

Predicting Autism Spectrum Disorders Through Machine Learning Techniques

Dr. MALLISHETTY PRAVEEN KUMAR¹, CHILKAPATI SAI SUDHA²

#1 Associate Professor, Department of CSE, PBR Visvodaya Institute of Technology and Science, Kavali

#2 Assistant Professor, Department of CSE-IoT, PBR Visvodaya Institute of Technology and Science, Kavali

ABSTRACT—These days, autism spectrum disorder is becoming a more widespread issue affecting people of all ages. The maintenance of the patient's physical and mental health can be substantially aided by early diagnosis of this neurological condition. The use of machine learning approaches for early autism spectrum disorder (ASD) prediction is being investigated in this

1. INTRODUCTION

These days, autism spectrum disorder is becoming a more widespread issue affecting people of all ages. The majority of ASD diagnoses occur in children under the age of two, though they can occur at any age depending on the severity and intricacy of the symptoms. The maintenance of the patient's physical and mental health can be substantially aided by early diagnosis of this neurological condition. Early diagnosis is superior to conventional behavioral investigations, which take a long time to detect and diagnose ASD by analyzing children's behavior in clinics, even when a complete cure seems unattainable.

It has typically happened as a result of environmental variables or any hereditary connections, which affect the children's nerve systems as well as their general

study. use machine learning techniques to create the model, such as Random Forest, Adaboost, and C-Support Vector Classification. A Streamlit-developed, user-friendly web interface is integrated with the model in this project. letting users enter medical information to get estimates of possible ASD presence Predicting Autism Spectrum Disorders Through Machine Learning Techniques.

social and cognitive abilities. Common symptoms of the illness include repetitive behaviors, obsessional interests, and trouble communicating, especially in social settings. To identify ASD, a comprehensive assessment involving multiple tests conducted by psychologists and child healthcare experts is required.

Early diagnosis and treatment of ASD are essential since they serve to mitigate symptoms to some extent, improving the quality of life for the affected individual overall. A variety of clinical techniques can be used to identify autism as early as possible, however these are laborious diagnostic processes that are rarely used unless there is a significant predicted risk of the development of ASD.

Training ASD models with machine learning allows for faster and more

accurate training. To stop autism from having long-lasting consequences on children, a variety of machine learning classification algorithms can be employed to predict autism early on. Machine learning techniques are utilized to diagnose ASD problems as classification tasks. Prediction models are constructed using chronological datasets, and those patterns are then utilized to predict whether or not an individual has ASD.

2.LITERATURE SURVEY

- The writing review on chemical imbalance range jumble identification. we investigated different exploration papers and studies connected with this field.
- In 2017, Fadi Thabtah have proposed a screening model utilizing AI Adaption and DSM-5. A screening device has been utilized to acknowledge at least one objectives in screening.
- It additionally referenced the AI characterization with their advantages and disadvantages. The analyst attempted to feature the issue going with existing ASD screening instruments and the consistency of such apparatuses utilizing the DSM-IV rather than the DSM-5 manual.
- M.S. Mythili, A. R. Mohamed shanavas et al. have a concentrate on ASD utilizing grouping strategies. the fundamental point of this paper was to recognize the mental imbalance issue and the degrees of mental imbalance. In this Brain Organization, SVM and fluffy methods with WEKA devices are utilized to dissect the understudy's way of behaving and their social association.
- Rahul Mishra anticipated a model that was fabricated in view of sequential dataset, and afterward utilized those examples to foresee that the individual is experiencing ASD or not, yet this was least compelling as its precision is simply just 67.5564%.
- V. Geetha assessed the exhibition of ML Procedures Specifically Multi-facet

Perceptron, J48 Classifier, Gullible Bayes, and Bayesian Organization to foresee ASD in grown-ups at a beginning phase. This test would be done exclusively to grown-ups.

- Mary Hanleya , a blended strategy, multi-source approach with instructors and guardians were utilized to comprehend what tangible contrasts mean for learning and school life for mentally unbalanced students. The aim of the study was to learn more about the effects of unusual sensory reactions and sensitivities on children with ASD, which were reported by parents and teachers.

3.PROPOSED SYSTEM • Using machine learning algorithms and datasets, the objective is to develop a model that can quickly and accurately identify children with autism spectrum disorder.

- To foster another AI system and perform prescient investigation on a dataset relating to cross breed chemical imbalance screening of small kids.
- By using AI procedures like Irregular Timberland, Adaboost, and C-Backing Vector Grouping.
- The objective is the creation of a model that accurately identifies individuals with ASD. The task joins the model with a natural web interface made with Streamlit so clients might enter patient data and get gauges about the probability of an ASD being available.

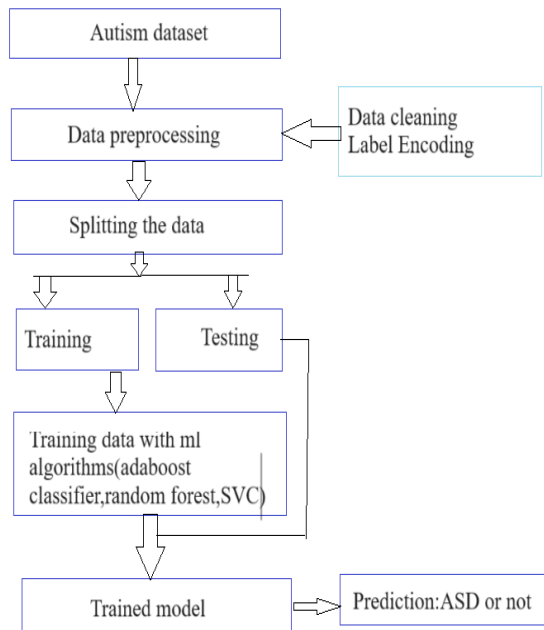


Fig 1:Architecture

3.1 IMPLEMENTATION

Data collection:

- The dataset for autism spectrum detection utilized in this project was sourced from Kaggle. The prepared data typically consists of rows and columns, where each row represents an individual and each column represents a specific feature.

Data Preprocessing:

- Gathered a large, well-structured dataset containing relevant features for ASD prediction. Consider publicly available datasets.
- Preprocess the data to handle missing values, outliers and label encoding.

4.RESULTS AND DISCUSSION

Splitting the data:

- The pre-processed data is split into training and testing data. Training Set contains 80% data. This larger portion of the data is used to train the machine learning models
- The Testing Set contains 20% It's used later to evaluate the model's performance on new data it hasn't encountered before.

Machine Learning Model Training:

- in these ML algorithms for classification, such as Support Vector Machines (SVMs), Random Forests, Ada Boost are used.
- Train the ML model on the training set and evaluate its performance on the testing set using metrics like accuracy score, precision, recall, and F1-score.

User Interface:

- Developed a user-friendly web interface using Streamlit to collect patient information from users.
- Integrated the trained ML model into the web application to analyse the entered data and provide a prediction (potential ASD or not ASD).
- Emphasize that the prediction is for initial screening purposes and should not be considered a definitive diagnosis. Advise users to consult a healthcare professional for comprehensive evaluation.

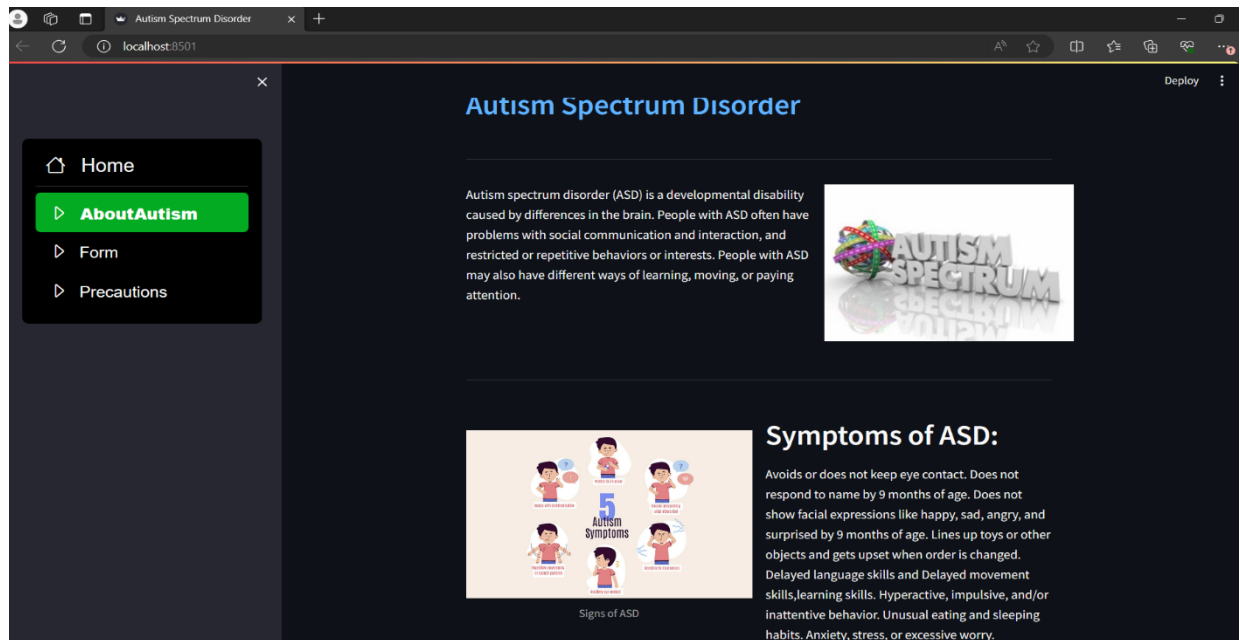


Fig 2.home page

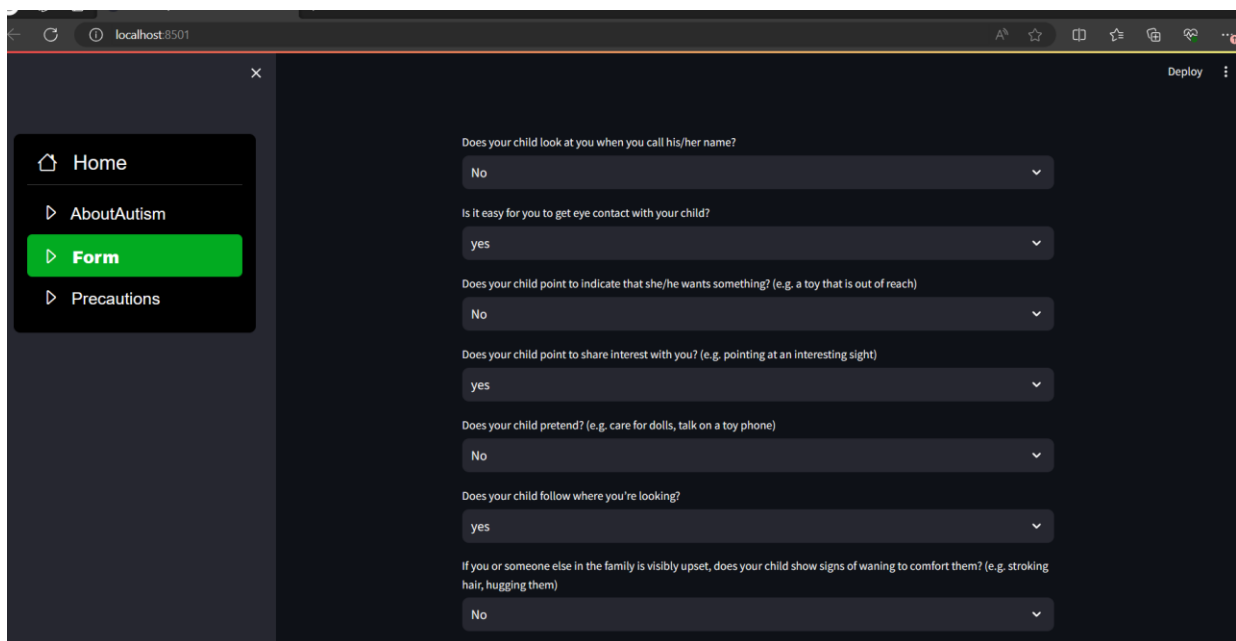


Fig 3: form page

Fig 4: form page

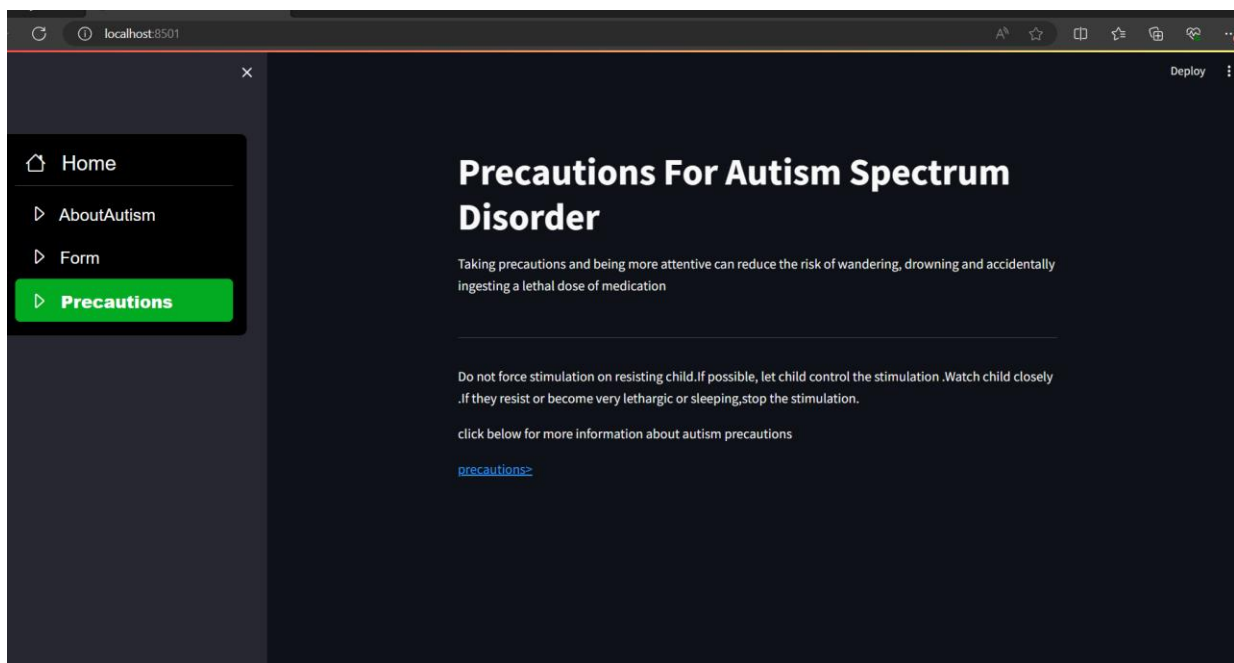


FIG 5:precautions page

5.CONCLUSION

In this project, we embarked on a journey to leverage machine learning techniques for the early detection and diagnosis of autism spectrum disorder (ASD). The project encompassed several key stages,

including data preprocessing, model training, and the development of a user-friendly interface using Streamlit.

We began by importing necessary libraries and performing data preprocessing to prepare our dataset for model training. This involved encoding

categorical variables, handling missing values, and splitting the data into training and testing sets. We used the AdaBoost classifier as our machine learning model due to its ability to combine multiple weak learners to build a robust classifier.

After training the model on the dataset, we evaluated its performance using metrics such as accuracy score, confusion matrix, and classification report. The results indicated promising accuracy in predicting the presence or absence of ASD, showcasing the potential of machine learning in aiding clinical diagnosis.

To make the model accessible to end-users, we developed a user interface using Streamlit. This interface allowed users to input relevant information about a patient, such as behavioural traits and family history, and receive instant feedback on the likelihood of ASD presence. The interface also provided valuable information about autism spectrum disorder, including

symptoms, precautions, and resources for further exploration.

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