

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320-088X

IJCSMC, Vol. 3, Issue. 7, July 2014, pg.585 – 593

RESEARCH ARTICLE



Analyses of Autistic Patients By using Interpretation Value Analysis

Priyanka Juneja^{#1}, Anshul Anand^{*2}

¹ Shri Baba Mastnath Engineering College
Asthal Bohar, Rohtak, MDU
Haryana (India)
er.priyanka_6168@yahoo.com

² Shri Baba Mastnath Engineering College
Asthal Bohar, Rohtak, MDU, Haryana
Anshulnnd9@gmail.com

Abstract: *Data Mining is represented as the statistical technique that takes the decision based on historical data. Neural imaging studies of autism spectrum disorder (ASD) have consistently demonstrated deficits in connectivity. One of the major research areas under the data mining is prediction system. One of the major research areas under the data mining is prediction system. The prediction system is about to take some decision about the occurrence of some event in near future. Such kind of prediction systems is useful to perform the necessary action on time so that the future loss can be minimized. We have defined a prediction system to identify the learning disability for the autistic patients. The medical disease prediction is an application of expert system, that we here defining by using an intelligent soft-computing approach called probabilistic neural network and Fuzzy Logic*

Keywords: *Data mining, supervised learning, unsupervised learning, Autism*

I. INTRODUCTION

Data Mining is sometimes represented as the statistical technique that takes the decision based on historical data. But instead, it is defined as a science to find the input pattern over the large datasets. The data mining is about to derive the useful information from the available raw set of information. It has its importance in many potential applications in different areas such as financial field, medical care systems etc. In short we can say there is no field that does not require the data mining operations. In business it is being used in many application such as eligible loan candidate detection, fraud detection etc. It is used in network applications,

attack detection, load detection, ideal user detection etc. In this present work the data mining is being studied under the health care system. Health care system is one of the crucial applications of data mining where the accurate results are expected after the appropriate processing and even then obtained results cannot be used directly without the expert concern. In clinical area, the data mining is used to perform the prediction, classification, clustering etc. [15][25]

This document gives a detailed description of the purpose, design and implementation of the Data Mining Framework. The primary purpose of the Data Mining Framework is to help determine trends in patient records to improve Health Care.

SUPERVISED LEARNING

In supervised learning, each input vector requires a corresponding target vector which represents the desired output. This input vector along with the target vector is called training pair. During training the input vector is presented to the network, which results to an output vector. This output vector is called the actual output vector. Then actual output vector is compared with the desired (target) output vector.[24]

In there exist a difference between the two output vectors, then error signal is generated by the network. The error signal is used for adjustment the weight until the actual output matches the desired output. In this type of learning a supervisor or a teacher is required to minimize the error.

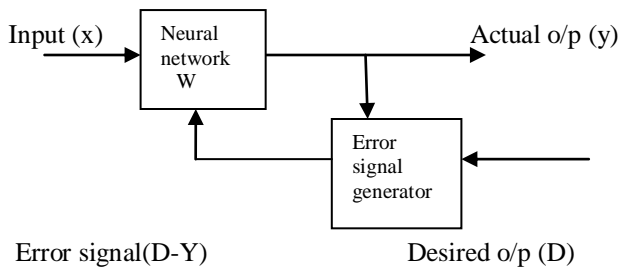


Figure 1: Supervised learning

UNSUPERVISED LEARNING

In this learning, the input vector of similar are grouped without the use of training data to specify how a member of each group look or which group a member belongs. In this, network receives the input pattern and organizes those patterns to form clusters. When new input pattern is applied, neural network gives the output response indicating the class to which the input pattern belongs.[16][24]

It is for an input, a pattern class cannot be found then a new class is generated. This process is called self organizing.

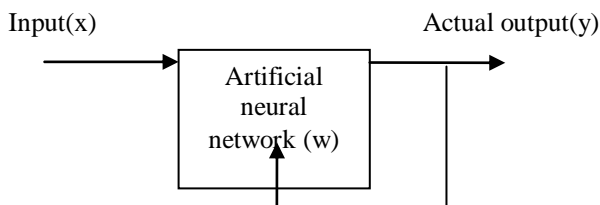


Figure 2: Unsupervised learning (self organizing)

Fuzzy Control

A fuzzy system is one of major soft computing approach that defines a decision system on current dataset. The fuzzy control system is the combination of fuzzy set theory defined with number of fuzzy operators and the language. The fuzzy system is itself a non linear system that is very similar to digital control system but difference is that it does not depends on mathematical model. It is comparatively complex system that defines the control method and the process control. The basic stages of a fuzzy control system are described.

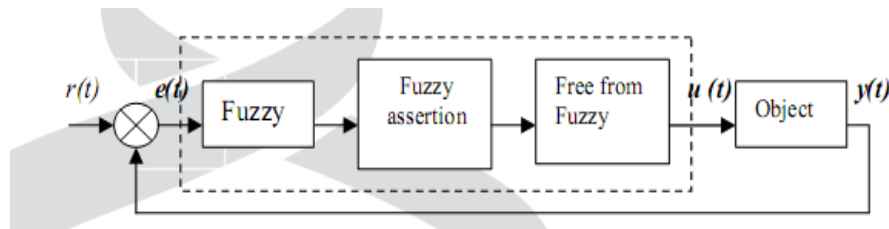


Figure 3 : Fuzzy System

A fuzzy control system begins with the fuzzy system with control strategy. The fuzzy system is defined with a set of requirements that will be asserted to obtain the actual idea. In the next stage the fuzzy system is defined on the input system and the final fuzzy value is obtained. [24]

Autism

Learning disability - With Learning disability problem children see, hear and understand thing differently. This can lead to trouble with learning new information and skills, and putting them to use. The most common types of learning disabilities involve problems with reading, writing, math, reasoning, listening, and speaking. [7]

Visual Processing Disorder - Someone with a visual processing disorder has trouble interpreting visual information. He or she may have a hard time with reading or telling the difference between two things that look similar. People with a visual processing disorder often have trouble with hand-eye coordination.

ADHD – Attention deficit hyperactivity disorder (ADHD), while not considered a learning disability, can certainly disrupt learning. Children with ADHD often have problems sitting still, staying focused, following instructions, staying organized, and completing homework.[6]

Autism – Difficulty mastering certain academic skills can stem from pervasive developmental disorders such as autism and Asperger’s syndrome. Children with autism spectrum disorders may have trouble communicating, reading body language, learning basic skills, making friends, and making eye contact.[5][6]

There are different symptoms for various age groups as explain below:

Preschool signs and symptoms of learning disabilities

- Problems pronouncing words
- Trouble finding the right word
- Difficulty rhyming
- Trouble learning the alphabet, numbers, colours, shapes, days of the week
- Difficulty following directions or learning routines
- Difficulty controlling crayons, pencils, and scissors or colouring within the lines

Trouble with buttons, zippers, snaps, learning to tie shoes

II. LITERATURE REVIEW

Exploration of Autism Using Expert System (Sveeraraghavan, 2007). This system is consist of three parts: 1) knowledgebase screener 2) Intelligent gaming 3) report generator.

Increasing Intelligibility in the Speech of the Autistic Children by an Interactive Computer Game. (Rahman, 2010). There is no definite treatment for autism. But we can help autistic children being providing games and teaching facilities to improve their skills. In this paper Game is for improving the intelligibility in the speeches of autistic children. In this paper, main concentration for the unintelligible sound.

Reach and throw movement analysis with Support Vector Machines in early diagnosis of autism. In this paper peculiar feature is finding in reach and throw movement by using SVM (support vector machine) reach and throw means the child is reaching to table and throwing the ball .. group is identifying. [12]

Very Early Diagnosis of Autism Spectrum Disorder Based On Acoustic Analysis Of Pre-verbal Vocalizations Of 18-Month Old Toddlers. (Santos, 2013). In the early detection of Autism means taking the symptoms of patient during childhood based on preverbal vocalization (communication like crying etc), by using the technique supervised learning SVM (support vector machine).

fMRI study of young adults with autism interacting with a humanoid robot (Chaminade, 2012)

In this paper study of MRI how the brain is affected when person play with robots In this paper to prove that robotics is helpful for autistic patients for improvement while playing the game with robot , brain is scanning and its study that brain become more active after playing with robot.[6]

A step Towards an Intelligent Human Computer Interaction :Physiology-based Affect-Recogniser (Kuriakose, 2012)

In this paper Analysis of variation in the participant when they interact with VR Environment. In this paper task presentation module is there to see how the participant pick the task, and then avatar will narrate the story based on participant choice and then participant have to interact with avatar. In the whole scenario Therapist will observed the whole view by video camera without the knowledge of participant.

Hybrid Ontology based e - Learning Expert System for Children with Autism (Karthika Venkatesan, 2013)

This paper provides the e-learning content for the autistic children based on their age and disability. Teaching facilities vary on the basis of age and disability characterises. Ontologies are conceptual mapping of concepts usually used to represent Domain based Knowledge and derive inference on the knowledge require. Tracking and assessment methodologies have to apply to monitor to monitor the progress of the learner. [7]

Identification Of Faulty DTI-based Sub-Network in autism using Network Regularized SVM (Li, 2012)

Is paper faulty sub networks associate with ASD using the diffusion tensor imaging (DTI) By using neural network approach SVM (support vector machine). To identify faulty sub network in order differentiate ASD from normal TD (typical developing). For the construction of brain connectivity network, an improved tensor based fast marching (FM) algorithm was used to simulate the water diffusion dynamics in DTI. (Li, 2012)[8]

Affect Recognition in Robot Assisted Rehabilitation of Children with Autism Spectrum Disorder (Changchun Liu,2002)

In this present work, author defined a human-computer interaction model to identify the automatic identification of autism under the spectrum disorder. The main objective of author is to perform the autism detection under the adaptive dynamic approach.

Ontology Driven Data Integration for Autism Research (Lynn Young, 2009)

In this paper, author defined an ontology based information extraction approach to identify the autism in children. Author performed a deep study on spectrum disorder and generated the complex structure under different autism types and the causes. Author performed the analysis on a group data so that the semantic data interaction can be incorporate with the system itself. Author defined a metadata extracted approach to derive the ontology queries on database and obtain the qualified results respective to the autism.

The Relationship between Nature Experience Activities and Multiple Intelligences Development of Children with Autism (Chiou-Shya Torng, 2013)

Author defined an activity and intelligent study and the improvement of these vectors in autistic students. Author defined a behavioral study on the autistic student to perform decision making. In this work, the analytical study was performed by the author under different vectors such as self-reflection, logical reasoning analysis, musical analysis, interpersonal intelligent analysis etc. Author defined the analysis under the emotional stability so that the reinforcement over the system obtained.

Design and Development of a Virtual Dolphinarium for Children With Autism (Cai, 2013)

In this the autistic child increase their gesture by playing with virtual dolphin , by hand posture child can copy dolphin trainer in virtual dolphinarium so by this 3-D virtual technology child can be play as well as increase their hand movements.

III. PROPOSED WORK

Health care organizations store huge amounts of data in the form of patient databases. Trends in these databases can be identified using data mining practices, which sort and model the data in order to arrive at a conclusion. The data mining applications present the data in the form of data marts. This allows end users to choose the specific sets of data, which they want to be analyzed. The data in these data marts can then be presented using a graphical user interface, arranging the data into columns and rows.

In the Health care industry, however, the lack of standard clinical vocabulary has hindered the process of data mining to a certain extent. For example a simple term such as ‘hypertension’ can be expressed in various ways in health care. This could lead to unnecessary problems, during the process of data mining. The increase in the use of standardized terms will reduce the percentage of errors in the data mining process. [14][15]

Cleaning the data before it can be mined is also an important step in the data mining process. In many Health care organizations, the mode of preparing patient reports can lead to a good deal of confusion. For instance, in a certain hospital, a report was prepared, before and after a patient went in for an X-ray check. This could be

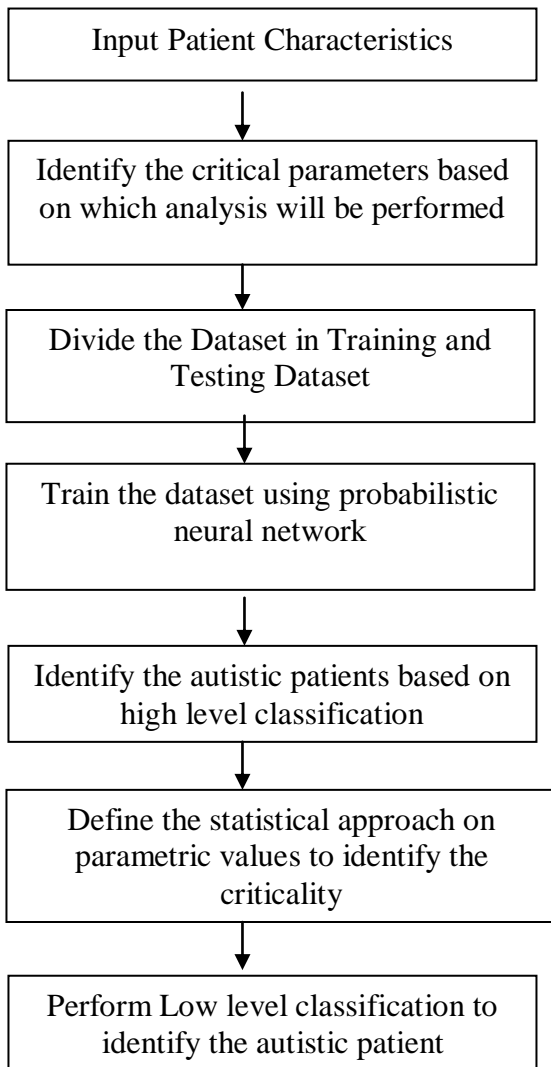


Figure 4: Flowchart of Proposed Work

Interpretation

The major affect on autism is predicted based on Interpretation analysis. The interpretation is about to observe something i.e. some event or some object. In this work we have taken this feature as the primary attribute and classify it in four stages called, “Low”, “Normal”, “High”.

IV. RESULT

The autistic patients are here analyzed by using interpretation value analysis. The figure is showing the statistical analysis using interpretation analysis. Here x axis represents the instances and y axis represents the interpretation value. Higher the interpretation value, more accurate the interpretation done by the value analysis.

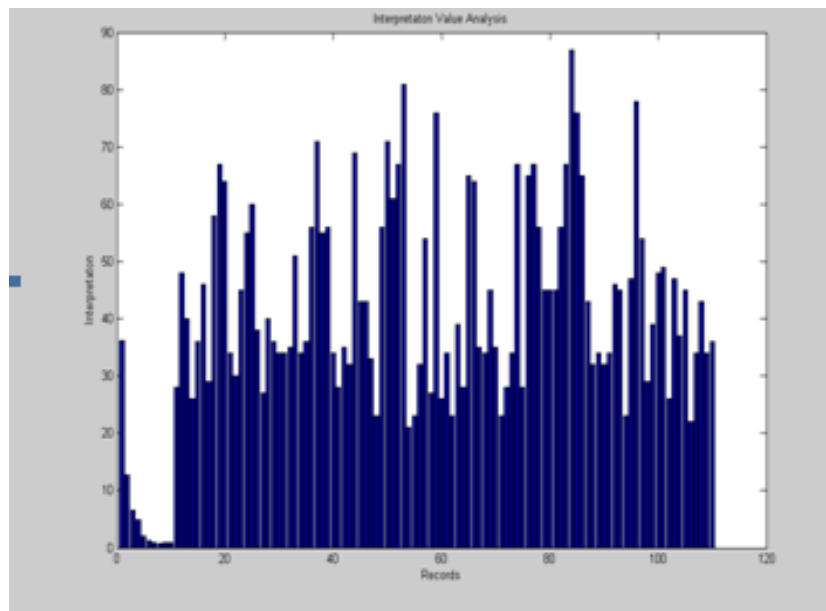


Fig.5 Interpretation Value Analysis

V. CONCLUSION

In this paper, the analysis on the patient symptom information based a pre level decision is taken about to identify the chances of autism. The work is under the intelligent system that can be adapted by a doctor. In this work we have taken a parameter based fuzzification that will perform the analysis based on some parameters. The parameter values are driven from the doctor. More the accurate values will be driven more accurate the results will be. In this we have driven the decision making based on some parameters.

ACKNOWLEDGEMENT

The work presented here is carried out using MATLAB environment at Shri Baba Mastnath Engineering College Rohtak, Haryana, India.

REFERENCES

1. Sampathkumar, Veeraraghavan, Karthik Srinivasan “EXPLORATION OF AUTISM USING EXPERT SYSTEMS”, Fourth International Conference on Information Technology, pp 261-264, 2007
2. Md. Mustafizur Rahman, S. M. Ferdous, Syed Ishtiaque, “Increasing Intelligibility in the Speech of the Autistic Children by an Interactive Computer Game”, International Symposium on Multimedia(ISM), pp 383 – 387, 2010
3. Paolo Perego, Sara Forti, Alessandro Crippa, Angela Valli and Gianluigi Reni “Reach and throw movement analysis with Support Vector Machines in early diagnosis of autism”, Annual International Conference of the IEEE in Medicine and Biology Society, pp 2555 – 2558, 2009
4. Joan F. Santos, Nirit Brosh, Tiago H. Falk, Lonnie Zwaigenbaum, Susan E. Bryson, Wendy Roberts, Isabel M. Smith, Peter Szatmari and Jessica A. Brian, “Very early detection of autism spectrum disorders based on acoustic analysis of pre-verbal vocalizations of 18-month old toddlers”, International Conference on Acoustics, Speech and Signal Processing, pp 7567 – 7571, 2013
5. Yiyu Cai, Noel K. H. Chia, Daniel Thalmann, Norman K. N. Kee, Jianmin Zheng, and NadiaM. Thalmann”Design and Development of a Virtual Dolphinarium for Children with Autism”, IEEE Transactions on Neural Systems and Rehabilitation Engineering, pp 208 – 217, 2013
6. Thierry Chaminade, David Da Fonseca, Delphine Rosset, Ewald Lutchter, Gordon Cheng, Christine Deruelle “fMRI study of young adults with autism interacting with a humanoid robot”, IEEE RO-MAN, pp 380 – 385, 2012
7. Arthika Venkatesan, Sindhuja Nelaturu, “Hybrid Ontology based e - Learning Expert System for Children with Autism”, International Conference on Information and Communication Technology, pp 93 - 98 ,2013
8. Hai Li, Zhongh Xue, Timothy M. Ellmore, Richard E. Frye, Stephen T. Wong, “Identification Of Faulty DTI-based Sub-Network in autism using Network Regularized SVM”, International Symposium on Biomedical Imaging, pp 550 – 553, 2012
9. Filippo Amato, Alberto López, Eladia María Peña-Méndez, Petr Vaňhara, Aleš Hampl, Josef Havel, “Artificial neural networks in medical diagnosis”, Journal of Applied Biomedicine, pp 37 – 42, 2013
10. MA. O’Riordan and F. Passetti, “Enhanced Discrimination in Autism”, Proceedings of the 9th International Conference on Neural Information Processing , Vol. 3, pp 1539-1542, 2002
11. Changchun Liu, Karla Conn, Nilanjan Sarkar and Wendy Stone, “Affect Recognition in Robot Assisted Rehabilitation of Children with Autism Spectrum Disorder”, International Conference on Robotics and Automation, pp 1755-1760, 2007
12. Lynn Young, Samson W. Tu, Lakshika Tennakoon, David Vismer, Vadim Astakhov, “Ontology Driven Data Integration for Autism Research”, International Symposium on Computer-Based Medical Systems, pp 1 – 7, 2009
13. Chiou-Shya Torng, “The Relationship between Nature Experience Activities and Multiple Intelligences Development of Children with Autism”, Seventh International Conference on Complex, Intelligent, and Software Intensive Systems, pp 683-687, 2013
14. N. Aditya Sundar, ”Performance Analysis Of Classification Data Mining Techniques Over Heart Disease Data Base”, [IJESAT] INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE & ADVANCED TECHNOLOGY ISSN: 2250–3676

15. Mr. Dhiraj Pandey, "Prediction System To Support Medical Information System Using Data Mining Approach", International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622
16. T Srinivasan," Knowledge Discovery in Clinical Databases with Neural Network Evidence Combination".
17. Francesco Folino," A Comorbidity-based Recommendation Engine for Disease Prediction", 978-1-4244-9166-7/10/ 2010 IEEE
18. K.Srinivas," Mining Association Rules from Large Datasets Towards Disease Prediction", 2012 International Conference on Information and Computer Networks (ICICN 2012) IPCSIT
19. Smitha.T, "Classification Rules by Decision Tree for Disease Prediction", International Journal of Computer Applications (0975 – 8887), Volume 43– No.8, April 2012
20. Milan Kumari, "Review of Data Mining Classification Models in Cardiovascular Disease Diagnosis", National Workshop-Cum-Conference on Recent Trends in Mathematics and Computing (RTMC) 2011
21. SHELLY GUPTA, "Data Mining Classification Techniques Applied For Breast Cancer Diagnosis And Prognosis", Indian Journal of Computer Science and Engineering (IJCSE), ISSN : 0976-5166 Vol. 2 No. 2 Apr-May 2011 188
22. A.Sudha, "Utilization of Data mining Approaches for Prediction of Life Threatening Diseases Survivability", International Journal of Computer Applications (0975 – 8887), Volume 41– No.17, March 2012
23. L. Sathish Kumar, "Prediction for Common Disease using ID3 Algorithm in Mobile Phone and Television", International Journal of Computer Applications (0975 – 8887), Volume 50 – No.4, July 2012
24. Neural Networks Simon Haykin, . Satish Kumar Fuzzy Logic & Fuzzy Sets Klir & Yuan. Satish Kumar
25. Modern Database Management by Feffray A. Lioffer, Mary B. Prescottl, Fred R Mcfadden, 6th edition, Pearson Education Database system concepts by Korth.