SUMMARY AND CONCLUSIONS
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This thesis contributes to the development of Dynamic Reducts and its properties and Parallel Reducts and its properties and algorithms for Parallel Reducts and Relative Reducts and Heuristic algorithm for finding Reducts in the Object-Oriented Rough Set Model. These Reducts are very useful in Object-Oriented Software Systems, Data Mining classification problems and Machine Learning Problems, and Neural Network problems, Artificial Intelligence problems, and Pattern Recognition problems.

The core of the thesis, deals with the work of finding out the most stable Reducts in the Object-Oriented Rough Set Model, after arbitrarily, deleting number of rows in the classes, class names and corresponding object mapping table. Such stable Reducts were named as dynamic Reducts. An algorithm is given for Dynamic Reduct, Core of Object-Oriented Rough Set Model, the Core of Sub-Object-Oriented Rough Set Model, the (F-$\lambda$)–Dynamic Core, Generalized Dynamic Core in the Object-Oriented Rough Set Model.

The concept is then extended to introduce a new method to compute the stable Reducts in a series of Sub-Object-Oriented Rough Set Models, which is called Parallel Reduct while focusing on the need to have them.
The Thesis, also dealt with another new Reduct called Relative Reduct along with an algorithm for finding them. It also discussed some of the issues related to intense computation of Discernibility Matrix and positive regions and proposed concept of Relative class dependency to fix these issues. The validity of the work is verified by the application of examples to examine the results and to determine whether the techniques proposed are effective and efficient with regard to accuracy and convergence. The empirical results established the efficacy of this work proposed work and the techniques developed are ideal for solving the feature reduction problems.

6.2. Scope for Future Research

Finding Reduct from given decision table is one of the interesting problems of rough set theory. There are different Reducts like Dynamic Reducts, Relative Reducts, Parallel Reducts, and Genetic Reducts. Several software’s have been developed to generate different types of Reducts. An example of such software i.e ROSETTA.

ROSETTA [1], software supports the complete Data Mining process, from Data pre-processing, including handling incomplete Data, Data discretization, generating Reduct sets which contain essential attributes for the given Data Set, to classification, rule generation, and cross validation.
evaluation. Some discretization and Reducts generation packages are from the RSES library [24].

The terms RSES2.2, RSES [24] stand for Rough Set Exploration System. This system supports Data pre-processing, handling incomplete Data, Data decomposition, Reducts generation, classification and cross validations.

ROSE2 ROSE [7] stands for Rough Sets Data Explorer. This software is designed to process data with large boundary regions. It supports Data pre-processing, data discretization, handling missing values, core and Reducts generation, classifications and rule generation, as well as evaluations. It also provides not only the classical Rough Set Model, but also the variable precision model, which is not provided by [1] and [24].

LERS [51] stands for Learning from Examples based on Rough Sets. It is not publicly available. The system was designed especially to process missing values of attributes and inconsistency in the Data Set. Certain rules and possible rules are both extracted based on the lower and upper approximations. In addition to the rough sets based systems mentioned above, there are other available knowledge discovery systems based on the methodologies of Rough Sets such as DBROUGH [58] and GROBIAN [14].

RSES is the current version of RSES [24] is RSES 2.2.1. RSES provides a Genetic Algorithm to control the number of Reducts generated, which is appropriate for larger Data Sets to only generate representative Reducts.

Note that there are other Reduct Generation Approaches provided by some other software’s such as ROSE2 [7]. In ROSE2 software, there are three Reduct generation functions, the “lattice search”, “heuristic search” and “manual search” approaches [7]. For Reduct generation, there are two options on discernibility provided by the ROSETTA software, which are full discernibility and object related Discernibility [2]. With the option of full discernibility, the software will produce a set of minimal attribute subsets that can discern all the objects from each other. With object related discernibility, the software produces Reducts that can discern a certain object from all the other objects.
The design of new software’s for Reducts with Dynamic Reducts, Parallel Reduct, Relative Reducts and Heuristic Reducts in Object-Oriented Rough Set Model will be a part of experimental future Research.

Development of Heuristic Genetic Reduction Algorithm

A Genetic Algorithm (GA) is a search technique used in computer science to find approximate solutions to optimization and search problems. Generating classes or classes with names through Object-Oriented Reducts by Genetic Algorithms, two elements are required: first, definition and implementation of the genetic representation, i.e. a solution to reduction problem must be represented as a genome (or chromosome) Second generation of fitness function.

Usually, each chromosome that represents a solution to classes or classes with names reduction is designed to be a string of m binary bits \( s_1, s_2, \ldots, s_m \) that where \( m \) is the number of the classes or classes with names \( s_j = 1 \), it means the classes or classes with names on that bit are included in the Object-Oriented Reduct, otherwise, \( s_j = 0 \). Although this simple binary encoding manner is practicable for many optimization problems, it can be improved further to enhance the efficiency of Genetic Algorithm when applied to searching classes or classes with name Reducts in the Object-Oriented Rough Set Model. Such a development of Heuristic
Genetic Algorithm is another interesting aspect for future direction in research related to Reducts.

Testing with live data, refinement of methods and generation of Reducts of other type in the Object-Oriented Rough Set Model will be some of the suggested topics for continuing future work in this area.