



Statistical Analysis for the Prediction of Asperger Syndrome in Adults

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Abstract— Asperger syndrome is widely described as a neurodevelopmental disorder, belongs to the family of Autism. In India, more than one million people are affected per year. The main goal of the paper is to predict and analyses the Asperger syndrome (AD) in Adults by applying relevant data mining classification algorithms. Decision-making process in data mining will facilitate higher resource utilization in this Syndrome in adults.

Keywords— Neurodevelopmental disorder, Asperger syndrome, Autism, Data Mining

I. INTRODUCTION

Asperger Syndrome (AD) is an invasive developmental disorder that is broadly described as a mild form of autism. People with Asperger syndrome (AD) tend to have many of the social and sensory issues of those with more severe forms of autistic disorder but have average or above-average IQs and vocabularies. They often have trouble in picking up on delicate forms of communication like body language, humour and sarcasm.

Asperger syndrome remains undiagnosed until an adult begins to have serious difficulties to face in school, the workplace or their personal lives. Indeed, many adults with Asperger syndrome receive their diagnosis when seeking help for related issues such as anxiety or depression. Diagnosis tends to centre primarily on difficulties with social interactions. For instance, someone with Asperger syndrome might initiate conversations with others by extensively relating facts related to a particular topic of interest. He or she may resist discussing anything else and have difficulty allowing others to speak. Often, they don't notice that others are no longer listening or are uncomfortable with the topic. They may lack the ability to "see things" from the other person's perspective.

Another common symptom is an inability to understand the intent behind another person's actions, words and behaviours. So children and adults affected by Asperger syndrome may miss the humour and other implications.

Similarly, they may not instinctually respond to such “universal” nonverbal cues such as a smile, frown or “come here” motion. People with Asperger syndrome to have difficulty in controlling their emotions. They may cry or laugh easily or at inappropriate times.

In this paper, classification techniques are used to measure and estimate the Asperger person deals with the accuracy, confusion matrices and also the execution time taken by the various classification data mining algorithms.

Section 2 dealt with the Introduction about Data mining, Section 3 dealt with the Analysis of Data and Section 4 dealt with Data Interpretation and Inferences, section 5 dealt with Results and Discussion section 6 ends with the conclusion.

II. INTRODUCTION TO DATA MINING

Data mining is the extraction of knowledge or patterns from a large amount of data usually referred to as knowledge discovery. Data Mining can be a multidisciplinary field, has the areas like information technology, machine learning, statistics, pattern recognition, information retrieval, artificial neural networks, and knowledge-based systems, artificial intelligence and data visualization. There are several major data mining techniques are useful for discovering patterns such as association, classification, clustering, prediction, sequential patterns, decision trees, etc. The general functional diagram is as follows,

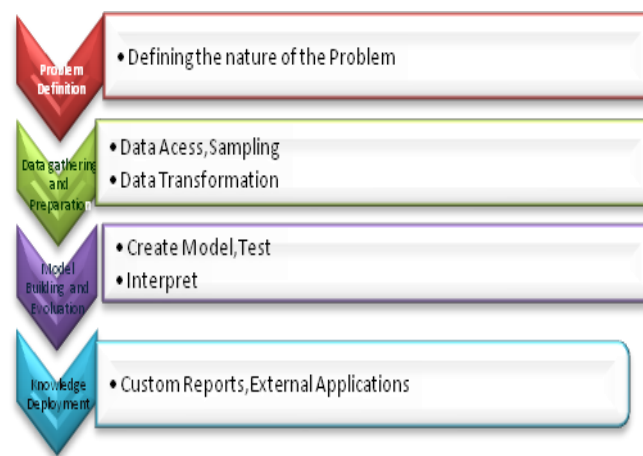


Fig 1 Functional diagram

The application of data mining is widely common in the medical field. An Asperger syndrome disorder is a complex developmental disability that affects the knowledge that emerges can be used to better understanding of Asperger syndrome person. The data mining system is pivotal and crucial to measure the Asperger syndrome person's improvement. The classification algorithms are accustomed to classify and analyze the data set correctly and accurately. The main objective of the paper is to use data mining methodologies to predict and forecast the Asperger syndrome in adults. In this paper, the classification techniques are used and employed to gauge the Asperger level by various classification data mining algorithms.

2.1 CLASSIFICATION TECHNIQUES:

Classification techniques have shown their usefulness for the complex process of diagnosis. The importance of classification techniques in the medical community is especially for diagnostic purposes and it has increased gradually. The important reason for improving medical diagnosis is to enhance the human ability to find better treatments, and to help with the prediction of diseases to make the diagnoses more efficient. The classification task will involve the following: each object in a data set is represented by a number of features, and each of these objects will be determined by a number of classes to which it belongs. The features will be accumulated into an input vector x . The classifier will be provided by a number of previous objects that is training set, each vectors of feature values and label the correct class.

This analysis research paper contains various kinds of SVM classification algorithms. It is a classic data mining technique based on machine learning. It is used to classify each item in a set of data into one of the predefined set of classes or groups. Classification method makes use of mathematical techniques such as decision trees, linear programming, neural network and statistics.

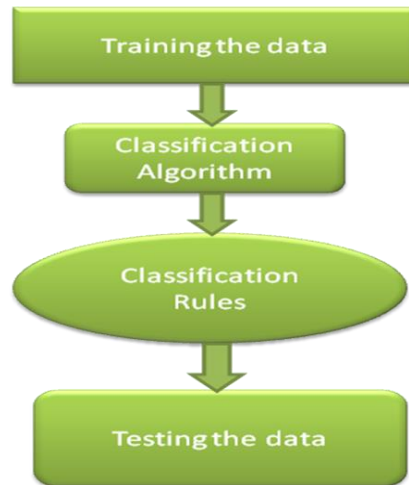


Fig 2 Flow diagram

In classification, support vector machine is supervised learning models with associated learning algorithms that analyze data and acknowledge the patterns, used mainly for classification and regression analysis.

2.2 SVM CLASSIFICATION:

Linear SVM is new and fast machine learning algorithm used for solving multi-class classification problems for large data sets. An SVM training algorithm builds the model that assigns new examples into one class or the other, creating it a non-probabilistic binary linear classifier. An SVM model could be a representation of the examples as points in space, and it is mapped so that the examples of the separate categories are divided by a transparent gap that is as wide as possible. In SVMs we tried to find a decision boundary that maximizes the 'margin' by separating the positives from the negative training data points.

To find this we maximize: $1/2 \|\omega\|^2$ subject to the constraints $y_i(\omega \cdot x_i + b) \geq 1$

The resulting Lagrange multiplier equation $L=1/2 \|\omega\|^2 - \sum_{i=1}^n \lambda_i (y_i(\omega \cdot x_i + b) - 1)$

In addition to linear classification, SVM efficiently performs a non-linear classification called KNN and Fine Gaussian implicitly mapping their inputs into high-dimensional feature area.

III. ANALYSIS OF DATA

Analysis and interpretation of collected data is the brain of this work. After analysis of data, only one can arrive at the findings with the related problem identified. This findings which have been arrived after analysis and interpretation helps to find out the hidden solution for the problem and give the most appropriate suggestions for overcoming problems.

Data is analyzed using Classification techniques. Analysis of data through these techniques has been achieved with the help of Orange tool and Matlab. The Matlab software has also been used to analyze and depict the collected data via various tables and charts. Questions were framed based on the behavioural traits of a person and collected data on emotional intelligence by asking the respondents to give their opinion on the following questions. Data are collected from the male at the age group of 50-65 from different sectors.

IV. DATA INTERPRETATION AND INFERENCES

Out of fifty questions, the scores were evaluated and the following table is constructed

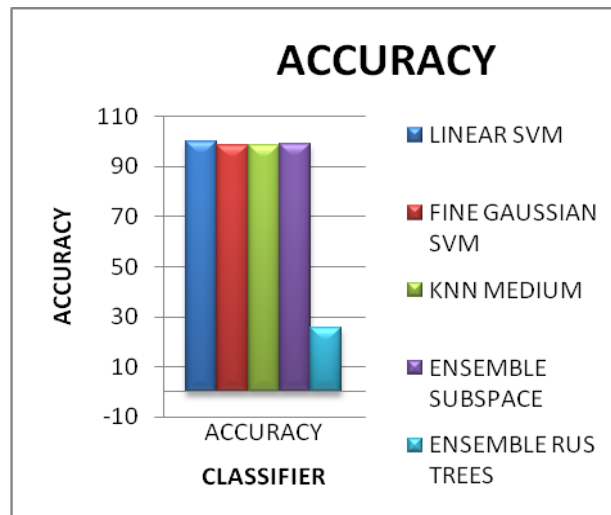
<i>A. Score 0-29</i>	<i>B. Score 30-33</i>	<i>C. Score 34 and above</i>
<i>No Asper</i>	<i>Slight trace of Asper</i>	<i>The higher level of Asper should meet the doctor</i>

Table -1 Evaluation table

Orange is an open-source software system that implements a large collection of machine learning algorithms and is widely utilized in data mining applications. From the above data, the asper file was created. This file was loaded into Orange explorer. Asperger prediction is influenced by the scores of the questioner and the levels of Asperger is predicted. 200 samples were taken for the implementation. The classify panel permits the user to use classification algorithms to the dataset and it is used to estimate the accuracy of the resulting Asperger predictive model, and to visualize the model. The Classification tree, Support Vector Machine and Naive Bayes logic were enforced in Orange. Under the “Test options”, the 10 fold cross-validation is chosen. The above data is also implemented by using MatLab. The data are trained and used in Matlab for analysis of classification Techniques.

V. RESULTS AND DISCUSSION

The analysis and interpretation of classification is a time-consuming process that needs a deep understanding of statistics. The models need a large amount of time to finish and expert analysis to look at the classification and relationships within the data.



This shows that out of a hundred adults with the age group of 40-60 one person will affect, for this we have taken two hundred data. The score result is taken as the class and score value, age areas attributes. The above graph shows that only Linear SVM produces 100% result.

VI. CONCLUSION

The work explores the potency of machine learning algorithms in deciding the influence of result. It is discovered that Linear Support Vector Machine is best than that of different algorithms employed in the study. This study is going to be useful for the psychology department. In future, it can increase the analysis by using different classification techniques and association rule mining for the Asperger dataset. A next step to increase the reliability of the results is repeating the research study using a larger sample.

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