and complexity/performance evaluation.

f) Figures require explanation.

Figures display graph paths but without explanation of notation, color coding, or the actual reasoning steps. Readers unfamiliar with the model cannot interpret them easily.

g) A discussion of limitations and assumptions would help contextualize the model.

Minor Comments:

- Some references (e.g., Olayinka 2020) should be more clearly linked to the mathematical definitions presented.
- Terminology such as 'innovation' and 'intuitive' edges should be formally defined in the text.
- There are several typographical errors across the manuscript that should be corrected.

Declarations

Potential competing interests: No potential competing interests to declare.