

**Towards Why-Not Spatial Keyword Top-k Queries: A Direction-Aware Approach**

**Abstract:**

With the continued proliferation of location-based services, a growing number of web-accessible data objects are geo-tagged and have text descriptions. An important query over such web objects is the direction-aware spatial keyword query that aims to retrieve the top-k objects that best match query parameters in terms of spatial distance and textual similarity in a given query direction. In some cases, it can be difficult for users to specify appropriate query parameters. After getting a query result, users may find some desired objects are unexpectedly missing and may therefore question the entire result. Enabling why-not questions in this setting may aid users to retrieve better results, thus improving the overall utility of the query functionality. This paper studies the direction-aware why-not spatial keyword top-k query problem. We propose efficient query refinement techniques to revive missing objects by minimally modifying users’ direction-aware queries. We prove that the best refined query directions lie in a finite solution space for a special case and reduce the search for the optimal refinement to a linear programming problem for the general case. Extensive experimental studies demonstrate that the proposed techniques outperform a baseline method by two orders of magnitude and are robust in a broad range of settings.

**Existing System:**

A common pattern in the above scenarios is that the user wants to know why an expected object does not appear in a result. This type of functionality relates to the query quality and is called why-not functionality. Three typical solution models exist: (1) manipulation identification, which identifies query operators that prevent missing objects from being included in a result; (2) database modification, which updates the original database so that the query can revive missing objects; and (3) query refinement which revises the original query so that missing objects can enter the result. We adopt the query refinement model to answer why-not questions on direction-aware spatial keyword top-k queries.

The previous works adjust the preferences between spatial proximity and textual relevance or suggest more accurate query keywords to get the inclusion of missing objects in the query result. In this paper, we address the problem from a new perspective, i.e., modifying the query direction as motivated by the above examples.

**Proposed System:**

We provide a detailed problem analysis and propose efficient query refinement algorithms to answer direction-aware why-not questions by reducing solution spaces for both the special case and the general case.

We extend the proposed algorithms to support whynot questions with multiple missing objects.

We perform extensive experiments on real-life datasets to evaluate the performance of the proposed algorithms. The results indicate that the algorithms are efficient in a broad range of settings. In particular, the proposed solution is two orders of magnitude faster than a baseline method.