ABSTRACT
This work is a hybrid architecture design furnished successfully using artificial intelligence techniques, rough set theory (RST) and machine learning algorithms (MLA). The purpose of this work is to bring the spotless and smart approach in identifying the Thyroid Disease (TD) in a human. The data considered for the Thyroid Disease Diagnoses (TDD) is inconsistent, redundant and consists of missing attribute values as per the literature survey. The proposed work is to construct an expert advisory system with hybrid architecture, which is to determine the optimistic disease growth because of the thyroid gland. A string matching system (SMS) was at the outset developed, which can predict the actual TDD based on the knowledge available. If the SMS fails, an individual approaches using artificial bee colony optimization and particle swarm optimization are developed to achieve the accuracy of results appreciating the measure values 65% and 93 %, but the results obtained are calculated using missed attribute values. Hence, the proposed work generates the missing attribute value by using RST and the obtained data is given to predict disease along with its prevention and curing methods. However, the data generated cannot predict the optimal disease and hence it is proposed to use a MLA so that, obtained result is error free. Regularization methods (RM) of MLA are considered for classification. The analysis report generated by the proposed work suggests the best algorithm for
predicting the exact levels of TDD. The work is a study of MLA on UCI thyroid datasets (UCITD). The developed system deals with RM i.e., ridge regression algorithm (RRA) & least absolute shrinkage and selection operator algorithm (LASSO). The above algorithms produce at most 79% accuracy by RRA and 98.99% accuracy by LASSO. Thus, the work shows the importance of LASSO, along with an example for parameter generation. The decisive factors (DF) suggest the accuracy rate of LASSO is much better when compared with RRA. A comparative study is made by using IETD datasets which produces the best classification accuracy for a selected classifier variable as its significant factor. The knowledge for implementation of this work is gathered from Intelligent System Laboratory of K.N. Toosi University of Technology, Imam Khomeini Hospital and Indian e-Thyroid disease Machine learning Repository. A questionnaire form is developed for providing an interface for user, so they can contribute the data. The entire work involves the design and development of thyroid expert advisory system useful for humans.

**Keywords:** Classification, Improvised Prophecy, Machine Learning Algorithms, Rough Set, Thyroid Datasets.