

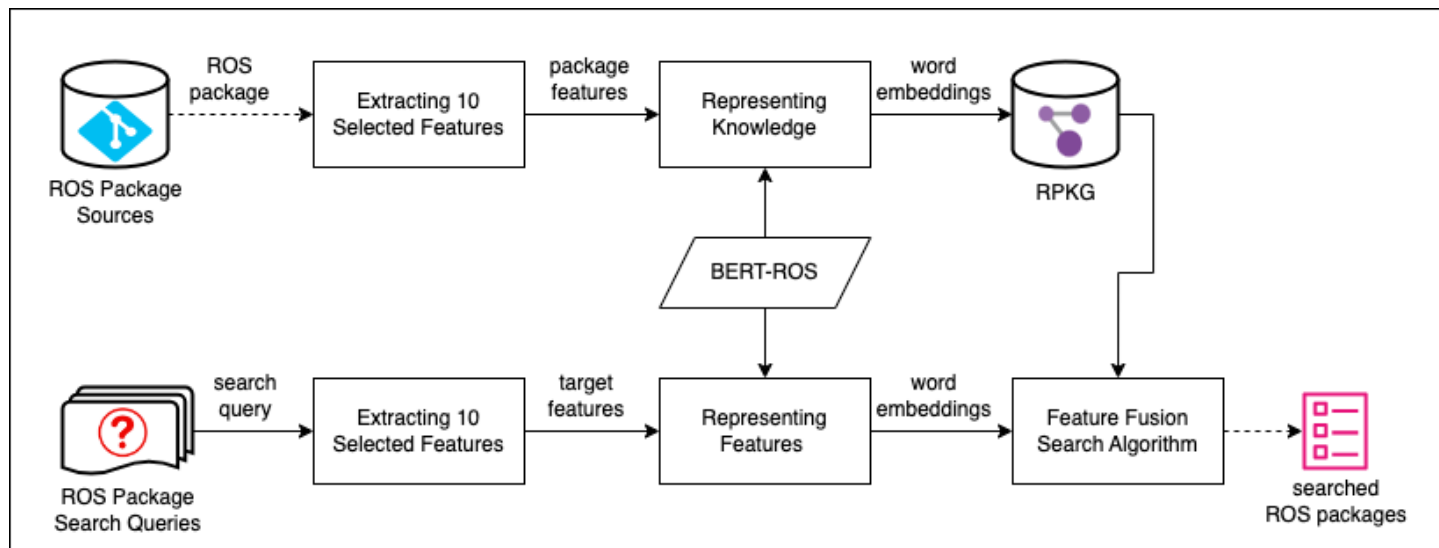
ROS package search for robot software  
development:  
a knowledge graph-based approach

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# Problems & Ideas

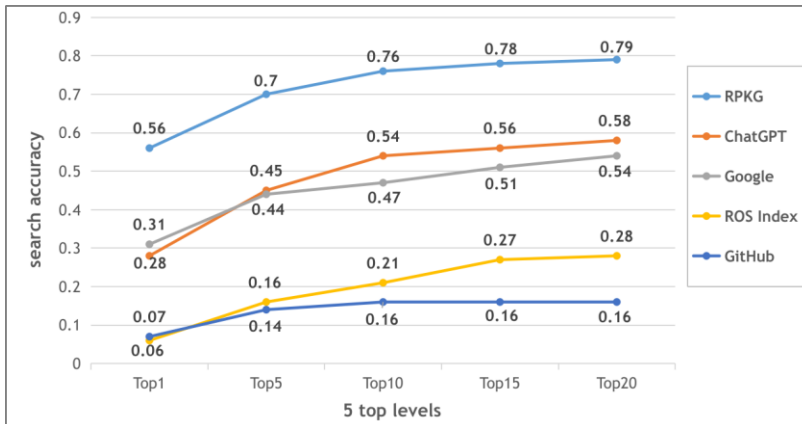
- Problems of existing ROS package search approaches:
  - The current ROS package search approaches are limited to simple keyword matching, lacking semantic understanding.
  - They fail to utilize the multi-dimensional features of packages, missing opportunities for more accurate and relevant results.
- Ideas: A knowledge graph to store semantic knowledge of multi-dimensional features extracted from ROS packages and a feature fusion matching algorithm to enhance the ROS package search accuracy.



The overview of the knowledge graph-based ROS package search approach

# Main Contributions

- Contributions:
  - A high-level abstraction view of ROS packages, which discusses the main concepts of each ROS package and the main relationships between ROS packages;
  - A multi-dimensional feature extraction technique and a ROS package knowledge graph, which more comprehensively represents ROS packages from multiple dimensions in a structured way;
  - A novel ROS package feature fusion matching algorithm by considering weighted similarities of multiple features from users' queries, which outperforms existing methods by at least 21% in search accuracy.



Comparison of search accuracy on 5 top levels

Comparison of time efficiency on different search methods

Method	Average Time(s)	Coefficient of Variation
RPKG	1.017	0.572
ROS Index	0.069	1.522
GitHub	0.541	1.523
Google	0.305	0.190
ChatGPT	24.611	1.523