CHAPTER-II

REVIEW OF LITERATURE
2.1. REVIEW

This Chapter deals with Review of Literature along with identification of the problem in the current work, together with the proposed methodology to address some of the issues.

**Dayong Deng et al (2006)[8]**, defined a new Discernibility Matrix and Function between two Decision Tables. They are extension of Hu’s improved Discernibility Matrix and Function. The Method of new Discernibility Matrix and Function may be applied to the cases of large amount of data and incremental data.

**Dayong Deng et al (2009)[10]**, presented a new type of attribute Reducts in a Decision System, which is called Parallel Reduct. The Parallel Reduct is the extension of both Pawlak reduct and Dynamic Reduct. It could be counted by parallel computation, and could be applied to tremendously large data and increased data can be just like Dynamic Reducts, but Parallel Reducts are obtained easily than Dynamic Reducts.

**Dayong Deng et al (2006)[11]**, investigated the dynamic characteristics in an incomplete decision system while information is increasing. They modified the definition of reduction of conditional attributes in this case,
and presented algorithms of reduction in order to deal with increased information.

Dai Jian-hua et al (1977)[12], introduced Heuristic information into Genetic Algorithm, and proposed a Heuristic Genetic Algorithm. In the Genetic Algorithm, they constructed a new operator for maintaining the classification ability. Their experiment showed the proposed algorithm is efficient and effective for minimal reduct, even for the special example that the simple Heuristic Algorithm can’t get the right result.

Xu Linzhang et al (2008)[60], introduces Genetic Algorithm-based Rough Set attribute reduction algorithm into the job of taxation attribute reduction. Their method optimizes the configuration of fitness function, improves the convergence of original algorithm and changes the limitation of current attribute reduction in Genetic Algorithm. Their algorithm fundamentally realizes the selection of comparatively small attribute sets with the presupposition that the data classification ability is not changed. It is valid after being tested.

Li Yurong et al (2006)[38], discussed a Hierarchical Reduction Algorithm of Rough Sets Theory. According to the acquisition mode, cost and the real time requirement, the attributes are classified into different parts allocated at several layers in this algorithm. So the knowledge can be presented hierarchically with multiple granularities at multiple layers. And the
reduction can hierarchically be applied to part of attributes allocated at each layer instead of all attributes at only one layer. The Hierarchical Reduct, derived by hierarchical reduction, can solve the problem with coarser granularity at lower layer, avoiding solving problem with finer granularity at deeper layer, where the incompleteness exists. The application of this algorithm to complete and incomplete system are discussed. At the same time, examples are given, showing the validity and practicability of this algorithm. Furthermore, the information theory basis of this algorithm is put forward and some propositions are proved. Based on these, the relation between information entropy, knowledge granularity and layer is revealed, which help to grip the essence of the algorithm.

Yuan Zhang et al(2008)[62], presented Hierarchical Attributes in decision tree, designed an optimize algorithm of decision tree based on Rough Sets. Hierarchical attributes which work by combining the hierarchical attribute values and deleting the associated objects when max rules exist in Decision Table. They developed algorithm can abstract the simplest rule set that can cover all information for Decision making. A real example is demonstrated with its feasibility and efficiency.

Yuan Junpeng et al(2006)[21], discussed the concept Hierarchy, introduced a new kind of knowledge representation into the system of Data mining which can help transfer the concept hierarchy into a range of
Decision Tables. While taking into account the relationship among the nodes at different levels of a concept hierarchy, they further proposed a hierarchical reduction algorithm which can be used for the reduction of both attributes and values in the Decision Tables. At the same time to theoretically prove the rationality of the algorithm, they furthermore proved its efficiency and reliability with an empirical study of the Micro-Electro-Mechanical system.

Haijun Wang et al (2007) [19], an introduced Heuristic Attribute Reduction algorithm based on that attribute frequency is presented. They analyzed many other attribute reduction algorithms, utilized the Discernibility Matrix and the appeared attribute frequencies to determine each attribute's significance, based on the principle of maximum attribute frequency, they achieved the reduction of the information system. An illustrative example is demonstrated with the algorithm's effectiveness and validity.

Fang Jin et al (2010) [15], presented a Rank Approach based on projection model to deal with Multiple Attribute Decision-Making [MADM] problems under risk and with attribute value as Continuous Random Variable on bounded intervals. Firstly, Risk decision matrix is normalized by density function, and weights of attributes are calculated based on exception value of Random Variable by using projection pursuit model and Genetic Algorithm. Next, through calculating weighted correlation coefficients...
between alternatives and ideal solutions, weighted grey correlation projection models on ideal solutions are developed by Grey Correlation Projection Method for every alternative. Furthermore, alternatives are ranked by Grey Correlation Projection Value. Finally, an MADM example with interval numbers is provided to demonstrate the steps and effectiveness of the proposed approach.

K. Thangavel et al (2009)[28], focused on the review of the techniques for Dimensionality Reduction under Rough Set Theory environment. Further, they have reviewed Rough Sets hybridization with Fuzzy Sets, Neural Network and Mataheuristic Algorithms. The performance analysis of the algorithms has been discussed in connection with the classification.

Moussa Boussouf et al (2001)[43], presented scalable feature selection using Rough Set Theory. They proposed a scalable algorithm to find a set of reducts based on Discernibility function, which is an alternative solution for the exhaustive approach. Their study showed that their algorithm improves the classical one from three points of view: Computation Time reducts size and the Accuracy of induced model.

Roman W. Swiniarski et al (2003)[55], presented applications of Rough Set Methods for feature selection in pattern recognition. They emphasized the role of the basic constructs of Rough Set Approach in feature selection,
namely reducts and their approximations, including Dynamic Reducts. In the overview of methods for feature selection, they discussed feature selection criteria; including the Rough Set based Methods. The algorithm for feature selection is based on an application of a Rough Set Method to the result of Principal Components Analysis (PCA) used for feature projection and reduction. Finally, they have presented numerical results of face and Mammogram Recognition Experiments using Neural Network, with feature selection based on proposed PCA and Rough Set Methods.

Ming Yang et al(2008)[42], discussed a novel condensing tree based Genetic Algorithm for attribute reduction. To efficiently reduce space complexity of a Discernibility Matrix, a compact structure, the so-called "Condensing Tree" (denoted by C-Tree for short ), was introduced, and two efficiently Heuristic Algorithms based on C-Tree for attribute reduction were presented, but the previously proposed algorithms only obtain one attribute subset. So they presented, a novel Condensing Tree Based Genetic Algorithm for attribute reduction. The new algorithm not only obtain multiple effective attribute sets, but also can sufficiently use the compactness of C-Tree, hence has high efficiency. Their theoretical analysis and experimental results showed that the algorithm has better or comparable performance on the six UCI benchmark Data sets than that directly based on Discernibility Matrix.
Jan G. Bazan et al (1996) [3], investigated a problem on how information about the Reduct Set changes in a Random Sampling Process of a given Decision Table could be used to generate these laws. The reducts stable in the process of decision table sampling are called Dynamic Reducts. Dynamic reducts define the set of attributes called the dynamic core. This is the set of attributes included in all Dynamic Reducts. The set of decision rules can be computed from the Dynamic Core or from the best Dynamic Reducts. They report the results of experiments with different Data Sets, e.g. market data, medical data, textures and handwritten digits. The results are showing that Dynamic Reducts can help to extract laws from Decision Tables.

Hongru Li et al (2006) [20], investigated the attribute reduction in Decision Systems based on a congruence on the power set of attributes and present a method of determining congruence classifications. They obtained the reducts of attributes in decision systems by using the classification. Moreover, they proved that the reducts obtained by the congruence classification coincide with the distribution reducts in Decision Systems.

Jing Liu et al (2008) [25], described theory of Concept Lattice as an efficient tool for knowledge representation and knowledge discovery. One of the key problems of knowledge discovery is attribute reduction. They proposed a novel approach to attribute reduction in formal concept lattices.
Their approach employs all the extents of the meet-irreducible elements in the lattice. Each of them determines a family of attribute sets common to the objects in the extent. By various combinations of minimal elements from each family we can produce reducts of the formal context. Furthermore, a related algorithm is developed, and an illustration example is employed to perform the reduction process of the proposed method.

**G.Ganesan et al (2007)[18]**, describes that Janusz Starzyk developed an algorithm for computing Reducts using strong equivalence and the law of expansion on the data, and implementation of this algorithm is cumbersome for huge volumes of data. They developed a technique for obtaining the reduct of the entire system by partitioning it into two with respect to records and obtaining the reducts of the two subsystems and the ‘between reducts’. Further, they also deal with a technique for combining the reducts computed at the clients to obtain global reducts.

**Domini k slezak (2002)[9]**, presents Information Entropy Measure to extend the Rough Set based notion of a Reduct by introducing the Approximate Entropy Reduction Principle (AERP). It states that any simplification (reduction of attributes) in the Decision Model, which approximately preserves its conditional entropy (the measure of inconsistency of defining decision by conditional attributes) should be performed to decrease its prior entropy (the measure of the model's
complexity). It showed NP-hardness of optimization tasks concerning application of various modifications of AERP to data analysis.

Gexiang Zhang et al (2007)[17], stated existing discretization methods cannot process continuous interval-valued attributes in Rough Set Theory. They extended the existing definition of discretization based on cut-splitting and gave the definition of generalized discretization using class-separability criterion function firstly. Then, a new approach was proposed to discretize continuous interval-valued attributes. The introduced approach emphasized on the class-separability in the process of discretization of continuous attributes, so the approach helped to simplify the classifier design and to enhance accurate recognition rate in pattern recognition and machine learning. In the simulation experiment, the decision table was composed of 8 features and 10 radar emitter signals, and the results obtained from discretization of continuous interval-valued attributes, reduction of attributes and automatic recognition of 10 radar emitter signals show that the reduced attribute set achieves higher accurate recognition rate than the original attribute set, which verifies that the introduced approach is valid and feasible.

Xiangyang Wang et al (2008)[61], proposed a new algorithm to find Minimal Rough Set Reducts by using Particle Swarm Optimization (PSO). Like Genetic Algorithm, PSO is also a type of evolutionary algorithm. But
compared with GA, PSO does not need complex operators as crossover and mutation that GA does, it requires only primitive and simple mathematical operators, and is computationally inexpensive in terms of both memory and times. The experiments on some UCI data compare the algorithm with GA-based, and other deterministic Rough Set Reduction Algorithms. Their results show that PSO is efficient to minimal rough set reduction.

Robert Susmaga(2002)[53], Suggests that for a given data set, in which some pre-defined objects are described in terms of numerous parameters, the idea is to obtain a more compact description of these objects. As there are no universal descriptions for all possible applications, the idea is to focus on a description that is advantageous from a particular point of view, e.g. represented in the form of a consistency condition. Such a description may be created when sparse/redundant attributes are identified and eliminated from the data. In its classic form, reducts are minimal subsets of attributes that retain the consistency condition. He introduces the idea of constructs, in which the condition is modified so that the construct should manifest even better properties than those of reducts.

Jie Zhou et al(2009)[26], give an Algorithm Reduct of Boolean Functions Based on Primes. Based on the decomposition principles of a Discernibility Function, a complete algorithm ‘CAMARDF’ for finding a minimal reduct is put forward in this paper. Since it depends on logical reasoning, it can be
applied for all Decision Tables after their Discernibility Functions constructed reasonably. The efficiency of \textit{CAMARDF} is illustrated by experiments with UCI data sets further.

\textbf{A. A. Bakar et al (2002)}\cite{6}, proposed an algorithm in finding minimal reducts based on Propositional Satisfiability (SAT). A branch and bound algorithm is presented to solve the proposed SAT problem. Their experimental result showed that the proposed algorithm has significantly reduced the number of rules generated from the obtained reducts with high percentage of classification accuracy.

\textbf{Yasuo Kudo et al(2010)}\cite{35}, focus on Rough Set Theory which gives mathematical foundations of set-theoretical approximation for concepts, as well as reasoning about data. They presented the concept of Relative Reducts which is one of the most important notions for rule generation based on Rough Set Theory. From the viewpoint of approximation, they introduced an evaluation criterion for Relative Reducts and using roughness of partitions that are constructed from Relative Reducts. They proposed criterion evaluates each Relative Reduct by the average of coverage of Decision Rules based on the Relative Reduct, which also corresponds to evaluate the roughness of partition constructed from the Relative reduct.
Liqing He et al (2005)[37], proposed a new algorithm of Attribute Reducts based on Variable Precision Rough Set Theory. An improved Genetic algorithm (GA) which adopts information entropy as its fitness function was introduced. The strategy of mixed crossover and two points mutation enlarges the search scope. The cross generation elicit selection and self-adapting strategy make the Genetic Algorithm converge to the overall optimal solution stably and quickly, which gives it an edge over the normal GA. The effectiveness and the advantage with respect to the norm GA are checked through an example.

Qinghua Hu et al (2006)[49], discussed analysis on classification performance of Rough Set Reducts. They reviewed the proposed attribute reduction algorithms and reduction selection strategies. They conducted a series of numeric experiments. Their results show that, statistically speaking, the classification systems trained with the reduct with the least features get the best generalization power in terms of single classifiers. Furthermore, good performance was observed from combining the classifiers constructed with multiple reducts compared with Bagging and Random Subspace Ensembles.

Bao Y et al(2004)[64], discussed an efficient method for computing all reducts, the process of data mining of Decision Table using Rough Sets Methodology, the main computational effort is associated with the
determination of the reducts. Computing all reducts is a combinatorial NP-hard computational problem. They proposed algorithm to achieve its faster execution, with a better constant factor, which solve this problem in reasonable time for real-life data sets. They proposed two new efficient algorithms to compute reducts in information systems. The proposed algorithms are based on the proposition of reduct and the relation between the reduct and Discernibility Matrix. They conducted experiments on some real-world domains in execution time. Their results show that it improves the execution time when compared with the other methods. In real application, they combined the two proposed algorithms.

**Mikhail Ju et al (2006)[44]**, discussed the most part of binary decision tables with upper and lower bounds on the cardinality of partial Reducts and length of irreducible partial decision rules are obtained. The number of partial Reducts and the numbers of irreducible partial decision rules were evaluated. Complexity of algorithms for construction of all partial Reducts and all irreducible partial decision rules is studied on the basis of obtained bounds.

**Ning Xu et al (2008)[46]**, obtained a feasible solution, depth-first-searching is mainly used and a feasible reduct always can be obtained. Whether the feasible reduct is a minimal reduct or not and how far it is to minimal reduct, both are not known. It only gives the information that how many
attributes it has and it is a Reduct. Based on Rough Sets Reduction Theory and the Data Structure of information system, the least condition attributes to describe the system’s classified characteristics can be known. So an area of searching minimal reducts is decided. By binary search in the area, the minimal reducts were obtained quickly and doubtlessly.

K. Thangavel et al (2005)[29], presented Quick Reduct and Improved Quick Reduct Algorithms, some experiment results. The redundant attributes are eliminated in order to generate the effective reduct set (i.e., reduced set of necessary attributes) or to construct the core of the attribute set. They analyzed the efficiency of the proposed Improved Quick reduct Algorithm against the standard Quick Reduct Algorithm. Their experimental works are carried out on Medical Data Sets of UCI Machine Learning Repository and the Human Immuno deficiency Virus(HIV) Data set.

Xiangyang et al (2008)[62], attempted to solve the Particle Swarm Optimization (PSO) using a Particle Swarm Optimization approach. Their proposed approach discovers the best feature combinations in an efficient way to observe the change of positive region as the particles proceed through the search space. They evaluated the performance of the proposed PSO algorithm with Genetic Algorithm (GA). Their empirical results indicate that the proposed algorithm could be an ideal approach for solving
the feature reduction problem when other algorithms failed to give a better solution.

**Xiaohua Hu et al(2003)[63]**, discussed new approach to computing core attributes in Rough Set Theory based on relational database systems. Especially, the fundamental operators of relational algebra are used to define the necessary and sufficient conditions that an attribute is a core attribute under the condition of the data table being consistent. Furthermore, inconsistent Data Table can be easily checked out and noise data can be efficiently eliminated. With their approach, they presented an efficient and scalable algorithm for computing core attributes.

**D.Q Miao et al(2009)[13]**, described that Relative Reduct can be considered as a minimum set of attributes that preserves a certain classification property. They investigates three different classification properties, and suggested three distinct definitions accordingly. In the Pawlak Rrough Set Model, while the three definitions yield the same set of Relative Reducts in consistent Decision Tables, they may result in different sets in inconsistent tables. Relative Reduct construction can be carried out based on a Discernibility Matrix. Their study explicitly stresses a fact, that the definition of a Discernibility Matrix should be tied to a certain property. Regarding the three classification properties, they defined three distinct definitions accordingly. Based on the common structure of the specific
definitions of Relative Reducts and Discernibility Matrices, general definitions of Relative Reducts and Discernibility Matrices are suggested.

**Zhiqiang Geng et al (2009)[65]**, proposed one method that cannot handle the complex system with many attributes or features, so a hybrid mechanism is proposed based on Rough Set Integrating Artificial Neural Network (Rough-ANN) for feature selection in pattern recognition. Their Rough Set-based on the attributes reduction as the preprocessor can decrease the inputs of the NN and improve the speed of training. So the sensitivity of rough set to noise can be avoided and the system's robustness is to be improved. The RS-based heuristic algorithm was proposed for feature selection. Their approach can select an optimal subset of features quickly and effectively from a large database with a lot of features. Moreover, the validity of the proposed hybrid recognizer and solution is verified by the application of practical experiments and fault diagnosis in industrial process.

**Ravi S et al (2009)[56]** discussed Dynamic Reducts in Object-Oriented Information Systems. Class structures represent abstract data forms, and abstract structural hierarchy is based on 'has-a' relationship and 'offers-a' relationship. Object structures illustrate many kinds of objects and actual dependence among objects by 'has-a' relationship and 'offers' relationship. Name structures provide concrete design of objects, and connect class
structures and object structures consistently. In this article, the relation
taken between classes and class names is improper, and in the example it is
represented as ‘is-a’ relationship, but as such there is no is-a relationship
existing in that example given. The second problem with that article is
while finding Reducts and Dynamic Reducts, the attributes are considered
directly, if so there no difference in finding Reducts and Dynamic Reducts
in “traditional” rough set theory and Object-Oriented Information System,
since lowest level of hierarchical elements need to be considered as
equivalence classes[52] not as attributes. Reduct[31] in object-oriented
rough set models is class and class.names which is not represented in this
article which is another problem identified in that article. The discernibility
matrix used in “traditional” rough set theory is considered in this article, if
so there is no difference traditional rough set theory and Object-Oriented
Information System using rough set theory. This is also improper in this
article, as they used Discernibility Matrix in “traditional” rough set theory
but not the revised Discernibility Matrix [31]

Richard Jensen et al(2008)[54], discussed feature selection aims to
determine a minimal feature subset from a problem domain while retaining
a suitably high accuracy in representing the original features. Rough set
theory (RST) has been used as such a tool with much success. RST enables
the discovery of data dependencies and the reduction of the number of
attributes contained in a dataset using the data alone, requiring no additional
information. This article describes the fundamental ideas behind RST-based
approaches and reviews related feature selection methods that build on these ideas. Extensions to the traditional rough set approach are discussed, including recent selection methods based on tolerance rough sets, variable precision rough sets and fuzzy-rough sets. Alternative search mechanisms are also highly important in rough set feature selection. Their article includes the latest developments in this area, including RST strategies based on hill-climbing, genetic algorithms and ant colony optimization.

Yasuo Kudo et al (2006)[30], introduced object-oriented paradigm into Rough Set Theory. They provided concepts of class, object, and name, respectively. Class structures represent abstract data forms, and abstract structural hierarchy is based on ‘is-a’ relationship and ‘has-a’ relationship. Object structures illustrate many kinds of objects and actual dependence among objects by ‘is-a’ relationship and ‘has-a’ relationship. Name structures provide concrete design of objects, and connect class structures and object structures consistently. Next, they combined class, name and object structures, and proposed Object-Oriented Information Systems, which include “traditional” Information Systems as special cases. Moreover, they introduced indiscernibility relations on the set of objects, lower and upper approximations, and object-oriented rough sets in the Object-Oriented Information Systems.
Yasuo Kudo et al (2006)[31], proposed a method of Decision Rule Generation in Object–Oriented Rough Set Models. The Object–Oriented Rough Set Model is an extension of the “traditional” Rough Set Theory by introducing Object–Oriented Paradigm used in Computer Science. The Object–Oriented Rough Set Model treats objects as instances of some classes, and illustrates Structural hierarchies among objects based on ‘is-a’ relationship and ‘has-a’ relationship. They introduced decision rules in the Object–Oriented Rough Set Model, and revised Discernibility Matrices proposed by Skowron and Rausen, to generate decision rules in the Object–Oriented Rough Set Model.

Yasuo Kudo et al (2008)[32], provided a concept of characteristic combination patterns to treat characteristics about how to combine objects in the Object-Oriented Rough Set Model proved that Object-Oriented Model treats semi-structured data in the framework of Rough Sets using structural hierarchies among objects and semi-structured decision rules represent structural characteristics among objects, which enable to capture them what to combine objects. It is generally difficult to capture characteristics about how to combine objects by semi-structured decision rules. They considered how to combine objects by characteristic combination patterns.
Yasuo Kudo et al (2008)[34], introduced a concept of explicit and implicit influences of structural characteristics among classes to treat characteristics about how to combine objects in the Object-oriented rough set model proposed by the authors. The Object-oriented rough set model treats semi-structured data in the framework of rough sets by using structural hierarchies among objects, and semi-structured decision rules represent structural characteristics among objects, which enable us to capture what to combine objects. However, it is generally difficult to capture characteristics about how to combine objects by semi-structured decision rules. They considered estimating structural characteristics about how to combine objects in the Object-Oriented Rough Set Model.

2.2. Problem Definition

With brief review of literature cited above, It is evident that Reducts in the Rough Set Theory play a dominant role in data analysis. In an Object-Oriented Rough Set Model, it is possible to have many Reducts. Computing all possible Reducts is a NP-hard problem. More so when the numbers of classes are more, the Reducts in such a model will become too large.

What will be the status of these Reducts, if an arbitrary number of rows in classes, class names, and related object mapping table are deleted needs investigation. Finding true Reduct in the Object-Oriented Rough Set Model is a NP-hard problem. In such a context what will be the core,
dynamic core, \((F-\lambda)\) Dynamic Core, Generalized Dynamic core related theorems in the Object-Oriented Rough Set model are in fact some important issues which need investigation. How does the storage space needs and computational time of Disernibility Matrix will effect when rows from classes, the class names, and object mapping table are removed and the properties of thus generated new Reduct need study.

To derive Dynamic Reduct, all of Reducts in the Object-Oriented Rough Set Model must be counted from the set of Sub-Object-Oriented Rough Set Models. It is however NP-Complete. The intersection of all Reducts of Sub-Object-Oriented Rough Set Models may be empty which poses a problem. Then how to deal with the problem of empty Reduct need investigation. Algorithms need to be developed for Parallel, Core of Parallel Reducts in Object-Oriented Rough Set Model.

As the process of obtaining Parallel Reducts, Relative Reducts, Quick Reducts, Heuristic Filter-Based Approach, requires intensive computations of positive regions, how to eliminate these intensive computations need to be investigated. This may lead to development of new Class Dependencies in the Object-Oriented Rough Set Model which also need investigation.
2.3. Methodology

Reduct in Object-Oriented Rough Set Model represents classes and class.name. For obtaining Reducts, it is required to compute Discernibility Matrix, where each cell of this Matrix will be either classes or a class.name. However finding all possible Reducts in Object-Oriented Rough Set Model is NP-hard Problem.

The effect on storage space and computational complexities of Discernibility Matrix are then examined by removal of rows from classes, the class names, and object mapping table and the properties of thus generated new Reduct called Dynamic Reduct.

The process first starts by removing one class, its class name and corresponding objects in the classes, class names, and object mapping table, then a comparison will be made for the positive regions of Sub-Object-Oriented Rough Set Model. When positive regions of Sub-Object-Oriented Rough Set Model are equal, and with the same decision name and different condition names if at all there exists at least one Sub-Object-Oriented Rough Set Model whose positive region are not equal, then we the process still continues to generate new Reducts.

This paved the way to obtain what is called as Parallel Reduct in the Object-Oriented Rough Set Model.
The positive region of Object-Oriented Rough Set Model, and the corresponding objects within them, whose positive regions are equal and minimal in count will then be compared. Such corresponding classes, classes.names(names other than decision name) are taken in this work as Relative Reducts.

Then the ratio of positive region and total number of objects will be computed to find Quick Reduct.

The largest positive region is then determined by developing a procedure using Heuristic Filter–Based Approach. This algorithm will reduce number entries viz, class.names in the Reduct. Then comparisons are done on the ratio of cardinality of equivalent classes with respect to condition name to the cardinality of equivalent classes with respect to decision name. When this ratio is equal 1, the corresponding class.name(name here is other than decision name) will be removed from Reduct.

If it can determined that one class for each category of original class(which represents is-a relation between that category of class to original class)and its name and corresponding object in the classes, class names, object mapping tables is sufficient to represent Reduct in the Object-Oriented Rough Set Model. This Reduct is absolutely equivalent to number
of classes of each category of original class in classes, class names, objects in the table. So this will reduce the amount of storage space, reduce the cost of computation of Reducts when various dynamic reducts are considered in the Object-Oriented Rough Set Model.

As it is possible to generate huge number of Dynamic Reducts in the Object-Oriented Rough Set Model, and since generation of true Reduct in the Sub-Object-Oriented Rough Set Model is not possible, it is proposed to have Parallel Reduct with its properties.

Feature selection is very important aspect since it results relevant features among original features according to given selection criteria. For finding relevant features, the concept of positive regions is introduced with comparisons among them. For finding irrelevant features and for their removal from the Reduct with respect to specific selection a criterion is considered.

The validity of the proposed work will be established by the application of practical examples to examine the results inorder to determine whether the techniques proposed are effective and efficient with regard to accuracy and convergence. The empirical results will be examined to establish the efficacy of the proposed work and the process established could be an ideal approach for solving the feature reduction problems.