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Artificial Neural Network

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Highlights

Attacks and Weaknesses

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VOLUME 13

ISSUE 3

VERSION 10



GLOBAL JOURNAL OF COMPUTER SCIENCE AND TECHNOLOGY: D
NEURAL & ARTIFICIAL INTELLIGENCE

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NEURAL & ARTIFICIAL INTELLIGENCE

VOLUME 13 ISSUE 3 (VER. 1.0)

OPEN ASSOCIATION OF RESEARCH SOCIETY

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Backpropagation in HL7 in Medical Informatics to Analysis Speed of Sending Data

By Kanika Sharma & Asst. Prof. Hardeep Singh Kang

RIMT-IET, Mandi Gobindgarh

Abstract - In this paper, analysis the speed of sending message in Healthcare standard 7 with the use of back propagation in neural network. Various algorithms are define in backpropagation in neural network we can use trainlm algorithm for sending message purpose. This algorithm appears to be fastest method for training moderate sized feedforward neural network. It has a very efficient matlab implementation. The need of trainlm algorithm are used for analysis, increase the speed of sending message faster and accurately and more efficiently. The proposed work is used in healthcare medical data. With the use of backpropagation in healthcare standard seven (HL7) sending message between two systems. To increase the speed of the healthcare sending data we can use Train LM algorithm. Train LM algorithm is more fastest algorithm it can be increase efficiency and improve accuracy of the system and also provide real time application. To increase speed of sending message these algorithm used. With the use of this algorithm it can be decreasing time of sending message to the other system.

Keywords : medical informatics, HL7, backpropagation.

GJCST-D Classification : C.1.3



BACKPROPAGATION IN HL7 IN MEDICAL INFORMATICS TO ANALYSIS SPEED OF SENDING DATA

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Backpropagation in HL7 in Medical Informatics to Analysis Speed of Sending Data

Kanika Sharma ^a & Asst. Prof. Hardeep Singh Kang ^σ

Abstract - In this paper, analysis the speed of sending message in Healthcare standard 7 with the use of back propagation in neural network. Various algorithms are define in backpropagation in neural network we can use trainlm algorithm for sending message purpose. This algorithm appears to be fastest method for training moderate sized feedforward neural network. It has a very efficient matlab implementation. The need of trainlm algorithm are used for analysis, increase the speed of sending message faster and accurately and more efficiently. The proposed work is used in healthcare medical data. With the use of backpropagation in health care standard seven (HL7) sending message between two systems. To increase the speed of the healthcare sending data we can use Train LM algorithm. Train LM algorithm is more fastest algorithm it can be increase efficiency and improve accuracy of the system and also provide real time application. To increase speed of sending message these algorithm used. With the use of this algorithm it can be decreasing time of sending message to the other system. More efficiently, accurately sending message. Healthcare standard 7 are mainly used to exchange information and data between systems. The OSI seventh layer applications are used in this standard and also provides various application protocols to communication between system and also exchanging data.

Keywords : medical informatics, HL7, backpropagation.

I. INTRODUCTION

Medical informatics is the sub-discipline of health informatics that directly impacts the patient – physician relationship. It focuses on the information technology that enables the effective collection of data using technology tools to develop medical knowledge and to facilitate the delivery of patient medical care. The goal of medical informatics is to ensure access to critical patient medical information at the precise time and place it is needed to make medical decisions. Medical informatics also focuses on the management of medical data for research and education.

a) Healthcare Standards

Healthcare standards provides framework for exchanging, integration, sharing and retrieval's of EHR. These standards define how information is packed and communicate from one party to another, setting the languages, structure and data types. HL7 standards

support clinical practice and the management, delivery, and evaluation of health services, and are recognized as the most commonly used in the world. Healthcare provides seven standards to perform various functionalities. The latest standard implement in Healthcare is Health Level Seven (HL1-7) is a standard series of predefined logical formats for packaging healthcare data into messages to be transmitted among computer system.

b) Neural Networks

Are originally modelled as a computational model to mimic the way the brain works. Brain is made from small functional units called neurons. A neural has a cell body, several short dendrites and single long axon. By the dendrites and axon several neurons connected. Dendrites take various signals and pass to the other neurons as a input signal. These input increase or decrease to the electrical potential of the cell body and if it is reaches a threshold, a electric pulse is sent to the axon and the output occurs.

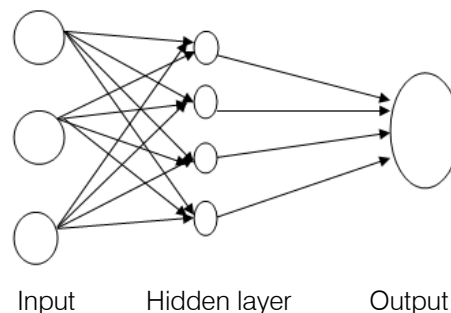
II. TYPES OF NEURAL NETWORK

a) Biological Neural Network

Are made up of real biological neurons that are connected or functionally related in a nervous system. In the field of neuroscience they often identified groups of neurons that perform a specific physiological function in laboratory analysis.

b) Artificial Neural Network

Are composed of interconnecting artificial neurons (programming constructs that mimic the properties of biological neurons).it is used for solving artificial intelligence problems without necessary creating a model of a real biological system. 3 layers in neural network I/P, hidden layer and O/P.



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c) Backpropagation

It is an abbreviation for “backward propagation of errors” is a common method of training artificial neural network. It is an error function and supervised learning method and generalisation of the delta rule. It requires a dataset of the desired O/P of many I/Ps making up the training set. It is most useful for feed forward network. For better understanding, the back propagation learning algorithm can be divided into 2 phases:-

- Phase1- Propagation
- Phase 2- Weight updates

Various algorithms in backpropagation neural network:

i. Backpropagation using Gradient Decent

It is relative simply implementation, standard method and generally work well but slow and inefficient.

ii. Simulating Annealing

It is a global minimum can guarantee of optimal solution but it is slower than gradient decent and also much more complicated implementation.

iii. Genetic Algorithm

Faster than simulated annealing and also less like to get stuck in local minima but it is slower than gradient descent and also memory intensive for large network.

iv. Simplex Algorithm

It is similar to gradient decent but faster and easy to implement but does not gurantee a global minima.

v. Train LM Algorithm

It is much faster than all algorithm and also used to calculate performance easily implement in matlab. It used to solve the fitting problem and also provide fastest many mode sizes feed forward network.

III. METHODOLOGY

a) Levenberg–Marquardt Algorithm

In order to make sure that the approximated Hessian matrix $J^T J$ is invertible.

Levenberg–Marquardt algorithm introduces another approximation to Hessian matrix:

$$H \approx J^T J + \mu I \quad (1.1)$$

where

μ is always positive, called combination coefficient.

I is the identity matrix.

From Equation 1.1, one may notice that the elements on the main diagonal of the Hessian matrix will be larger than zero. Therefore, with this approximation (Equation 1.1), it can be sure that matrix H is always invertible.

$$w_{k+1} = w_k - (J_k^T J_k)^{-1} J_k e_k \quad (1.2)$$

By combining Equations 1.1 and 1.2, the update rule of Levenberg–Marquardt algorithm can be presented as

$$w_{k+1} = w_k - (J_k^T J_k + \mu I)^{-1} J_k e_k \quad (1.3)$$

As the combination of the steepest descent algorithm and the Gauss–Newton algorithm, the Levenberg–Marquardt algorithm switches between the two algorithms during the training process. When the combination coefficient μ is very small (nearly zero).

Equation (1.1) approaching to Equation (1.2) and Gauss–Newton algorithm is used. When combination coefficient μ is very large, Equation 1.1 approximates to

$$w_{k+1} = w_k - \alpha g_k \quad (1.4)$$

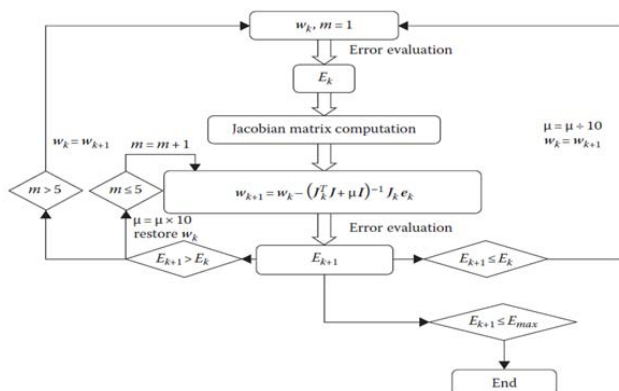
and the steepest descent method is used. If the combination coefficient μ in Equation 12.25 is very big, it can be interpreted as the learning coefficient in the steepest descent method (1.4).

$$\alpha = \frac{1}{\mu}$$

The training process using Levenberg–Marquardt algorithm could be designed as follows:

- With the initial weights (randomly generated), evaluate the total error (SSE).
- Do an update as directed by Equation 1.1 to adjust weights.
- With the new weights, evaluate the total error.
- If the current total error is increased as a result of the update, then retract the step (such as reset the weight vector to the precious value) and increase combination coefficient μ by a factor of 10 or by some other factors. Then go to step ii and try an update again.
- If the current total error is decreased as a result of the update, then accept the step (such as keep the new weight vector as the current one) and decrease the combination coefficient μ by a factor of 10 or by the same factor as step iv.
- Go to step ii with the new weights until the current total error is smaller than the required value.

The flowchart of the above procedure is



IV. CONCLUSION

To analyzing the speed of sending messages between the systems. Improving the quality and accuracy of the message sending in HL7 standard. Less time require exchanging data between systems. It can be based on real time application. Provide efficient and accurate data. Train LM algorithm easily implement in matlab and provide better result as compare to all other backpropagation algorithms. Fastest method for training moderate sized feed forward neural network. In the future we can also work on Dicom images to increase the speed of sending image fastly and best quality with use of this algorithm.

V. FUTURE SCOPE

In future work, also more improve the speed of sending message with some another network and also more distortion measures and feature domains will be used as the image samples. Also, the relationship between the metrics adopted for the combination will be further investigated to find the best combination among them. More experiments are needed to validate properties of the network such as it optimum number of neurons in hidden layers, validation etc. Performance comparison of LMBP with other networks should also be discussed.

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Classification of Heart Disease using Artificial Neural Network and Feature Subset Selection

By M. Akhil Jabbar, B.L Deekshatulu & Priti Chandra

AEC, Bhongir, India

Abstract - Now a day's artificial neural network (ANN) has been widely used as a tool for solving many decision modeling problems. A multilayer perception is a feed forward ANN model that is used extensively for the solution of a no. of different problems. An ANN is the simulation of the human brain. It is a supervised learning technique used for non linear classification. Coronary heart disease is major epidemic in India and Andhra Pradesh is in risk of Coronary Heart Disease. Clinical diagnosis is done mostly by doctor's expertise and patients were asked to take no. of diagnosis tests. But all the tests will not contribute towards effective diagnosis of disease. Feature subset selection is a preprocessing step used to reduce dimensionality, remove irrelevant data. In this paper we introduce a classification approach which uses ANN and feature subset selection for the classification of heart disease. PCA is used for preprocessing and to reduce no. Of attributes which indirectly reduces the no. of diagnosis tests which are needed to be taken by a patient. We applied our approach on Andhra Pradesh heart disease data base. Our experimental results show that accuracy improved over traditional classification techniques. This system is feasible and faster and more accurate for diagnosis of heart disease.

Keywords : andhra pradesh, artificial neural network, chi-square, data mining, feature subset selection, genetic search, heart disease, principal component analysis.

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Classification of Heart Disease using Artificial Neural Network and Feature Subset Selection

M. Akhil Jabbar^a, B.L Deekshatulu^σ & Priti Chandra^p

Abstract - Now a day's artificial neural network (ANN) has been widely used as a tool for solving many decision modeling problems. A multilayer perception is a feed forward ANN model that is used extensively for the solution of a no. of different problems. An ANN is the simulation of the human brain. It is a supervised learning technique used for non linear classification. Coronary heart disease is major epidemic in India and Andhra Pradesh is in risk of Coronary Heart Disease. Clinical diagnosis is done mostly by doctor's expertise and patients were asked to take no. of diagnosis tests. But all the tests will not contribute towards effective diagnosis of disease. Feature subset selection is a preprocessing step used to reduce dimensionality, remove irrelevant data. In this paper we introduce a classification approach which uses ANN and feature subset selection for the classification of heart disease. PCA is used for preprocessing and to reduce no. Of attributes which indirectly reduces the no. of diagnosis tests which are needed to be taken by a patient. We applied our approach on Andhra Pradesh heart disease data base. Our experimental results show that accuracy improved over traditional classification techniques. This system is feasible and faster and more accurate for diagnosis of heart disease.

Keywords : andhra pradesh, artificial neural network, chi-square, data mining, feature subset selection, genetic search, heart disease, principal component analysis.

1. INTRODUCTION

Data mining is the process of extracting knowledge able information from huge amounts of data. It is an integration of multiple disciplines such as statistics, machine learning, neural networks and pattern recognition. Data mining extracts biomedical and health care knowledge for clinical decision making and generate scientific hypothesis from large medical data.

Association rule mining and classification are two major techniques of data mining. Association rule mining is an unsupervised learning method for discovering interesting patterns and their association in large data bases. Whereas classification is a supervised learning method used to find class label for unknown sample.

Classification is the task of assigning objects tone of special predefined categories. It is pervasive problem that encompasses many applications.

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Classification is designed as the task of learning a target function F that maps each attribute set A to one of the predefined class labels C [1]. The target function is also known as classification model. A classification model is useful for mainly two purposes. 1) descriptive modeling 2) Predictive modeling.

An artificial neural network (ANN) is the simulation of human brain and is being applied to an increasingly number of real world problems. Neural networks as a tool we can mine knowledgeable data from data ware house. ANN are trained to recognize, store and retrieve patterns to solve combinatorial optimization problems. Pattern recognition and function Estimation abilities make ANN prevalent utility in data mining. Their main advantage is that they can solve problems that are too complex for conventional technologies. Neural networks are well suited to problem like pattern recognition and forecasting. ANN are used to extract useful patterns from the data and infer rules from them. These are useful in providing information on associations, classifications and clustering.

Heart disease is a form of cardio vascular disease that affects men and women. Coronary heart disease is an epidemic in India and one of the disease burden and deaths. It is estimated that by the year 2012, India will bear 60% of the world's heart disease burden. Sixty years is the average age of heart patients in India against 63-68 in developed countries. In India Andhra Pradesh state is in risk of more deaths due to CHD. Hence there is a need to combat the heart disease. Diagnosis of the heart disease in the early phase solves many lives.

Feature subset selection is a processing step in Machine learning and is used to reduce dimensionality and removes irrelevant data. It increases accuracy thus improves resultcomprehensibility. PCA is the oldest multivariate statistical technique used by most of the scientific disciplines. The goal of PCA is to extract the important information from data bases and express this information as principle components. Chi square test evaluates the worth of an attribute by computing the values of chi squared statistics w.r.t class. The larger the value of chi square, the more likely the variable is related to class.

In this paper we introduce a classification approach which combines multi layer perception with back propagation learning algorithm and feature

selection for classification of heart disease with reduced no of attributes. Our approach him proves classification and determines the attributes which contribute more towards the predication of heart disease which indirectly Reduces no. of diagnosis test which are needed tube taken by a patient.

In section 2 we review basic concepts of neural networks, PCA, chi square and heart disease section 3 deals with related work. Section 4 explains our proposed approach .Section 5 deals with results and discussion. We conclude our final remarks in section 6.

II. BASIC CONCEPTS

In this section we will discuss basic concepts of Neural networks, PCA, chi square and heart Disease.

a) Artificial Neural Networks

An ANN also called as neural network is a mathematical model based on biological neural networks. Artificial neural network is based on observation of a human brain [2]. Human brain is very complicated web of neurons. Analogically artificial neural network is an interconnected set of three simple units namely input, hidden and output unit. The attributes that are passed as input to the next form a first layer. In medical diagnosis patients risk factors are treated as input to the artificial neural network.

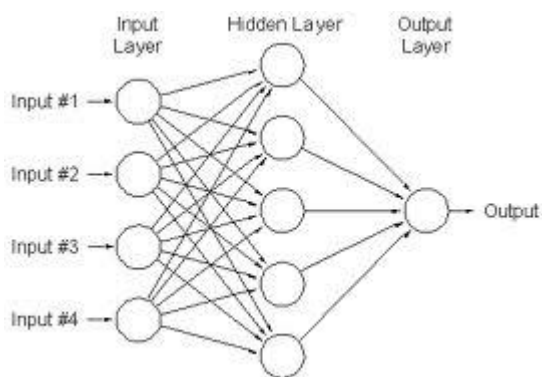


Figure 1 : Example ANN

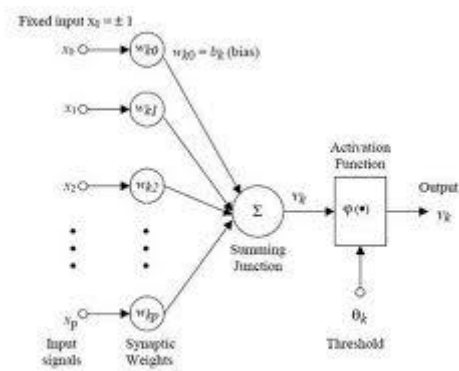


Figure 2 : Modeling a Boolean Function using Preceptor

Popular neural network algorithms are Hopfield, Multilayer perception, counter propagation networks, radial basis function and self organizing maps etc. The feed forward neural network was the first and simplest type of artificial neural network consists of 3 units input layer, hidden layer and output layer. There are no cycles or loops in this network. A neural network has to be configured to produce the desired set of outputs. Basically there are three learning situations for neural network. 1) Supervised Learning, 2) Unsupervised Learning, 3) Reinforcement learning the perception is the basic unit of a artificial neural network used for classification where patterns are linearly separable. The basic model of neuron used in perception is the Mc culluchpitts model. The perception takes an input value Vector and outputs 1 if the result is greater than predefined thresholds or -1 otherwise. The proof convergence of the algorithm is known apperception convergence theorem. Figure 1 shows ANN and figure 2 shows modeling a Boolean function using single layer perception [1]. Output node is used to represent the model output the nodes in neural network architecture are commonly known as neurons. Each input node is connected to output node via a weighted link. This is used to emulate the strength of synaptic connection between neurons. Simple perception learning algorithm is shown below.

Step 1 : Ret $D = \{(X_i, Y_i) / i=1, 2, 3, \dots, n\}$ be the set of training example.

Step 2 : Initialize the weight vector with random value, $W(o)$.

Step 3 : Repeat.

Step 4 : For each training sample $(X_i, Y_i) \in D$.

Steps 5 : Compute the predicted output $Y_i^{\wedge}(k)$.

Step 6 : For each weight we does.

Step 7 : Update the weight $w_{ij}(k+1) = w_{ij}(k) + \eta (y_i - y_i^{\wedge}(k))x_{ij}$.

Step 8 : End for.

Step 9 : End for.

Step 10 : Until stopping criteria is met.

The main function of artificial neural network is prediction. The effectiveness of artificial neural network was proven in medicine [3]. The note worthy achievement of neural network was in the application of coronary heart disease [4]. There is numerous advantages of ANN some of these include

- 1) High Accuracy.
- 2) Independent from prior assumptions about the distribution of the data.
- 3) Noise tolerance.
- 4) Ease of Maintenance.
- 5) ANN can be implemented in parallel hardware.

The following are the examples of where ANN are used

- 1) Accounting.
- 2) Fraud Detection.
- 3) Telecommunication.

- 4) Medicine.
- 5) Marketing.
- 6) Insurance.
- 7) Human Resources.

Performance of ANN can be improved by designing ANN with evolutionary algorithms and developing neuron fuzzy systems.

b) Feature Subset Selection

Feature subset selection is a preprocessing step commonly used in machine learning. It is effective in reducing dimensionality and removes irrelevant data thus increases learning accuracy. It refers to the problem of identifying those features that are useful in predicting class. Features can be discrete, continuous or nominal. Generally features are of three types. 1) Relevant, 2) Irrelevant, 3) Redundant. Feature selection methods wrapper and embedded models. Filter model rely on analyzing the general characteristics of data and evaluating features and will not involve any learning algorithm, where as wrapper model uses après determined learning algorithm and use learning algorithms performance on the provided features in the evaluation step to identify relevant feature. Embedded models incorporate feature selection as a part of the model training process.

Data from medical sources are highly voluminous nature. Many important factors affect the success of data mining on medical data. If the data is irrelevant, redundant then knowledge discovery during training phase is more difficult. Figure 3 shows flow of FSS.

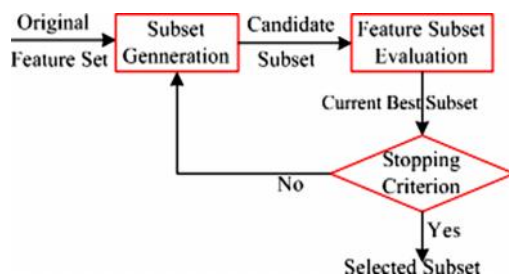


Figure 3 : Feature subset selection

Medical diagnosis is an important yet complicated task that needs to be executed accurately and efficiently [5]. Feature subset selection if applied on medical data mining will lead to accurate results. The detection of disease from several factors is a multi-layered problem and sometimes leads to false assumptions frequently associated with erratic effects. Therefore it appears reasonable if we apply feature subset selection in medical data mining towards assisting the diagnosis process. In this paper we apply feature subset selection. Using neural network for heart disease prediction For Andhra Pradesh population.

i. Principle Component Analysis

Principle component analysis (PCA) is a statically technique used in many applications like face

recognition, pattern recognition, image compression and data mining. PCA is used to reduce dimensionality of the data consisting of a large no. of attributes. PCA can be generalized as multiple factor analysis and as correspondence analysis to handle heterogeneous sets of variables and quantitative variables respectively. Mathematically PCA depends on SVD of rectangular matrices and Eigen decomposition of positive semi-definite matrices. The goal principle component analyses are

- 1) To extract the most important information.
- 2) from the data base Compress the size of the data and keeping only important information.
- 3) Simplify the data set description and to analyze the variables and structure of the observations.
- 4) Simplification.
- 5) Modeling.
- 6) Outlier Detection.

Procedure for principle component analysis is shown below

a. Procedure

Step 1 : Obtain the input matrix.

Step 2 : Subtract the mean from the data set in all dimensions.

Step 3 : Calculate covariance matrix of this mean subtracted data set.

Step 4 : Calculate the Eigen values and Eigen vector from covariance matrix.

Step 5 : Form a feature vector.

Steps 6 : Derive the new data set.

ii. Chi-Squared Test

One of the first steps in data mining and knowledge discovery is the process of eliminating redundant and irrelevant variables. There are various reasons for taking this step. The obvious reason is that going from a few hundred variables to few variables will make the result interpretation in an easy way. The second reason is due to curse of dimensionality. If the dimensionality is large. It is necessary to have a large training set. This is also known as peaking phenomenon. If the dimensionality increases up to a certain point accuracy increases, but after there is a reduction in classification accuracy [6].

Simplest way of determining relevant variables is to use chi square technique (χ^2). Chi square technique is used if all the variables are continuous. Assume that a target variable is selected; every parameter is checked to see if the use chi square technique detects the existence of a relationship between the parameter and the target.

Karl Pearson proved that the statistic

$$X_r^2 = \frac{\sum (O_i - E_i)^2}{E_i}$$

Where O observed frequency and E expected frequency.

If the data is given in a series of n numbers then degrees of freedom = n-1.

In case of binomial distribution degrees of freedom = n-1.

In case of poisson distribution degrees of freedom = n-2.

In case of normal distribution degrees of freedom = n-3 [7].

The following example illustrates chi square hypothesis. The total no of automobiles accidents per week in a certain community are as follows 12, 8, 20, 2, 14, 10, 15, 6, 9 and 4. We have to verify to see whether accident conditions were same during 10 week period using chi square test.

Expected frequency of accidents each week = $100/10 = 10$.

Null hypothesis H: The accident conditions were the same during the 10 week period.

Table 1 : Chi square computation

Observed frequency	Expected frequency	O-E	(O-E) ² /E
12	10	2	0.4
8	10	-2	0.4
20	10	10	10.0
2	10	-8	6.4
14	10	4	1.6
10	10	0	1.0
15	10	5	2.5
6	10	-4	1.6
9	10	-1	0.1
4	10	-6	3.6
Total	100		26.6

Chi square = 26.6 and degree of freedom = $10-1 = 9$

Tabulated chi square = 16.9

Calculated chi square > Tabulated chi square

So the null hypothesis is rejected i.e. accident condition were not same during the 10 week period.

Following are the requirements for chi square test

- 1) One or more categories of quantitative data
- 2) Independent observations
- 3) Adequate sample size
- 4) Simple random sample
- 5) Data in frequency form
- 6) And all observations must be used

c) Heart Disease

Coronary heart disease occurs when the arteries of the heart that normally provide blood and oxygen to the heart are narrowed or even completely blocked. Cardiovascular diseases account for high mortality and morbidity all around the world. In India mortality due to CHD 1.6 million in the year 2000. by the year 2015, 61 million cases will be due to

CHD [8]. Studies to determine the precise cause of death in rural areas of Andhra Pradesh have revealed that CVD Cause about 30% deaths in rural areas [9].

i. Risk factors for heart disease

Some of the risk factors for heart disease are

- 1) *Smoking*: Smokers risk a heart attack twice as much as non smokers.
- 2) *Cholesterol*: A diet low in cholesterol and saturated fat will help lower cholesterol levels and reduce the risk of heart disease.
- 3) *Blood pressure*: High BP leads to heart Attack
- 4) *Diabetes*: Diabetes if not controlled can lead to significant heart damage including heart attack and death
- 5) *Sedentary life style*: Simple leisure time activities like gardening and walking can lower our risk of heart disease.
- 6) *Eating Habits*: Heart healthy diet, low in salt, saturated fat, Trans fat, cholesterol and refined sugars will lower our chances of getting heart disease.
- 7) *Stress*: Poorly controlled stress an danger can lead to heart attacks and strokes.

This epidemic may be halted through the promotion of healthier life styles, physical activity; traditional food consumption would help to mitigate this burden.

d) Genetic Search

Generally for feature subset selection, search spaces will be large. There are 2 Power 204 possible features combinations for cloud classification problem. Search strategies such as genetic search are used to find feature subsets with high accuracy. Genetic algorithms are used for optimization problems and are well known for robust search techniques. GA searches globally and obtain global competitive solutions. Genetic Algorithms are biologically motivated optimization methods which evolve a population of individuals where each individual who is more fit have a higher probability of surviving into subsequent generation. GA uses a set of evolutionary metaphors named selection of individuals, mutation, and crossover. Many of the algorithms uses classifier as a fitness function. Figure 4 shows working principle of genetic algorithm.

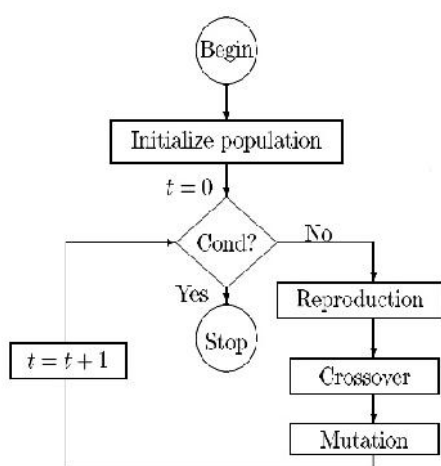


Figure 4 : Working principle of genetic algorithm

III. RELATED WORK

Few research works has been carried out for diagnosis of various diseases using data mining. Our approach is to apply feature subset selection and artificial neural networks for prediction of heart disease. M.A. Jabbaret.al proposed a new algorithm combining associative classification and feature subset selection for heart disease prediction [5]. They applied symmetrical uncertainty of attributes and genetic algorithm to remove redundant attributes. Enhanced prediction of heart disease using genetic algorithm and feature subset selection was proposed by Anbarasiet.al[10]. Heart disease prediction using associative classification was proposed by M.A. Jabbar et.al[11]. matrix based association rule mining for heart disease prediction was proposed by M.A. Jabbaret.al[12]. association rule mining and genetic algorithm based heart disease prediction was proposed in [13]. cluster based association rule mining for disease prediction was proposed in [14]. sellappan palaniappan et al proposed intelligent heart disease prediction system using naïve bayes, decision tree and neural network in [15]. graph based approach for heart disease prediction for Andhra Pradesh population was proposed by M.A. Jabbar et.al[16]. They combined maximum clique concept in graph with weighted association rule mining for disease prediction. Feature subset selection using FCBF in type II Diabetes patient's data was proposed by sarojinibala Krishnan et.al. [17]. Heart disease prediction using associative classification and genetic algorithm was proposed by M.A. Jabbaret.al [18]. in their paper they used Z-Statistics a measure to filter out the rules generated by the system.

This paper proposes a new approach which combines Feature subset selection with artificial neural network to predict the heart disease.

IV. PROPOSED METHOD

In this paper we used PCA and chi square as a feature subset selection measure. This measure used to rank the attributes and to prune irrelevant, redundant attributes. After applying feature subset selection classification using ANN will be applied on the data sets. PCA is a mathematical procedure that transforms a no. of correlated attributes into a smaller no. of correlated variables called principle components. Assume If V is a set of N column vector of dimensions D , the mean of the of the data set, is

$$M_v = E\{v\} \quad (1)$$

The covariance matrix is

$$C_v = E\{(V - M_v)\{V - M_v\}^T\}$$

The components of Cox denoted by C_{ij} represent the co variances between the random variable components V_i and V_j . the component C_{ii} is the variance of V_i . The Eigen vectors e_i and their corresponding values ---- are

$$C_v e_i = \lambda_i e_i \text{ where } i=1,2,3,\dots,n$$

If X is a matrix of Eigen vectors of the covariance matrix, row vectors formed by transforming

$$V.r = A(V - m_v)$$

The original data vector v can be reconstructed from r

$$V = XT r + m_v \quad (5)$$

Consider the weather data set. Attributes are ranked by applying the principal component analysis.

Table 2 : Weather data set

No.	Outlook	Temperature	Humidity	Windy	Play
1	sunny	hot	high	FALSE	no
2	sunny	hot	high	TRUE	no
3	overcast	hot	high	FALSE	yes
4	rainy	mild	high	FALSE	yes
5	rainy	cool	normal	FALSE	yes
6	rainy	cool	normal	TRUE	no
7	overcast	cool	normal	TRUE	yes
8	sunny	mild	high	FALSE	no
9	sunny	cool	normal	FALSE	yes
10	rainy	mild	normal	FALSE	yes
11	sunny	mild	normal	TRUE	yes
12	overcast	mild	high	TRUE	yes
13	overcast	hot	normal	FALSE	yes
14	rainy	mild	high	TRUE	no

a) Correlation Matrix

1 -0.47 -0.56 0.19 -0.04 -0.14 -0.15 0.04 -0.47 1 -0.47 0.3
 -0.23 -0.05 0 -0.09 -0.56 -0.47 1 -0.47 0.26 0.19 0.15 0.04
 0.19 0.3 -0.47 1 -0.55 -0.4 -0.32 0.23 -0.04 -0.23 0.26 -
 0.55 1 -0.55 -0.29 -0.13 -0.14 -0.05 0.19 -0.4 -0.55 1 0.63
 -0.09 -0.15 0 0.15 -0.32 -0.29 0.63 1 0.04 -0.09 0.04
 0.23 -0.13 -0.09 0 1

b) *Eigenvectors*

V1 V2 V3 V4 V5
0.2935 0.1035 -0.6921 -0.2573 0.1079

outlook=sunny

0.2218 -0.3252 0.6278 -0.1582 0.3164

outlook=overcast

-0.5026 0.2031 0.1002 0.4064 -0.4061

outlook=rainy

0.5393 -0.2059 0.0342 0.2702 -0.356

temperature=hot

-0.1324 0.6291 0.1542 -0.1518 0.3959

temperature=mild

-0.3943 -0.4833 -0.2031 -0.1038 -0.0777

temperature=cool

-0.3694 -0.4111 -0.1475 -0.0599 0.4021

humidity

0.1081 -0.039 -0.1699 0.7957 0.5217 windy

Ranked attributes are arranged in descending order

- 1) outlook=rainy
- 2) temperature=hot
- 3) outlook=sunny
- 4) outlook=overcast
- 5) humidity
- 6) windy
- 7) temperature=mild
- 8) temperature=cool

Ranking of the attributes based on chi square is shown in table 3 and proposed method is shown in figure 5.

Table 3 : Ranking of the attributes base on chi square

Rank	Name of the attribute	Chi square value
1	outlook	3.547
2	humidity	2.8
3	windy	0.933
4	temperature	0.57

The rank of the attributes is done w.r.t the values of PCA, and χ^2 in a descending order. High values of PCA the more information the corresponding attribute has related to class. We trained the classifier to classify the heart disease data set as either healthy or sick. The accuracy of a classifier can be computed by

$$\text{Accuracy} = \frac{\text{No. of samples correctly classified in test Data set}}{\text{Total no. of samples in test data}}$$

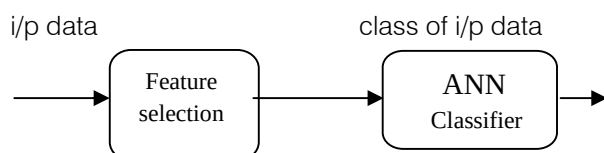
c) *Proposed algorithm*

Figure 5 : Block diagram of proposed method

PROPOSED ALGORITHM

Step 1) Load the data set

Step 2) Apply feature subset on the data set.

Step 3) Rank the attributes in descending order based on their value. A high value of PCA and χ^2 indicates attribute is more related to class. Least rank attributes will be pruned. Select the subsets with highest value.

Step 4) Apply multi layer perceptron on the remaining features of the data set that maximizes the classification accuracy.

Steps 5) find the accuracy of the classifier. Accuracy measures the ability of the classifier to correctly classify unlabeled data.

V. RESULTS AND DISCUSSION

We have evaluated accuracy of our approach on various data sets taken from tuned it repository [19]. out of 8 data sets one is non medical dataset A brief description about various data sets is shown in table 4. Accuracy of various data sets is presented in table 5. comparison of our accuracy with various classification algorithms.

The heart disease data set is collected from various corporate hospitals and opinion from expert doctors. Attributes selected for A.P Heart disease is shown in is shown in Table 7. Applying feature subset selection helps increase computational efficiency while improving accuracy. Figure 9 shows parameters for performing multilayer preceptor. we set learning rates 0.3 and training time as 500. figure 8 and table 8 clearly depicts that classification accuracy is improved with feature subset selection with PCA. Classification accuracy has been improved for various data sets with χ^2 and ANN which is shown in table 9 and figure 10. comparison of classification accuracy for various data sets with three algorithms using ANN and chi square is shown in table 10. our approach improved 6.5% against classification accuracy against J48 and 16.4% over naïve bayes algorithm and 7.3% than PART algorithm. Average accuracy for data sets using feature subset selection is 92.8%. Our proposed method was not much successful for hypothyroid and liver disorder this may be due to our method could not account for redundant attributes.

Table 4 : Description of various data sets

Data set	Instances	Attributes
Weather	14	5
Pima	768	9
hypothyroid	3770	30
breast cancer	286	10
liver disorder	345	7
primary tumor	339	18
heart stalog	270	14
lymph	148	19
heart disease A.P	23	12

Table 5 : Accuracy of various data sets using PCA

Data Set	Accuracy
Weather	100
Pima	98.82
hypothyroid	97.06
breast cancer	97.9
liver disorder	95.07
primary tumor	80
heart stalog	98.14
lymph	99.32
heart disease A.P	100

Table 6 : Comparison of classification accuracy for various data sets using PCA

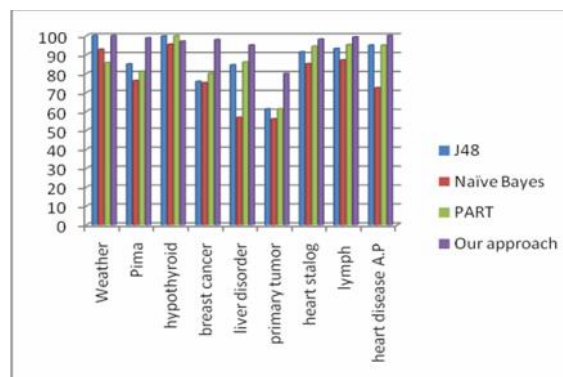
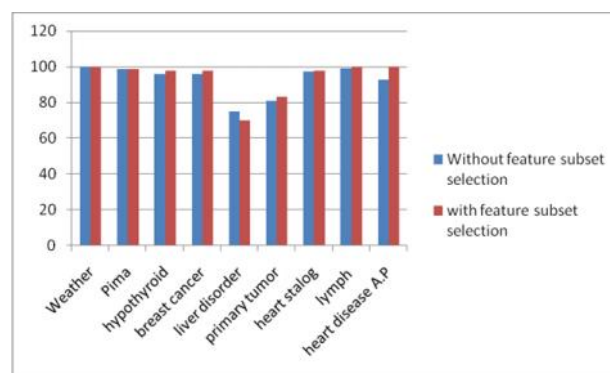
Data set	J48	Naïve Bayes	PART	Our approach
Weather	100	92.8	85.7	100
Pima	85.1	76.3	81.2	98.82
hypothyroid	99.8	95.44	99.86	97.06
breast cancer	75.87	75.17	80.06	97.9
liver disorder	84.6	56.8	86.08	95.07
primary tumor	61.35	56.04	61.35	80
heart stalog	91.48	85.18	94.4	98.14
lymph	93.23	87.16	95.27	99.32
heart disease A.P	95	72.5	95	100
average	87.3	77.4	86.5	96.2

Table 7 : Attributes of heart disease A.P

Sl.no	Attribute	Data Type
1	Age	Numeric
2	Gender	Nominal
3	Diabetic	Nominal
4	BP Systolic	Numeric
5	BP Dialic	Numeric
6	Height	Numeric
7	Weight	Numeric
8	BMI	Numeric
9	Hypertension	Nominal
10	Rural	Nominal
11	Urban	Nominal
12	Disease	Nominal

Figure 6 : Parameters of PCA

Parameters of PCA
Center data: false
Max.attributes:5
Transform back to original data: true
Variance covered: 0.95

*Figure 7 :* Comparison of classification accuracy*Figure 8 :* Parameters of multilayer perceptron

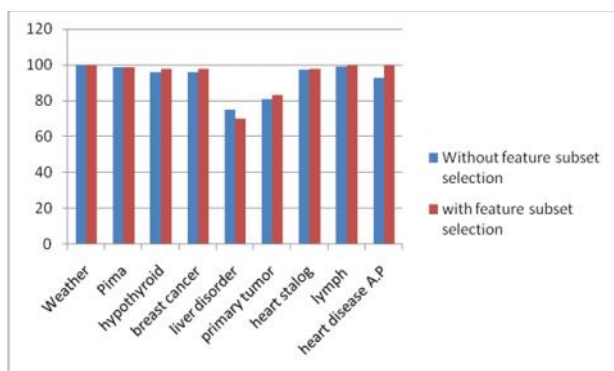


Figure 9 : Accuracy with and with out feature subset selection using PCA

Parameters of multilayer perceptron during training

- 1) GM-False
- 2) Decay-False
- 3) Auto build-False
- 4) Debug-False
- 5) Hidden layer-a
- 6) Training time -500
- 7) Learning rate-0.3
- 8) Momentum-0.2
- 9) Nominal to Binary-True
- 10) Normalize-True
- 11) Reset-false
- 12) Seed -0
- 13) Validation set-0
- 14) Validation threshold-20

Table 8 : Accuracy comaprison with and with out feature subset selection using PCA

Data Set	Without feature subset selection	With feature subset selection
Weather	100	100
Pima	98.69	98.82
hypothyroid	95.94	97.08
breast cancer	96.5	97.9
liver disorder	95.07	85
primary tumor	80.83	80
heart stalogs	97.4	98.14
lymph	99.3	99.3
heart disease A.P	100	100

Table 9 : Accuracy of various data sets with and without Feature subset selection using chi square

Data set	Without feature subset selection	with feature subset selection
Weather	100	100
Pima	98.69	98.82
hypothyroidyroid	95.84	97.64
breast cancer	95.84	97.64
liver disorder	74.78	70
primary tumor	80.82	83.18
heart stalogs	97.4	97.7
lymph	99.3	100
heart disease A.P	92.5	100
AVERAGE	92.7	93.8

Table 10 : Accuracy comparison for various data sets using Chi square method

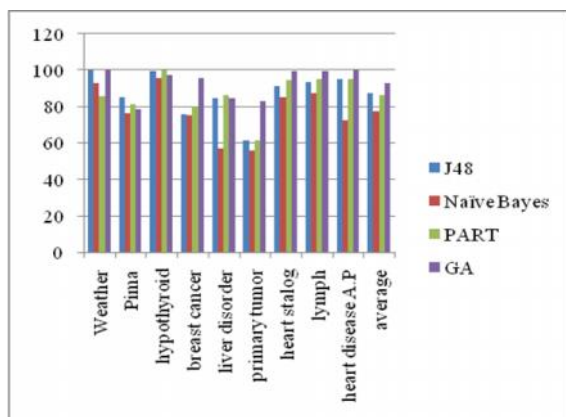
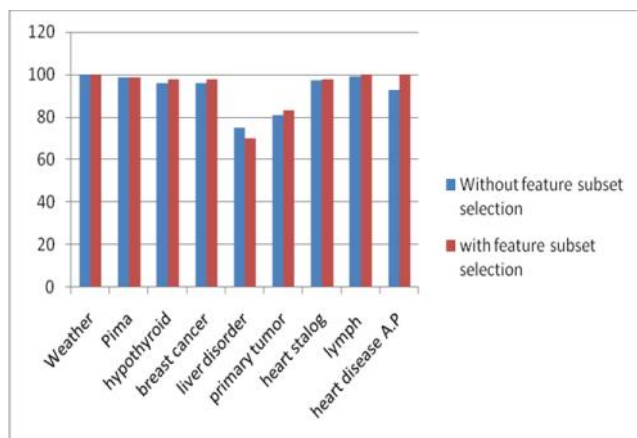
Data set	J48	Naive Bayes	PART	Our method
Weather	100	92.8	85.7	100
Pima	85.1	76.3	81.2	98.82
hypothyroid	99.8	95.44	99.86	97.64
breast cancer	75.87	75.17	80.06	97.64
liver disorder	84.6	56.8	86.08	70
primary tumor	61.35	56.04	61.35	83.18
heart stalogs	91.48	85.18	94.4	97.7
lymph	93.23	87.16	95.27	100
heart disease A.P	95	72.5	95	100
Average	87.3	77.4	86.5	93.8

Table 11 : Parameters of GA

Sl.no	Parameter	value
1	Cross over rate	0.6
2	Mutation rate	0.5%-1%
3	Population size	20-30
4	Selection	Basic roulette wheel selection

Table 12 : Accuracy comparisons GA+ANN, J48, NB, PART

Data set	J48	Naïve Bayes	PART	GA
Weather	100	92.8	85.7	100
Pima	85.1	76.3	81.2	78.3
hypothyroid	99.8	95.44	99.86	97.37
breast cancer	75.87	75.17	80.06	95.45
liver disorder	84.6	56.8	86.08	84.63
primary tumor	61.35	56.04	61.35	83.18
heart stalog	91.48	85.18	94.4	99.62
lymph	93.23	87.16	95.27	99.32
heart disease A.P	95	72.5	95	100
average	87.3	77.4	86.5	93.09

Figure 10 : Accuracy with feature subset selection for chi square**Figure 11 :** Accuracy comparison for GA,j48,NB,PART**Table 13 :** Accuracy comparison of PCA, χ^2 , GA

Data set	PCA	Chi square	GA
Weather	100	100	100
Pima	98.82	98.82	78.3
hypothyroid	97.06	97.64	97.37
breast cancer	97.9	97.64	95.45
liver disorder	95.07	70	84.63
primary tumor	80	83.18	83.18
heart stalog	98.14	97.7	99.62
lymph	99.32	100	99.32
heart disease A.P	100	100	100
average	96.2	93.8	93.09

Parameters for genetic search have been given in table 11. crossover rate should be high so we set the cross over rate as 60%. Mutation rate should be very low. Best rates reported are about 0.5%-1%. Big population size usually does not improve the performance of Genetic algorithm. So good population size is about 20-30. In our method we used roulette wheel selection method. The comparison of GA+ANN system with other classification systems has been given in table 12 and figure 11. The results acquired reveals that integrating GA with ANN performed well for many data sets and especially for heart disease A.P. we compared three feature selection methods in table 13. GA works well for 6 data sets. overall PCA with ANN works performed better than other classification methods.

VI. CONCLUSION

In this paper we have proposed a new feature selection method for heart disease classification using ANN and various feature selection methods for Andhra Pradesh Population. We applied different feature selection methods to rank the attributes which contribute more towards classification of heart disease, which indirectly reduces the no. of diagnosis tests to be taken by a patient. Our experimental results indicate that on an average with ANN and feature subset selection provides on the average better classification accuracy and dimensionality reduction. Our proposed method eliminates useless and distortive data. This research will contribute reliable and faster automatic heart disease diagnosis system, where easy diagnosis of heart disease will save lives. Coronary heart disease can be handled successfully if more research is encouraged in this area.

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CAPTCHA: Attacks and Weaknesses against OCR Technology

By Silky Azad & Kiran Jain

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Abstract - The basic challenge in designing these obfuscating CAPTCHAs is to make them easy enough that users are not dissuaded from attempting a solution, yet still too difficult to solve using available computer vision algorithms. As Modern technology grows this gap however becomes thinner and thinner. It is possible to enhance the security of an existing text CAPTCHA by system-apically adding noise and distortion, and arranging characters more tightly. These measures, however, would also make the characters harder for humans to recognize, resulting in a higher error rates and higher Network load .This paper presents few of most active attacks on text CAPTCHAs existing today.

Keywords : CAPCHA, human interactive proofs, recaptcha, optical character recog-nition, tesseract, security.

GJCST-D Classification : 1.2.7



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CAPTCHA: Attacks and Weaknesses against OCR Technology

Silky Azad ^a & Kiran Jain ^a

Abstract - The basic challenge in designing these obfuscating CAPTCHAs is to make them easy enough that users are not dissuaded from attempting a solution, yet still too difficult to solve using available computer vision algorithms. As Modern technology grows this gap however becomes thinner and thinner. It is possible to enhance the security of an existing text CAPTCHA by system-apically adding noise and distortion, and arranging characters more tightly. These measures, however, would also make the characters harder for humans to recognize, resulting in a higher error rates and higher Network load .This paper presents few of most active attacks on text CAPTCHAs existing today.

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I. INTRODUCTION

CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart)^[1], also known as Human Interactive Proof (HIP), is an automated Turing test in which both generation of challenges and grading of responses are performed by computer programs. CAPTCHAs are based on Artificial Intelligence (AI) problems that cannot be solved by current computer programs or bots, but are easily solvable by humans.



Figure 1 : CAPTCHAs from Internet Source
Hotmail.com

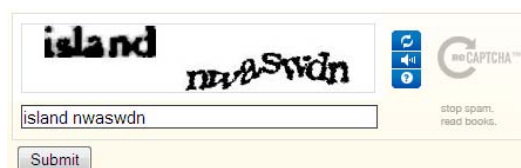
The term "CAPTCHA" was first introduced in 2000 by Von an et al., ^[1] describing a test that can differentiate humans from computers. Under common dentitions, the test must be

1. Easily solved by humans
2. Easily generated and evaluated,
3. But, Not easily solved by computer

Over the past decade, a number of different techniques for generating CAPTCHAs have been developed, each satisfying the properties described above to varying degrees. The most commonly found

CAPTCHAs are visual challenges that require the user to identify alphanumeric characters present in an image Obfuscated by some combination of noise and distortion. Figure 1 shows examples of such visual CAPTCHAs.

Another example of an excellent CAPTCHA service is re CAPTCHA^[2], re CAPTCHA is a user-dialogue system originally developed by Luis von An, Ben Maurer, Colin McMillan, David Abraham and Manuel Blum at Carnegie Mellon University's main Pittsburgh campus.



It uses the CAPTCHA interface, of asking users to enter words seen in distorted text images onscreen, to help digitize the text of books, while protecting websites from bots attempting to access restricted areas.^[1]

a) Applications of CAPTCHAs

CAPTCHAs are used in attempts to prevent automated software from performing actions which degrade the quality of service of a given system. CAPTCHAs are also used to minimize automated postings to various sites.

- Preventing Comment Spam in Blogs.
- Protecting Website Registration.
- Protecting Email Addresses.
- Prevention from Scrapers.
- Online Polls. IP addresses of voters are recorded in order to prevent single users from voting more than once.
- Preventing Dictionary Attacks. CAPTCHAs can also be used to prevent dictionary attacks in password systems.
- Search Engine Bots. It is sometimes desirable to keep WebPages un-indexed to prevent others from finding them easily.
- Preventing Worms and Spam. CAPTCHAs also offer a plausible solution against email worms and spam.

II. RELATED WORK

Marti Motoyama, et al ^[2] The Authors describes the reverse Turing tests, or CAPTCHAs, have become a

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ubiquitous defense used to protect open Web resources from being exploited at scale. An effective CAPTCHA resists existing mechanistic software solving, yet can be solved with high probability by a human being.

They have argued that CAPTCHAs, while traditionally viewed as a technological impediment to an attacker, should more properly be regarded as an economic one, as witnessed by a robust and mature CAPTCHA-solving industry which by passes the underlying technological issue completely.

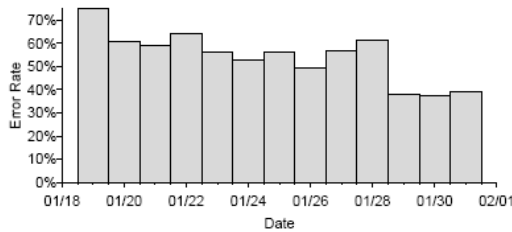


Figure 2 : Image to Text error rate for the custom Asirra CAPTCHA over time ^[2]

CAPTCHAs are suitable for use with standard solver image APIs. The authors wrote the instructions "Find all cats" in English, Chinese (Simplified), Russian and Hindi across the top, as the majority of the workers speak one of these languages. They submitted this image once every three minutes to all services over 12 days.

Image to Text displayed a remarkable adaptability to this new CAPTCHA type, successfully solving the CAPTCHA on average 39.9% of the time. Figure 2 shows the declining error rate for Image to Text; as time progresses, the workers become increasingly adept at solving CAPTCHA.

Elie Burstein, et al, ^[7] describe that the CAPTCHAs are designed to be easy for humans but hard for machines. However, most recent research has focused only on making them hard for machines. In this paper, they presented what is to the best of their knowledge the first large scale evaluation of CAPTCHAs from the human perspective, with the goal of assessing how much friction CAPTCHAs present to the average user. For the purpose of this study they have asked workers from Amazon's Mechanical Turk and an underground CAPTCHA breaking service to solve more than 318000 CAPTCHAs issued.

In the paper, "Text-based CAPTCHA Strengths and Weaknesses" by Elie Burstein and Mathieu Martin [4], The authors carry out a systematic study of existing visual CAPTCHAs based on distorted characters that are augmented with anti-segmentation techniques.

Applying a systematic evaluation methodology to 15 current CAPTCHA schemes from popular web sites, the authors find that 13 are vulnerable to automated attacks. Based on this evaluation, we identify a series of recommendations for CAPTCHA designers and attackers, and possible future directions for

producing more reliable human/computer distinguishers.

In the paper, "Attacks and Design of Image Recognition CAPTCHAs" [6], the authors systematically study the design of image recognition CAPTCHAs (IRCs). They first reviewed and examine all IRCs schemes known to them and evaluate each scheme against the practical requirements in CAPTCHA applications, particularly in large-scale real-life applications such as Gmail and Hotmail. Then the authors present a security analysis of the representative schemes the authors have identified. For the schemes that remain unbroken,

In the paper they presented their novel attacks. For the schemes for which known attacks are available, the authors propose a theoretical explanation why those schemes have failed. The authors have attempted a systematic study of image recognition CAPTCHAs.

The authors provided a thorough review of the state-of-the-art, presented a novel attack on a representative scheme, and analyzed successful attacks on the other representative schemes. Learned from these attacks, the authors defined for the first time a simple but novel framework for guiding the design of robust image recognition CAPTCHAs.

The framework led to their design of *Cortcha*, a novel CAPTCHA that exploits semantic contexts for image object recognition. Their usability study showed that Cortcha yielded a slightly better human accuracy rate than Google's text CAPTCHA. Cortcha offers the following novel features.

III. CONCLUSION

It is possible to enhance the security of an existing text CAPTCHA by systematically adding noise and distortion, and arranging characters more tightly. These measures, however, would also make the characters harder for humans to recognize, resulting in a higher error rate. There is a limit to the distortion and noise that humans can tolerate in a challenge of a text CAPTCHA. Usability is always an important issue in designing a CAPTCHA. With advances of segmentation and Optical Character Recognition (OCR) technologies, the capability gap between humans and bots in recognizing distorted and connected characters becomes increasingly smaller. This trend would likely render text CAPTCHAs eventually ineffective.

In the paper, "The Robustness of Google CAPTCHAs" [5], they reported a novel attack on two CAPTCHAs that have been widely deployed on the Internet, one being Google's home design and the other acquired by Google (i.e. re CAPTCHA). With a minor change, their attack program also works well on the latest Re CAPTCHA version, which uses a new defense mechanism that was unknown. When they designed their attack.

This suggests that their attack works in a fundamental level. Their attack appears to be applicable to a whole family of text CAPTCHAs that build on top of the popular segmentation resistant mechanism of "crowding character together" for security. They also proposed a novel framework that guides the application of their well-tested security engineering methodology for evaluating CAPTCHA robustness, and proposed a new general principle for CAPTCHA design.

They concluded that CAPTCHAs are still a new research area. Open problems include the mislabeling problem. Of all the problems they discussed, mislabeling causes the most human errors. The authors may be able to solve this using collaborative filtering, where known human users rate images according to how well they evoke their label. They presented more images per round in the anomaly detection CAPTCHA to debate computer performance.

IV. FUTURE SCOPE

A lot of work has been done in Enhancing CAPTCHA usability and Security one such example is use of re CAPTCHA^[2], However emergence of recent adverts and techniques made it more difficult to prevent automated bots and other dangerous spammers against CAPTCHA attacks. some techniques we have discussed in this paper provide more than 40% success rate, and as the faulty CAPTCHA requests are re-evaluated by the server and absence limiting count means that CAPTCHA decryption will be successful in consecutive attacks. In future we would like to use open source OCR Engines to validate such claims.

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Database Extract Information using Genetic Algorithm and Sending Message in HL7 Formatted using Back Propagation

By Kanika Sharma & Asst. Prof. Hardeep Singh Kang

RIMT College, Mandi Gobindgarh

Abstract - To analysis the speed of sending message in Healthcare standard 7 with the use of back propagation in neural network. Various algorithms are define in back propagation in neural network we can use back propagation algorithm for sending message purpose. Genetic Algorithm are used to extract information and send these information with this algorithm appears to be fastest method for training moderate sized feed forward neural network. It has a very efficient mat lab implementation. The need of this algorithm are used for analysis, increase the speed of sending message faster and accurately and more efficiently.

Keywords : *medical informatics, cloud computing, genetic algorithm, HL7, back -propagation.*

GJCST-D Classification : *1.2.6*



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Kanika Sharma ^α & Asst. Prof. Hardeep Singh Kang ^σ

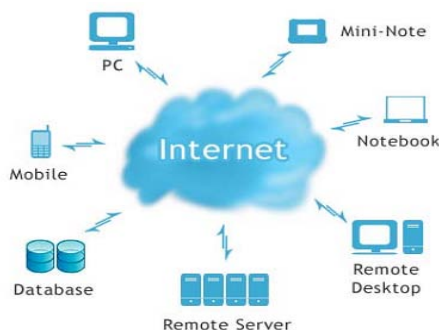
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keywords : medical informatics, cloud computing, genetic algorithm, HL7, back-propagation.

I. INTRODUCTION

Medical Informatics is the sub-discipline of health informatics that directly impacts the patient-physician relationship. It focuses on the information technology that enables the effective collection of data using technology tools to develop medical knowledge and to facilitate the delivery of patient medical care. The goal of medical informatics is to ensure access to critical patient medical information at the precise time and place it is needed to make medical decisions.

Cloud Computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). Cloud computing entrusts remote services with a user's data, software and computation. In the cloud computing using genetic algorithm to extract the meaningful information from a large database.



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Cloud computing are used for storing large amount of data in a single sever in a network which can easily and faster transfer to all other connected systems. With the use of Genetic algorithm extract meaningful and needed data from a large database.

Genetic Algorithm is used to calculate the fitness value and probability of occurrence. It is used to generate useful solutions to optimization and search problems.

II. HEALTHCARE STANDARDS

Healthcare standards provides framework for exchanging, integration, sharing and retrieval's of EHR. These standards define how information is packed and communicate from one party to another, setting the languages, structure and data types.

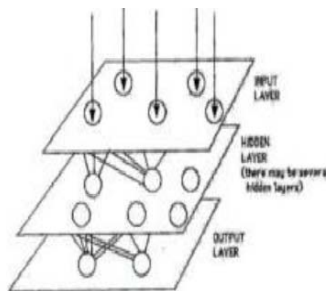
Healthcare standard 7 are mainly used to exchange information and data between systems. The OSI seventh layer application is used in this standard and also provides various application protocols to communication between system and also exchanging data.

These rules cover two broad areas:

- The formation of messages (what elements constitute a message and how these elements are put together).
- The communication of messages (how systems send messages back and forth, and how they verify the receipt and custody of the data in the messages).

Back propagation is an abbreviation for "backward propagation of errors" is a common method of training artificial neural network. It is an error function and supervised learning method and generalisation of the delta rule. For better understanding, the back propagation learning algorithm can be divided into 2 phases:-

1. Phase1- Propagation
2. Phase 2- Weight updates



Backpropagation is a method which is used in neural network. It can be used in various methods to improve the speed of the system. Neural network using three layers that are input, hidden and output layers. Various algorithms are defined in back propagation algorithms that are genetic algorithm, simulating algorithm, simplex algorithm and train LM algorithm. The Train LM algorithm is the best algorithm from all these algorithms. It can be easily calculate the system performance and also provide conversions feature.

III. METHODOLOGY

Healthcare data are used in medical field. The healthcare standards are defined some standard formats for those data. Healthcare seven standards are defined. We can use the last standard means latest standard seven that are based on OSI network seventh layer means application layer. These standard are mainly used for transmitted or exchange data between systems. These standard are mainly used the purpose of communication between sender and receiver. When we can send the HL7 formatted data with the use of some software we can check their speed, efficiency and accuracy of data. HL7 used logical formatted data with the set of rules. The healthcare data send between systems. Firstly we proposed that create a cloud which store large number of medical patient data after that we can use genetic algorithm to extract information from the large number of data stored in cloud. Then sending HL7 formatted data between the systems. Back-propagation algorithm used when sending data to improve the speed and accuracy of the system. Back propagation is neural network algorithms that are used for fast convergence. In the neural network consist of a set of neurons that can send or transmit data between neurons. It consist of three layers input, hidden and output layers. To improve the speed and accuracy of sending message we can change the weight value in the hidden layers. Various algorithms are used in back propagation to improve speed and accuracy. These algorithms are gradient decent, simulating annealing, simple algorithm and train LM algorithm. All these algorithms are training algorithms used for convergences purposes and analyzing speed. The Train LM algorithm is the best one all of these algorithms. With this we can improve the efficiency of software and send efficiently and accurately HL7 formatted data.

IV. CONCLUSION

Genetic algorithm is mainly used to provide an optimal solution for a specific search problem. It is used to calculate the fitness value. In a cloud computing used with genetic algorithm we can extract information from a large database and send these information in the HL7 format in one system to another. To improve the speed of the system we can use the back propagation train LM algorithm to improve the speed and accuracy of the system it can be easily calculate the performance of the system.

V. FUTURE SCOPE

Back-propagation is used to improve the performance of the system. If we can use this algorithm in any medical or other software then it can be improve the performance of the system. It can be provide better result as compare to the other algorithm used in the system. It can be improve system performance, efficiency and accuracy.

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GLOBAL JOURNAL OF COMPUTER SCIENCE AND TECHNOLOGY
NEURAL & ARTIFICIAL INTELLIGENCE

Volume 13 Issue 3 Version 1.0 Year 2013

Type: Double Blind Peer Reviewed International Research Journal

Publisher: Global Journals Inc. (USA)

Online ISSN: 0975-4172 & Print ISSN: 0975-4350

Gesture Recognition: A Survey of Gesture Recognition Techniques using Neural Networks

By Mahesh Sharma & Er. Rama Chawla

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Abstract - Understanding human motions can be posed as a pattern recognition problem. In order to convey visual messages to a receiver, a human expresses motion patterns. Loosely called gestures, these patterns are variable but distinct and have an associated meaning. The Pattern recognition by any computer or machine can be implemented via various methods such as Hidden Markov Models, Linear Programming and Neural Networks.

Each method has its own advantages and disadvantages, which will be studied separately later on. This paper reviews why using ANNs in particular is better suited for analyzing human motions patterns.

Keywords : *gesture recognition, artificial neural networks, pattern recognition.*

GJCST-D Classification : *1.2.6*



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Mahesh Sharma^a & Er. Rama Chawla^σ

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Each method has its own advantages and disadvantages, which will be studied separately later on. This paper reviews why using ANNs in particular is better suited for analyzing human motions patterns.

Keywords : *gesture recognition, artificial neural networks, pattern recognition.*

I. INTRODUCTION

A gesture is a form of non-verbal communication in which visible bodily actions communicate particular messages, either in place of speech or together and in parallel with words. Gestures include movement of the hands, face, or other parts of the body. The wave gesture is variable because even the same person's hand position may be several inches away from the position in a previous wave. It is distinct because it can be readily distinguished from a different gesture, such as a beckoning or a shrug. finally, it has the agreed meaning of "hello."

a) Using ANNs in Human Gesture Recognition

An artificial neural network, often just called a neural network, is a mathematical model inspired by biological neural networks. A neural network consists of an interconnected group of artificial neurons, and it processes information using a connections. In most cases a neural network is an adaptive system that changes its structure during a learning phase.

The Pattern recognition by any computer or machine can be implemented via various methods such as HMM (Hidden Markov Model), Linear Programming and Neural Networks. Each method has its own advantages and disadvantages, which will be studied separately later on.

ANNs in particular are better suited for Understanding and analyzing human motions patterns, As discussed earlier ANNs came in various forms but back propagation ANNs are much suited for analyzing

human Patterns, because gestures have motion vectors or Varying Directions associated with weight function. As motions direction can change the ANN must be able to sense the change in the pattern.

II. RELATED WORK

Richard Watson. "A Survey of Gesture Recognition Techniques Technical Report"^[1], Processing speeds have increased dramatically bitmapped displays allow graphics to be rendered and updated at increasing rates and in general computers have advanced to the point where they can assist humans in complex tasks.

Yet input technologies seem to cause the major bottleneck in performing these tasks under utilizing the available resources and restricting the expressiveness of application use. A recognition technique under development at TCD (Trinity College, Dublin) project was introduced in this survey paper. It remains to be discovered what exactly the context of gestures is undoubtedly this will depend on the application. The context of sign language for example would be syntactic and semantic information in the signed sentence along with facial expression and body movement.

William T. Freeman and Michal Roth. "Orientation Histograms for Hand Gesture Recognition"^[2].

The Authors present a method to recognize hand gestures, based on a pattern recognition technique developed by McConnell employing histograms of local orientation.

The Authors use the orientation histogram as a feature vector for gesture classification and interpolation. This method is simple and fast to compute, and others some robustness to scene illumination changes.

The Authors have implemented a real-time version, which can distinguish a small vocabulary of about 10 different hand gestures. All the computation occurs on a workstation; special hardware is used only to digitize the image.

A user can operate a computer graphic crane under hand gesture control, or play a game. They discussed limitations of this method. For moving or dynamic gestures", the histogram of the spatiotemporal gradients of image intensity form the analogous feature vector and may be useful for dynamic gesture recognition.

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III. CONCLUSION

Human gestures provide the most important means for non-verbal interaction among people. At present, artificial neural networks are emerging as the technology of choice for many applications, such as pattern recognition, gesture recognition, prediction, system identification, and control.

ANN provides good and powerful solution for gesture recognition and as described earlier Artificial Neural networks are applicable to multivariate non-linear problems. It has a fast computational ability. The ability of neural nets to generalize makes them a natural for gesture recognition.

IV. FUTURE SCOPE

We have discussed in this paper about work that has been done in the field of gesture recognition and use of ANNs in Gesture recognition problem in General There are various other methods that can be useful in detecting Human Motion patterns, however due to lack of Application platforms and exhaustive requirements of both CPU and Memory they are not suitable for use in current development Environments.

In our future work we would like to develop especially modified feed forward back propagating neural networks in this problem domain, The work will be carried out by collecting a large hand or computer pointer coordinates and processing them for patterns using ANNs.

SANJAY MEENA ., A Study on Hand Gesture Recognition Technique". Department of Electronics and Communication Engineering, The Authors describe that and gesture recognition system can be used for interfacing between computer and human using hand gesture. Their work presents a technique for a human computer interface through hand gesture recognition that is able to recognize 25 static gestures from the American Sign Language hand alphabet. The objective of this thesis is to develop an algorithm for recognition of hand gestures with reasonable accuracy.

The segmentation of gray scale image of a hand gesture was performed using Otsu thresholding algorithm. Otsu algorithm treats any segmentation problem as classification problem. Total image level was divided into two classes one was hand and other was background. The optimal threshold value was determined by computing the ratio between class variance and total class variance. A morphological filtering method was used to effectively remove background and object noise in the segmented image. Morphological method consists of dilation, erosion, opening, and closing operation.

Canny edge detection technique was used to find the boundary of hand gesture in image. A contour tracking algorithm was then applied to track the contour in clockwise direction. Contour of a gesture is

represented by a Localized Contour Sequence (L.C.S) whose samples are the perpendicular distances between the contour pixels and the chord connecting the end-points of a window centered on the contour pixels.

These extracted features are applied as input to classifier. Linear classifier discriminates the images based on dissimilarity between two images. Multi Class Support Vector Machine (MCSVM) and Least Square Support Vector Machine (LSSVM) was also implemented for the classification purpose. Experimental result shows that 94.2% recognition accuracy was achieved by using linear classifier and 98.6% recognition accuracy is achieved using Multiclass Support Vector machine classifier. Least Square Support Vector Machine (LSSVM) classifier was also used for classification purpose and shows 99.2% recognition accuracy.

In our future work we would like to develop especially modified feed forward back propagating neural networks in this problem domain, The work will be carried out by collecting a large hand or computer pointer coordinates and processing them for patterns using ANNs.

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- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

- Use standard writing style including articles ("a", "the," etc.)
- Keep on paying attention on the research topic of the paper
- Use paragraphs to split each significant point (excluding for the abstract)
- Align the primary line of each section
- Present your points in sound order
- Use present tense to report well accepted
- Use past tense to describe specific results
- Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives
- Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.



Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript-- must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.



- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently. You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.



Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

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- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.



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Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



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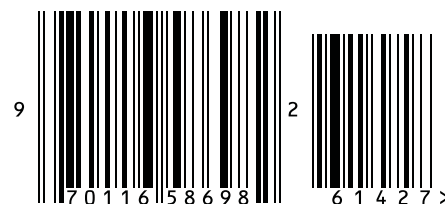


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ISSN 9754350

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