INSIGHT STUDY OF VARIOUS MODEL USED FOR ONLINE ANALYTICAL PROCESS

A Thesis

Submitted towards the Requirement for the Award of Degree of

DOCTOR OF PHILOSOPHY

IN

COMPUTER SCIENCE AND APPLICATION

Under the Faculty of Computer Science and Application

By

ANJANA YADAV
(Enrollment No – 161595506208)

Under the Supervision of

Dr. Balveer Singh
Professor, Department of Computer Science &Application
P.K. UNIVERSITY

2023
P.K. University
NH-27, Village. Thanra (P.O. - DINARA),
Shivpurii M.P. India–473665
www.pkuniversity.edu.in

CERTIFICATE OF THE SUPERVISOR

This is to certify that the work entitled **"Inside Study of Various Model used for Online Analytical Process"** is a piece of research Work done by Smt. Anjana Yadav Under my Guidance and Supervision for the degree of Doctor of Philosophy of Computer Science and Application, P.K. University (M.P) India.

I certify that the candidate has put an attendance of more than 240 day with me. To the best of my Knowledge and belief the thesis:

I – Embodies the work of the candidate himself/herself.

II – Has duly been completed.

III – Fulfill the requirement of the ordinance relating to the Ph.D. degree of the University.

Signature of the Supervisor

Date: ……...

P.K. University

(University established under section 2f of UGC act 1956 vide mp government act no 17 of 2015)

NH-27, Village. Thanra (P.O.-DINARA), Shivpurii M.P. India–473665

DECLARATION BY THE CANDIDATE

I declare that the thesis entitled **"Inside Study of Various Model used for Online Analytical Process**" is my own work conducted under the supervision of **Dr. Balveer Singh** Supervisor at P. K. University, Shivpuri Approved by Research Degree Committee. I have put more than 240 days of attendance with Supervisor at the center.

I further declare that to the best of my knowledge the thesis does not contain my part of any work has been submitted for the award of any degree either in this University or in any other University Without proper citation.

Signature of the candidate

Date: ……
Place: ……..

FORWARDING LETTER OF HEAD OF INSTITUTION

The Ph.D. thesis entitled **"Inside Study of Various Model used for Online Analytical Process**" Submitted by **Smt. Anjana Yadav** is forwarded to the university in six copies. The candidate has paid the necessary fees and there are no dues outstanding against him/her.

Name …… Seal
……..

Date: ……

Place: ……... ……...

(Signature of Head of Institution where
the Candidate was registered for Ph.D degree)

Signature of the Supervisor Date:

Date: …….. Address: ……..

Place: ……. …….

……

ACKNOWLEDGEMENT

I take this opportunity to express my gratitude and sincere thanks to **Dr. Balveer Singh**, Professor Department of Computer Science and Application ,P. K. University, Shivpuri, for his able guidance, valuable help enthusiastic attitude and suggestions throughout the period of my research work. I am very fortunate for having the opportunity to work under him. He had been a perennial source of inspiration and his guidance helped me to find the ways through hurdles.

I am indeed grateful to **Dr. Jitendra Kumar Mishra,** Director, P. K. University, Shivpuri, for providing the necessary facilities, infrastructure and encouragement for completion of thesis work.

I would not complete my duty if I omit to pay my sincere gratitude to all the persons, friends and relatives, who have directly or indirectly helped me in the completion of this work.

ANJANA YADAV
Enrollment No – 161595506208

"LIST OF ABBREVIATION"

ACO	-	Ant Colony Optimization
ALO	-	Ant Lion Optimization
CF	-	Configuration
CS	-	Consistency
DFOC	-	Dragon Fly Optimization based Clustering
ER	-	Entity Relationship
ETL	-	Extraction Transformation Loading
FA	-	Foodstuff sources Appeal
FFO	-	Fruit Fly Optimization
GA	-	Genetic Algorithm
GWO	-	Grey Wolf Optimization
HOLAP	-	Hybrid Online Analytical Process
HTML	-	Hyper Text Mark-up Language
IoMT	-	Internet of Medical Things
IoT	-	Internet of Thing
IT	-	Information Technology
K-SSOC	-	KMeans-Salp Swarm Optimization based Clustering
KPIs	-	Key Performance Indicators
MAC	-	Multidimensional Aggregation Cube
MATLAB	-	Matrix Laboratory
MOLAP	-	Multi-dimensional Online Analytical Process
MS	-	Maintenance Spending
OE	-	Opponent Escaping
OLAP	-	Online Analytical Process
OLTP	-	Online Transactional Processing
PDF	-	Portable Document Format
PSO	-	Particle Swarm Optimization
RDBMS	-	Relational Data Base Management System
ROLAP	-	Relational Online Analytical Process
SBI	-	Social Business Intelligence

SQL	-	Structured Query Language
SR	-	Standard Severance
UML	-	Unified Modeling Language
WMS	-	Whole Maintenance Spending
WQS	-	Whole Query Spending
WSF	-	Whole Maintenance Function
XML	-	Extensible Mark-up Language

"LIST OF TABLES"

"LIST OF FIGURES"

COURSE WORK CERTIFICATE

This is to certify that **AnjanaYadav**(Enrollment No.161595506208) D/O Mr.J.C.Yadav,Scholar of the Ph.D in Department Of Computer Science and Application Under the faculty of Computer Science and Application has successfully passed the course work examination with 'A' grade from P.K.University, Shivpuri (M.P.).

Registrar
P.K.University
Shivpuri (M.P.)

PLAGIARISM REPORT FROM THE CENTRAL LIBRARY

CERTIFICATE OF PLAGIARISM REPORT

1. Name of the Research Scholar	:	Anjana Yadav
2. Course of Study	:	Doctor of Philosophy (Ph.D)
3. Title of the Thesis	:	Inside Study of Various Model used for Online Analytical Process
4. Name of the Supervisor	:	Dr. Balveer Singh
5. Department	:	Computer Science and Application
6. Subject	:	Computer Science
7. Acceptable Maximum Limit	:	10% (As per UGC Norms)
8. Percentage of Similarity of Contents Identified	:	0%
9. Software Used	:	Original (Formerly URKUND)
10. Date of Verification	:	

Signature of Ouriginal Coordinator
(Librarian, Central Library)
P.K.University, Shivpuri (M.P.)

COPYRIGHT TRANSFER CERTIFICATE

Title of the Thesis: Inside Study of Various Model used for Online Analytical Process

Candidate's Name: Anjana Yadav

COPYRIGHT TRANSFER TO

The undersigned hereby assigns to the P.K. University, Shivpuri all copyrights that exist in and for the above thesis submitted for the award of the Ph.D. degree.

Date:

Anjana Yadav

Name of the scholar

Note: However, the author may reproduce/publish or authorize others to reproduce, material extracted verbatim from the thesis or derivative of the thesis for author's personal use provided that the source and the University's copyright notice are indicated.

"ABSTRACT"

The Online Analytical Processing (OLAP) based Multidimensional examination hassles for several stockpiling magnificence over huge data. For as much to recognize queries answering time companionable by OLAP framework users and understanding entire business perceive mandatory, OLAP data is structured as a data cube (a multidimensional model). The OLAP queries are responded in speedy and steady time by utilizing the cube materialization for assessments takers. But, this also involves unendurable expenses, regarding to stockpile memory and period, and as a data depot, OLAP has an average dimension and dimensionality which is to be significant on query processing. Consequently, cube assortment has got to be finished motivating to diminish inquiry management expenses, maintaining as a restraint the materializing gap. Several techniques and heuristics like deviationist and insatiable algorithms have been utilized to offer an estimated result. In this work, a Fruit Fly Optimization (FFO) approach is implemented in a lattice structure to obtain an optimal materialized data cube for reducing the query processing expenses. The results illustrate that FFO generates better performance than Particle Swarm Optimization (PSO) in terms of frequency and number of dimensions.

The data cube assessments dependent on Online Analytical Processing (OLAP) trouble for numerous depositing splendors over broad information. In favor of appreciating question answering era pleasant with OLAP skeleton patrons and allowing complete industry organized notice compulsory, OLAP information is organized as a data cube model. The OLAP questions are answered in rapid and sturdy time by exploiting the cube embodiment for appraisals buyers. Until now this moreover insets insupportable charge, concerning to accumulation remembrance and time, yet as a data storage area had a typical length and extent which will be influential on stimulating procedure. Thus, cube classification has visited to be refined fascinating to moderate question managing charge, preserving as a control the materializing breach. Numerous strategies and heuristics like divergence and voracious approaches have been exploited to suggest a vague solution. Here, a Grey Wolf Optimization (GWO) strategy is exploited in a lattice structure for finding the best data cube to decrease the question processing charge. The outputs describe the superior efficiency of GWO against GA, PSO and ALO based on total dimensions and frequency.

Medicine is a fresh way to utilize for curing, analyzing and detecting the diseases through data clustering with OLAP (Online Analytical Processing). The large amount of multidimensional clinical data is reduced the efficiency of OLAP query processing by enhancing the query accessing time. Hence, the performance of OLAP model is improved by using data clustering in which huge data is divided into several groups (clusters) with cluster heads to achieve fast query processing in least time. In this chapter, a Dragon Fly Optimization based Clustering (DFOC) approach is proposed to enhance the efficiency of data clustering by generating optimal clusters from multidimensional clinical data for OLAP. The results are evaluated on MATLAB 2019a tool and shown the better performance of DFOC against other clustering methods ACO, GA and K-Means in terms of intra-cluster distance, purity index, F-measure, and standard deviation.

The performance of query processing over OLAP (Online Analytical Processing) model is decreased due to higher query access time for huge multidimensional data. Therefore, the clustering is introduced to improve the OLAP model efficiency by getting quick query processing because of dividing the large data into various clusters. The K-Means is a famous technique of clustering the data into groups to solve various real life issues. However, K-Means has some drawbacks like sensitivity to primary centroid assortment in cluster and local optimum convergence. Hence, a KMeans-Salp Swarm Optimization based Clustering (K-SSOC) is implemented to improve the performance of K-Means by providing optimal clustering over huge OLAP multidimensional data. The outcomes are obtained on MATLAB 2019a environment based on the parameter purity index, standard deviation, F-measure, intra-cluster distance and running time complexity over 1000 iterations. The results illustrate the superior performance of K-SSOC against K-Means, ACO and PSO over total six multidimensional datasets based on parameters.

"TABLE OF CONTENTS"