Domain-Specific Research Idea Generation Process

Your Name

Algorithm 1 Domain-Specific Research Idea Generation

```
procedure GenerateResearchIdeas(query, knowledgeGraph, researchPapers, LLM, numIdeas)
    concepts ← ExtractKeyConcepts(query)
    relevantNodes ← FindRelevantNodes(knowledgeGraph, concepts)
    relatedPapers ← GetRelatedPapers(researchPapers, relevantNodes)
    ideas ← EmptyList()
    while Size(ideas) ¡ numIdeas do
        prompt ← CreatePrompt(concepts, relatedPapers)
        newIdea ← GenerateIdeaWithLLM(LLM, prompt)
        if IsNovel(newIdea) AND IsFeasible(newIdea) AND IsRelevant(newIdea) then
            ideas.Add(newIdea)
        end if
    end while
    return ideas
end procedure
```

1 Process Description

This algorithm outlines a method for generating domain-specific research ideas. It takes a user query, a knowledge graph of the domain, a set of research papers, a large language model (LLM), and the desired number of ideas as inputs.

1.1 Key Steps

1. Extract key concepts from the user's query
2. Find relevant nodes in the knowledge graph based on these concepts
3. Retrieve related research papers
4. Generate ideas using the LLM, guided by the extracted concepts and related papers

5. Filter ideas based on novelty, feasibility, and relevance
6. Continue generating and filtering until the desired number of ideas is reached

This process leverages domain knowledge (via the knowledge graph and research papers) and advanced language models to produce relevant and potentially innovative research ideas.