Re-CoSKQ: Towards POIs Recommendation Using Collective Spatial Keyword Queries (Position Paper)

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Introduction and goals

- Interest of recommender systems in mobile computing scenarios

- The location is a key spatial attribute:

Can techniques from the field of spatial databases help?

→ Explore the potential use of **Collective Spatial Keyword Querying (CoSKQ)**

Collective Spatial Keyword Querying (CoSKQ)

- Retrieve spatial objects that match the user preferences given:
  - Specific locations (of the user and also of the objects)
  - A set of keywords

- Use of IR-tree data structures (balanced trees that allow indexing objects and keywords)
- Exact solutions (NP-complete) + heuristics

Proposal: Re-CoSKQ for the recommendation of POIs

- Semantic coverage of the query keywords
  - No exact match required

- Minimize the cost:
  - Distance to get to the POIs
  - Similarity between the query and the descriptions of items

Examples of Cost Functions

$$cost(q, \mathbb{O}') = \alpha \cdot \max_{o \in \mathbb{O}'} [dist(q.\lambda, o.\lambda)] + \beta \cdot \max_{o_1, o_2 \in \mathbb{O}'} [dist(o_1, o_2)] + \omega \cdot \max_{k_1 \in q.\kappa, k_2 \in \cup_{o \in \mathbb{O}'} o.\kappa} [dist(k_1, k_2)]$$

← TYPE 1 – COMB

$$cost(q, \mathbb{O}') = \max \left\{ \alpha \cdot \max_{o \in \mathbb{O}'} [dist(q.\lambda, o.\lambda)], \beta \cdot \max_{o_1, o_2 \in \mathbb{O}'} [dist(o_1, o_2)], \omega \cdot \max_{k_1 \in q.\kappa, k_2 \in \cup_{o \in \mathbb{O}'} o.\kappa} [dist(k_1, k_2)] \right\}$$

← TYPE 2 – MAX

$$cost(q, \mathbb{O}') = \alpha \cdot \min_{o \in \mathbb{O}'} [dist(q.\lambda, o.\lambda)] + \beta \cdot \max_{o_1, o_2 \in \mathbb{O}'} [dist(o_1, o_2)] + \omega \cdot \max_{k_1 \in q.\kappa, k_2 \in \cup_{o \in \mathbb{O}'} o.\kappa} [dist(k_1, k_2)]$$

← TYPE 3 – MIN-MAX

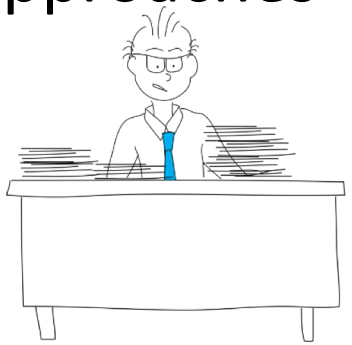
$$cost(q, \mathbb{O}') = \left[\left(\alpha \cdot \left(\sum_{o \in \mathbb{O}'} (dist(q.\lambda, o.\lambda))^{\phi_1} \right)^{\frac{1}{\phi_1}} \right)^{\phi_2} + \left(\beta \cdot \max_{o_1, o_2 \in \mathbb{O}'} dist(o_1, o_2) \right)^{\phi_2} + \left(\omega \cdot \max_{k_1 \in q.\kappa, k_2 \in \cup_{o \in \mathbb{O}'} o.\kappa} dist(k_1, k_2) \right)^{\phi_2} \right]^{\frac{1}{\phi_2}}$$

← TYPE 4 – UNIFIED COST FUNCTION

Current and Future Work

- Implementation of the evaluation proposal

- Evaluation of the performance and feasibility/benefits, comparison with other LARS
- Tuning and consideration of alternative functions
- Extensions: dynamic weights for cost functions, etc.
- Consider combining it with other pure RS approaches



THANK YOU...

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