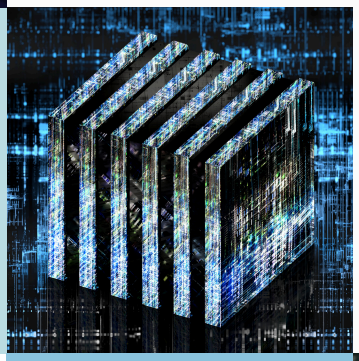
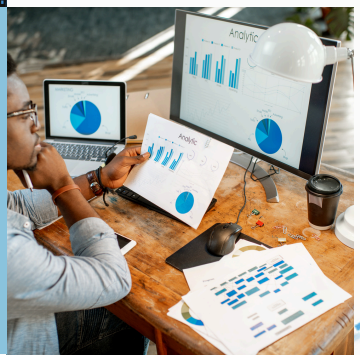
# Materialized View Selection in Multidimensional Model

Dr. Ajay Kumar Phogat





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# Materialized View Selection in Multidimensional Model

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# Abstract

The performance of OLAP queries in a data warehouse can be enhanced by view materialization, which is a powerful technique. But if every potential viewpoint is realized beforehand, the issue of space scarcity arises. Effective data warehousing depends on lowering query times by choosing the right set of materialized views at a reduced cost. When views are materialized, the expenses associated with creating, querying, and maintaining a data warehouse must also be considered.

Data cubing in a huge data warehouse application is difficult since it has multiple dimensions so each dimension has multi hierarchy levels. A business's performance depends on its ability to respond quickly and accurately. The query process time is critical for effective commercial applications because it allows quick access to data in big databases, mainly networked databases. Data cube computes the aggregates along all possible combinations of dimensions. In this book author have proposes data cube computation algorithm for efficient view selection in multidimensional model. The proposed algorithm provides formal analysis leading toward detection of an optimal path for any two given valid pair of cuboids at different levels. A Comparative analysis of multidimensional model structures such as Traditional Lattice and Hyper-Lattice has been done in which we found that hyper lattice structure is more flexible and also a storage economic structure compare to traditional structure as less cuboids are generated at every level in lattice when we add new dimension in the structure. An algorithm based on the brute force approach proposed for view selection that guarantees the problem of view selection with the worse run time complexity O(2n) has been proposed. MinCostPath algorithm has been proposed for optimal path selection in hyper lattice structure for view selection that can respond to huge query. An algorithm for data cube computation is proposed that takes less computation time than MR Cube algorithm in serial processing environment and also simulated and observed.

# Preface

The book explores several aspects of materialized view selection in multidimensional model and analyzes various multidimensional model features within the context of a data warehouse.

The first chapter includes the brief information about the background, applications, problems faced in data cube computaion. The different types of multidimensional structures are discussed in this chapter. This chapter also includes the various approaches of view selection.

The second chapter presents the literature survey and different approaches proposed by authors are discussed. This chapter focuses on methodologies that are used in data cube computation. The different attributes & constraints for view selection is also discussed that used for materialization. Comparative study of various view selection methods are also discussed.

The third chapter present the features of multidimensional model & data cube concept. An algorithm is proposed for dynamic construction of lattice of cuboid according to the number of dimension in this paper. Dimensions may be increase or decrease as per business requirement.

The third chapter includes the attribues of hyper lattice structure. A breif comparative analysis is done for data cube computation. After analysis be conclude that hyper lattice strucute has more advantages over traditional lattice strucute. As when add new dimension in the structure than traditional strucure becomes almost double but in case of hyper lattice we have add new dimension easily without exapanding the structure so much, so it resolve the problem of storage.

In this chaper logical & conceptual structure of hyper lattice sructure has been discussed. An algorithm is proposed for efficient data cube computaion has been proposed for view selection in hyper lattice stucture. In the lattice

structure various map reduction methods are widely used for data cube computation. We have poposed lowest first approach that work efficiently in a single thread environment compare to MR Cube algorithm.

The last chapter gives a discussion on the concluding remarks and a brief of some points related to future directions of the research.

# Acknowledgment

It gives me an immense pleasure and full satisfaction in expressing my sincere gratitude and heartfelt thanks for I am indeed indebted not only to one but various individuals. I have been helped and supported by my family, friends, and colleagues. I express my gratitude to one and all for their extensive support in the endeavor.

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**Ajay Kumar Phogat**

# Table of Contents


| | | |
|---|---|---|
| **Abstract** | | **IV** |
| **Preface** | | **V - VI** |
| **Acknowledgment** | | **VII** |
| **Table of Contents** | | **VIII - X** |
| | **Title of Chapters** | **Page No.** |
| | **UNIT 1** | |
| 1.1 | *Introduction* | 1 |
| 1.2 | *Data Warehouse* | 1 - 2 |
| 1.3 | *Data Warehouse Extract Transform and Load (ETL) Process & Architecture* | 3 - 5 |
| 1.4 | *Multidimensional Modeling* | 6 - 12 |
| 1.5 | *Online Analytical Procesing (OLAP) Operations* | 12 - 14 |
| 1.6 | *Data Mining (DM) Concept* | 14 - 18 |
| 1.7 | *Data Cube Materialization* | 18 - 19 |
| | **UNIT 2** | |
| 2.1 | *Introduction* | 20 - 21 |
| 2.2 | *Conceptual Multidimensial Modelling* | 21 - 27 |
| 2.3 | *Materialized Views Selection and Maintainance in Data Warehouse* | 27 - 28 |
| 2.4 | *Challenges in Materialization View Selection* | 28 |
| 2.5 | *Classification Of Materialization View Selection Approaches* | 28 - 33 |

## UNIT 3


| | | |
|---|---|---|
| 3.1 | *Introduction* | 34 - 35 |
| 3.2 | *Related Work* | 35 - 36 |
| 3.3 | *Mathematical Concept of Lattice and its Structure in Data Warehouse* | 36 - 38 |
| 3.4 | *Proposed Algorithm for Cuboid Construction* | 38 - 40 |
| 3.5 | *Implementation of Lattice of Cuboid & Results* | 40 - 41 |
| 3.6 | *View Selection in Lattice Structure Using Brute Force Approach* | 41 - 44 |


## UNIT 4


| | | |
|---|---|---|
| 4.1 | *Introduction* | 45 - 47 |
| 4.2 | *Related Work* | 47 - 49 |
| 4.3 | *Hyper-Lattice Structure in Data Warehouse* | 49 - 51 |
| 4.4 | *Proposed Framework for Data Cube Computation in Hyper Lattice* | 52 - 53 |
| 4.5 | *Comparative Analysis - Traditional Lattice Vs Hyper Lattice* | 54 - 55 |
| 4.6 | *Data Cube Computation in Hyper Lattice Stucture* | 55 - 58 |
| 4.7 | *Use of Hyper-Lattice for Efficient Query Processing* | 58 |
| 4.8 | *Selection of Minimal Cost Path in Hyper Lattice of Cuboid* | 59 - 60 |
| 4.9 | *Implementation of algorithm* | 60 - 62 |
| 4.10 | *Conclusion & Future Scope* | 63 |

## UNIT 5


| | | |
|---|---|---|
| 5.1 | *Introduction* | 64 - 67 |
| 5.2 | *Related Work* | 67 - 68 |
| 5.3 | *State Ofart* | 69 - 70 |
| 5.4 | *Lowest First Approach* | 70 - 75 |
| 5.5 | *Proposed Algorithm* | 75 - 78 |
| 5.6 | *Implementation and Results* | 78 - 79 |
| 5.7 | *Conclusion* | 80 |


## UNIT 6


| | | |
|---|---|---|
| 6.1 | *Summary* | 81 |
| 6.2 | *Contribution of the Book* | 81 |
| 6.3 | *Future Work* | 82 |

**REFERENCES** 83 - 95

## ABOUT THE AUTHOR

**Dr. Ajay Kumar Phogat** is working as an Assistant Professor in Maharaja Surajmal Institute (Affiliated to GGSIPU, Dwarka, New Delhi). He has 16 years of teaching experience in various institutions. He did his Ph.D. & M.Tech in Information Technology from University School of Information Communication Technology, GGS Indraprastha University. He has published research papers in ESCI & Scopus journals & presented research papers in various National & International conferences. His areas of interest are Programming languages, Algorithms, DBMS and Data Mining & Data Warehouse.

## ABOUT THE BOOK

Database and data warehouse applications deal with huge amount of data. In real life applications managing this huge amount of data is a big challenge. This book is designed to discuss the data models and various materialization techniques to overcome the problem of access time & storage space in data warehouse.

The different types of multidimensional structures are discussed in this book and compared the architecture of the models. Optimal view selection algorithm were discussed and proposed in this book for better decesion support systems. Optimizations techniques are required to reduce the space and time constraint. In this book author have proposes data cube computation algorithm for efficient view selection in multidimensional model. The proposed algorithm provides formal analysis leading toward detection of an optimal path for any two given valid pair of cuboids at different levels. A Comparative analysis of multidimensional model structures such as Traditional Lattice and Hyper-Lattice has been done in which we found that hyper lattice structure is more flexible and also a storage economic structure compare to traditional structure as less cuboids are generated at every level in lattice when we add new dimension in the structure.

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