**Different applications where Neural Networks are used:**

A lot of works have been done in medical diagnosis using different neural network

techniques. But it had always been a tough task to identify the best technique for any

diagnosis. Different techniques have their own limitations in terms of accuracy and time

Artificial neural network can be

employed for the disease diagnosis, so as to improve the quality of diagnosis

**Summary and Gaps**

**Comparative Study of GD, LM and SCG Method of**

**Neural Network for Thyroid Disease Diagnosis**

**Prerana, Parveen Sehgal**

E. Radwan *et al.* [11] used the concept of rough set theory in

data discretization for continuous attribute values, data

reduction and rule induction. Also, Rough sets try to cluster

the Thyroid relation attributes in the presence of missing

attribute values and build the Modified Similarity Relation

that is dependent on the number of missing values with

respect to the number of the whole defined attributes for each

rule. Thus, the rule associated strength is measured.

Moreover, The MSIM, modified similarity analysis relation,

is used to classify rules contain missing attribute value, gaps,

with respect to the number of the whole defined attributes for

each rule. Also, constructing of discernibility matrix,

deduction of the production rules, and reducts in the presence

of the missing attribute value are used to extract the minimal

set of productions rules that describe similarity relation

among rules. Hence, feature selection reduces the

dimensionality of the data, the size of the hypothesis space

and allows classification algorithm to operate faster and

more effectively.

With regard to Neural Networks:

Gradient Descent & variants used: Scaled Conjugate Gradient (Several Advantages provided), ***Levenberg Marquardt***

**Gap:** Research can be extended at different angles

like analysis and effects of varying network parameters like

number of layers and number of neurons in hidden layers,

learning rate, adaptive learning rate and other network

parameters etc. Also, we can extend our research to find

theoretical formulations for optimal values of these changed

parameters.

Methodology: Neural network has been established of their potentials in many domains related with medical disease diagnosis and other application. Although, Neural networks never replace the human experts instead they can helpful for decision making, classifying, screening and also can be used by domain experts to cross-check their diagnosis. In our earlier studies on rough set based computing model [19] and soft computing model [20], we have established the accuracy of 71% for decision making of prevalence neonatal disease. This ANN MLP model proves the better results and helps the domain experts and even person related with the field to plan for a better diagnose and provide the patient with early diagnosis results as it performs realistically well even without retraining. As clinical decision making requires reasoning under uncertainty, expert systems and fuzzy logic will be suitable techniques for dealing with partial evidence and with uncertainty regarding the effects of proposed interventions. Neural Networks have been proven to produce better results compared to other techniques for the prediction tasks. Our study concludes with higher prediction result and when the Network has trained and tested after optimizing the input parameters, the overall predictive accuracy acquired was 75%.

BACKPROPOGATION NEURAL NETWORK FOR PREDICTION OF HEART DISEASE

**NABEEL AL-MILLI**

**SURVEY MATERIAL:** Dilip Roy Chowdhury et al. [1] applied a backpropagation neural network in predicting neonatal disease diagnosis. The proposed method is used to recognize a pattern for the diagnosing and prediction of neonatal diseases. The authors applied backpropogation algorithm to train a neural network on different categories of neonatal diseases. The accuracy of the proposed model is 75% with higher stability.

Milan Kumari et al. [2] solve cardiovascular disease dataset using different data mining algorithms, such as: Support Vector Machine, Artificial neural networks (ANNs), Decision Tree, and RIPPER classifier

The author’s analyze the performance of these algorithms through several statistical analysis factors such as: sensitivity, specificity, accuracy, error rate, True Positive Rate and False Positive Rate. Accuracy of RIPPER, Decision Tree, ANN and SVM are 81.08%, 79.05%, 80.06% and 84.12% respectively. While the results of error rates for RIPPER, Decision Tree, ANN and SVM are 2.756, 0.2755, 0.2248 and 0.1588 respectively. The analysis shows that out of these four classification models SVM predicts cardiovascular disease with least error rate and highest accuracy.

A decision support system for diagnosis of Congenital Heart Disease has been proposed by Vanisree K et al. [3]. The core of the proposed system is based on Backpropagation Neural Network (multi layered Feed Forward Neural Network). The benchmark set used in this work are the signs, symptoms and the results of physical evaluation of a patient. The proposed system achieved an accuracy of 90%.

Niti Guru et al. [4] applied a neural network for prediction of heart disease, blood pressure and sugar. The benchmark consists of 78 records with 13 attributes are used for training and testing. The author used a supervised network for diagnosis of heart disease and trained it using back propagation algorithm

A prototype Intelligent Heart Disease Prediction System (IHDPS) based on data mining techniques is proposed by Sellappan Palaniappan et al. [5]. The techniques used are Decision Trees, Naive Bayes and Neural Network. The proposed models are developed based on .NET platform. The benchmark dataset has several attributes such as age, sex, blood pressure and blood sugar which is used to predict the likelihood of patients getting a heart disease.

Gap:

**Translation of Speech for foreign patient diagnosis**

An automated speech recognition (ASR) system can be used to recognize a foreign patient’s speech. After it is recognized, the speech could be translated into another language with synthesis in real time. As an example, the EU-BRIDGE project intends to develop automatic transcription and *Krzysztof Wołk, Krzysztof Marasek 2*

translation technology. The project desires innovative multimedia translation services for audiovisual materials between European and non-European languages