

Preface

The capability of database has been significantly improved over the decades. However, the usability of database is far from meeting users' requirements. This book covers a comprehensive overview of preference query analysis and optimization, which is the key tactic for improving database usability. It is worth mentioning that this book spotlights on two representative preference queries, i.e., the reverse top- k query and the reverse skyline query.

The three key problems of preference query result analytics include: *causality and responsibility problem*, *why-not and why questions*, and *why-few and why-many questions*. This book elaborates four aspects of preference query analysis and optimization, including: (i) causality and responsibility problem: If preference query results include users' unexpected objects or users' expected objects do not appear in the preference query results, the users may want to know what causes the appearance of the unexpected objects and/or what causes the absence of the expected objects. Toward this, we explore the causality and responsibility problem on probabilistic reverse skyline queries. (ii) Why-not and why questions: Usually, the users would also like to know how to obtain expected preference query result objects and/or exclude unexpected preference query result objects. In view of this, we investigate the why-not and why questions on reverse top- k queries. (iii) Why-few and why-many questions: In real applications, preference queries might return too few (even empty) or too many answer objects to users. To this end, we study the why-few and why-many questions on reverse skyline queries. (iv) We develop an interactive system, termed as IS2R, to analyze unexpected reverse top- k query results. Based on the feedbacks from users, the system offers the explanations of the unexpected reverse top- k query results as well as the suggestions on how to get the expected reverse top- k query results, to the users, including (a) to contain the expected objects in reverse top- k query results, (b) to remove the unexpected objects from reverse top- k query results, (c) to increase the reverse top- k query result objects, and (d) to reduce the reverse top- k query result objects.

This book is aimed toward the readers with an interest in database usability. It provides researchers and postgraduates a comprehensive overview of the general concepts and techniques for preference query analysis and optimization. This book

can be an introductory book for the newcomers in the related research areas. Moreover, it is also able to help practitioners and developers to improve the usability of the database.

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