Seminar Report: Language-Grounded Dynamic Scene Graphs for Interactive Object Search

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Abstract

[Content generated by Prompt 2]

1. Introduction

[Content generated by Prompt 2]

- **Key points to cover:** Motivation for mobile manipulation in unexplored environments; the "Interactive Semantic Search" task definition.

2. Related Work

[Content generated by Prompt 3]

- **3D Scene Graphs:** [Summary of Hydra, etc.]
- **LLMs for Planning:** [Summary of SayPlan, etc.]
- **Object Search:** [Summary of ESC, etc.]

3. Paper Summary

3.1 Problem Statement

[Content generated by Prompt 4]

- Include the POMDP formulation tuple explicitly: (S, A, O, T, P, r).

3.2 Approach: MoMa-LLM

- Overview of the architecture (Reference Fig. 2 in paper).

3.2.1 Hierarchical 3D Scene Graph

[Content generated by Prompt 5]

- **Voronoi Graph Construction:** [Details]
- **Room Classification:** [How the LLM is prompted]

3.2.2 High-Level Action Space

- List the actions: `Maps`, `go_to_and_open`, `close`, `explore`, `done`.

3.2.3 Grounded High-Level Planning

[Content generated by Prompt 6]

- **Scene Structure Encoding:** [How text is formatted]
- **Partial Observability:** [Handling frontiers]

3.3 Experiments

3.3.1 Experimental Setup

- **Simulator:** iGibson.
- **Robot:** Fetch (Sim), Toyota HSR (Real).

3.3.2 Evaluation Metrics

- **Success Rate (SR)**
- **SPL**
- **AUC-E (Area Under Efficiency Curve):** [Detailed explanation of why this is novel]

3.3.3 Results

[Content generated by Prompt 7]

- **Simulation:** MoMa-LLM vs Baselines.
- **Real-world:** Transfer capabilities.

4. Discussion

[Content generated by Prompt 8]

- **Strengths:** [Open vocabulary, structured reasoning]
- **Limitations:** [Perception dependency, latency]
- **Reproducibility:** [Code availability mention]

5. Conclusion

[Content generated by Prompt 9]

References

[List the paper and key references mentioned in the text]