

Addressing Exploratory Information Needs with Relevant Entities



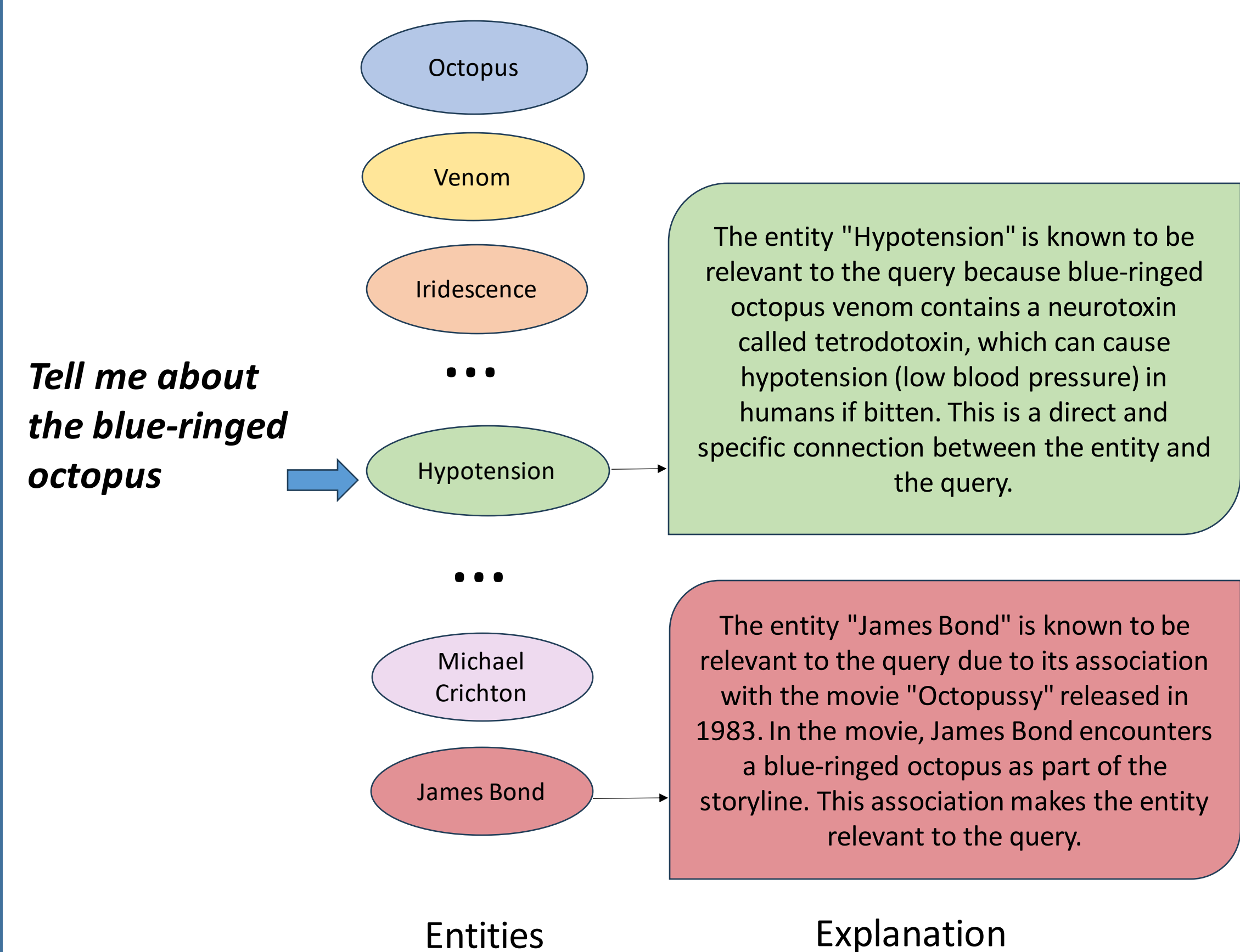
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Introduction

- We present an exploratory search system where users seek queries with no prior knowledge.
- Entities are knowledge landmarks that play a crucial role in human communication.
- We employ entities to guide users through the exploratory information need and provide explanations of the relevance of these entities to the information need.
- By exploiting relevant entities, users can refine their search strategies, discern contextual relationships, and explore the subtleties of the topic, enriching their exploratory search experience.



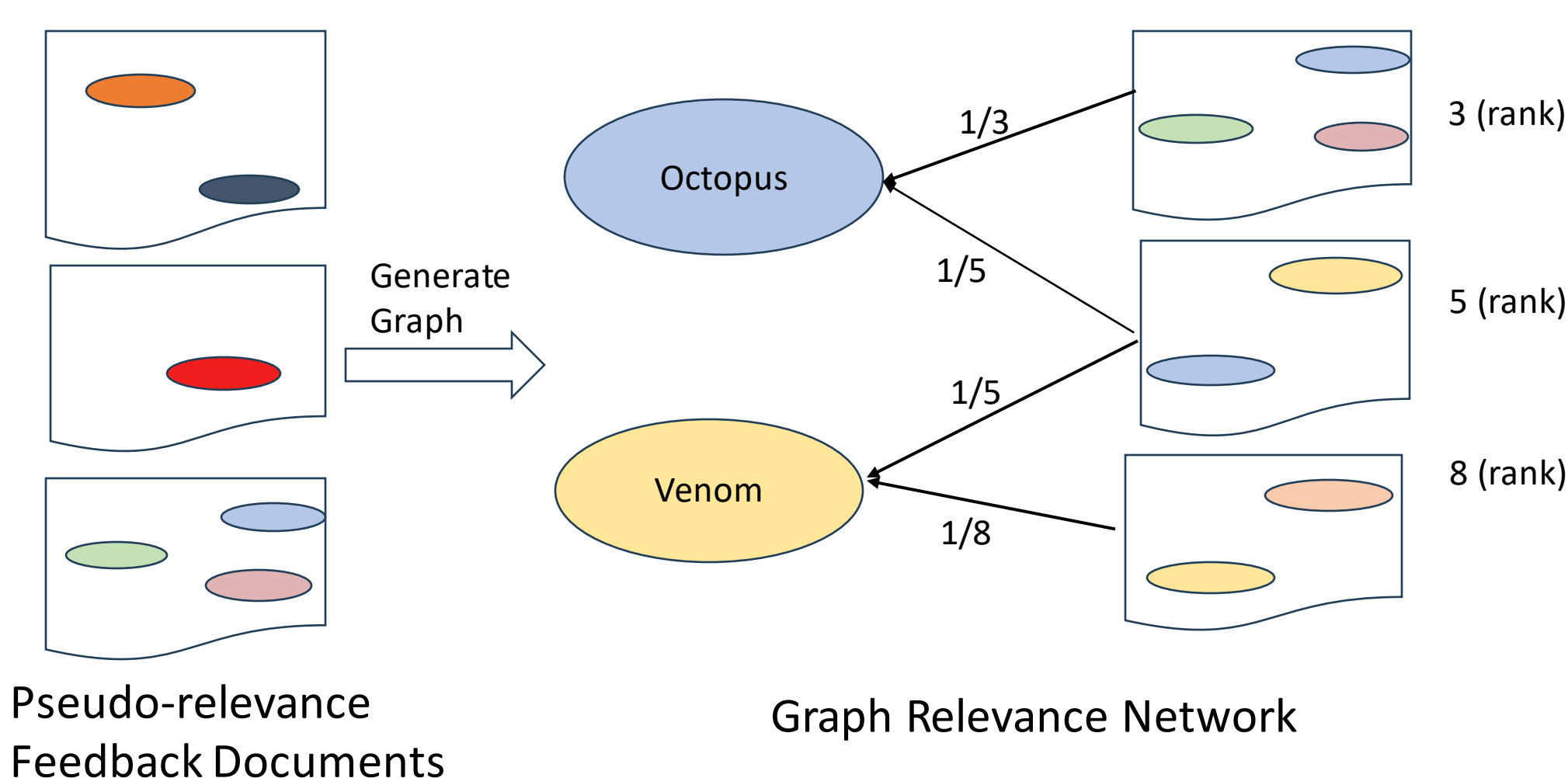
Methodology

We have three step pipeline in guiding the user through different pieces of relevant information:

- 1) Entity Retrieval
- 2) Explanation Generation
- 3) Validation & Relevance Checks

Entity Retrieval – Graph Relevance Network (GRN)

- Inspired by Entity Context Model [1] which assumes that the entity contexts in relevant documents can help to identify relevant entities.
- Aims to capture information that renders an entity relevant to the query.



Explanation Generation

- Use GPT-3.5 to generate explanations of the relevance of entities to the query with zero-shot.

You will be given a query and an entity, which are considered to be relevant. First, identify any possible reason they are known to be relevant, and explain behind their perceived relevance. Then assign a relevance judgement of 'Yes' if they are relevant, and 'No' if they are not. Format your answer as follows:

*Explanation:
Score:*

*Query: {query}
Entity: {entity}*

Validation & Relevance Checks

- We investigate the ability for LLMs to generate relevant explanations by prompting GPT-3.5 to classify the generated text against passages retrieved by search engine.

You will be given a created paragraph by GPT and several passages from search engine. These paragraph and the passages are saying about a certain entity, such as 'tiger', 'lion', etc. Your task is to determine whether the created paragraph can be constructed from the passages or not. Give me answer with 'Yes' or 'No'. 'No' means the paragraph cannot be made from the given passages without background knowledge. 'Yes' means the paragraph surely can be made from the given passages without any background knowledge.

- Use GPT-3.5 to generate relevance judgements of the entities to the query.

Results

- We evaluate our system on TREC Complex Answer Retrieval dataset.

Entity Retrieval Results:

| Methods | MAP | P@R |
|-------------|--------------|--------------|
| BERT-ER [2] | 0.263 | 0.319 |
| GAT [3] | 0.471 | 0.580 |
| GRN (Ours) | 0.494 | 0.565 |

Explanation Validation:

- **72%** of the generated explanations by GPT-3.5 can be validated against the retrieved passages.

Entity Relevance:

- LLM generated relevance judgements are **66% correctly judged** as relevant and 3% correctly judged as irrelevant.

Conclusions

- We present an exploratory system that guides users through entities and explanations.
- Our model GRN shows that relevance information is a more effective indicator to determine relevance of entities.
- In general, LLMs are able to generate valid explanations.
- LLMs in over 65% of cases, are able to detect the correct relevance label for the entities.

References

- [1] Entity Query Feature Expansion Using Knowledge Base Links
- [2] BERT-ER: Query-specific BERT Entity Representations for Entity Ranking.
- [3] GAT: Graph Attention Networks