Multi-location visibility query processing using portion-based transactional modeling and pattern mining

ABSTRACTS

Visibility computation is critical in spatial databases for realizing various interesting and diverse applications such as defence-related surveillance, identifying interesting spots in tourist places and online warcraft games. Existing works address the problem of identifying individual locations for maximizing the visibility of a given target object. However, in case of many applications, a set of locations may be more effective than just individual locations towards maximizing the visibility of the given target object.

In this paper, we introduce the Multi-Location Visibility (MLV) query. An MLV query determines the top-k query locations from which the visibility of a given target object can be maximized. We propose a portion-based transactional framework and coverage pattern mining based algorithm to process MLV queries. Our performance evaluation with real datasets demonstrates the effectiveness of the proposed scheme in terms of query processing time, pruning efficiency and target object visibility w.r.t. a recent existing scheme.

METHOD

1. we model T as a set of portions (equal-sized units). Each portion has a unique identifier pid.
2. An efficient methodology was proposed to compute the visibility, overlap and continuity of each candidate set in terms of portions. We refer to this framework as Portion-Based Framework (PBF).
3. We form a set of portion transactions by modeling the association of each portion and the corresponding query locations from which that portion is visible.
4. Given a set S of portion transactions, our problem now is to extract top-k candidate sets c_i such that for each c_i, $vis(c_i, T) \geq minV$, $overlap(c_i, T) \leq maxO$ and $continuity(c_i, T) = true$.
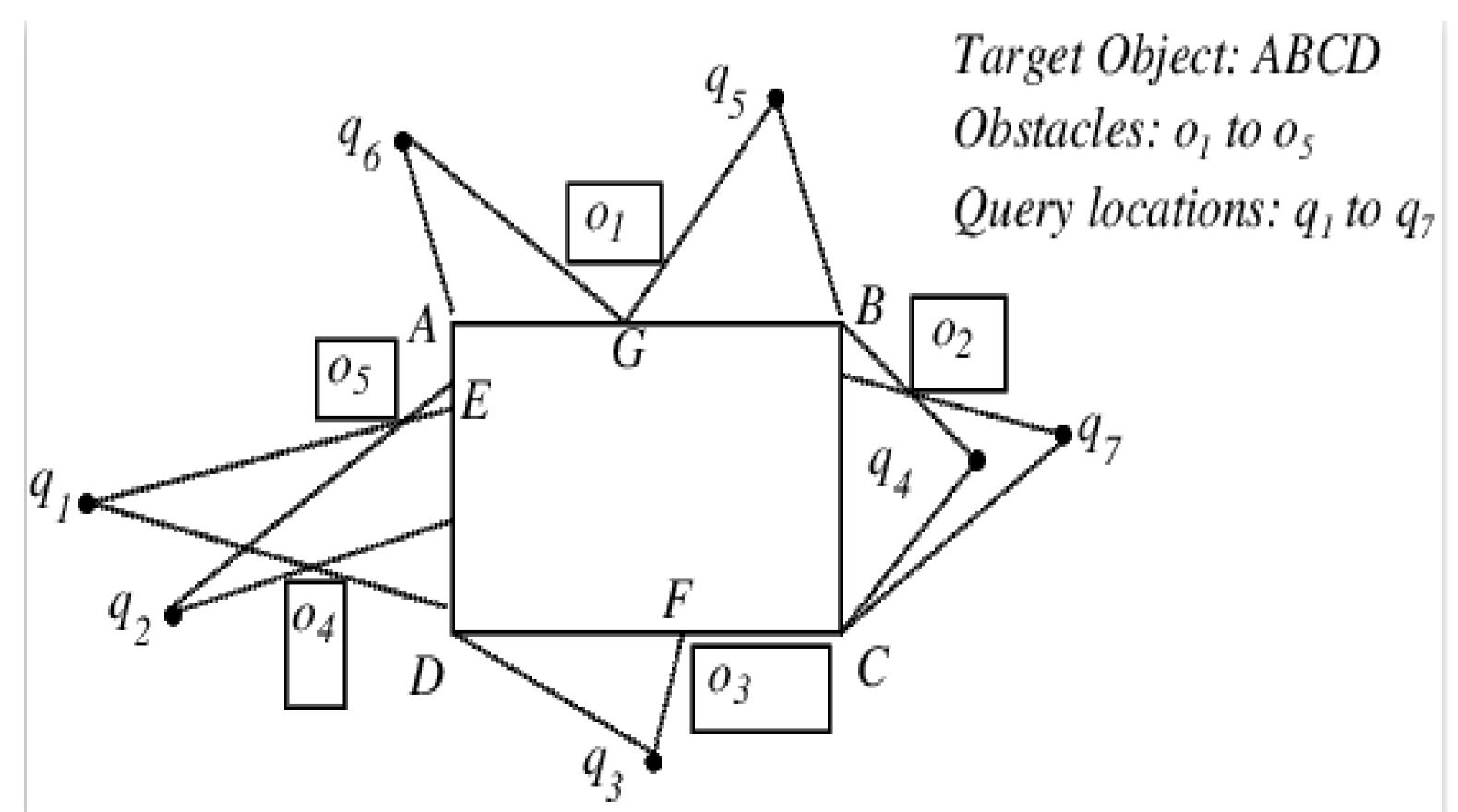5. MLV queries are extracted form portion transactions by apriori-based pruning strategy and coverage patterns.

OBJECTIVE

In case of many applications like Defence-related surveillance, online war-craft games and identifying interesting spots in tourists places a set of locations may be more effective than just individual locations towards maximizing the visibility of the given target object where the existing approaches identify individual locations for maximizing the visibility of target object. The main objective of tis paper is to addresses the problem of determining top-k candidate sets of query locations from which the visibility of a given target object can be maximized in the presence of obstacles.

Target Object: $ABCD$
Obstacles: o_1 to o_5
Query locations: q_1 to q_7

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