



Detection of Early Satge of Autism Spectrum Disorder

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ABSTRACT

A person with autism spectrum disorder (ASD) may experience lifetime difficulties with language acquisition, communication, cognition, and social skills. It affects about 1% of people worldwide, with symptoms typically appearing in the developmental stages, or the first two years following birth. Environmental factors or genetics are the main causes of ASD. On the other hand, early detection and treatment can improve the illness. Currently, the only techniques available for diagnosing ASD are clinical standardised testing. building prediction models based on the results by using models like Support Vector Machines (SVM), Random Forest Classifier (RFC), Naive Bayes (NB), and Logistic Regression (LR) on our dataset.

Keywords : Neuro Development Disorder, Stereotyped, Diagnosis, Genetic Mutation, Adolescence.

I. INTRODUCTION

A complex neurodevelopmental disorder, autism spectrum disorder (ASD) is typically caused by having an immediate family member with autism, certain genetic mutations, and certain physical and mental health conditions. ASD is characterized by limited, repetitive patterns of behaviors, interests, and activities as well as communication and social interaction deficits. The issue of uncommon introvertedness run clutter presently a day it is mounting quickly to all ages of Human populace. Extreme introvertedness patients confront diverse

sorts of challenges such as troubles with concentration, learning incapacities, mental wellbeing issues. Current blast rate of extreme introvertedness around word is various and it is expanding at the exceptionally tall rate. Prior discovery of extreme introvertedness can be more supportive for patients at an early arrange.

The doctors will diagnose a child with ASD specific methods for diagnosis of children with Autism are broken down into two levels:

Level-1: Starting screening level and it is carried out by common specialists of children.

Level-2: Get the more point by point assessment from anticipates and once more early discovery ASD around 18 months but conclusion is ordinarily at or after age of three and assignments are conducted utilizing neurodevelopment outline work the outline work incorporates including the child's family and specialists .ASD troublesome to analyze since it has such assorted list of side effects which incorporate postponed in discourse, no appropriate eye contact , need of reaction, destitute social aptitudes, Atypical tone behaviors issues, learning delay and more the most causes of ASD

II. EXISTING AND PROPOSED SYSTEMS

A.EXISTING SYSTEM

Diverse existing information mining strategies and its application were considered or investigated. Utilization of machine learning calculations was associated in different therapeutic information sets. Machine learning procedures have differing control completely different therapeutic information sets. Previously specified ordinary machine learning procedures gave less correct result and comes about furthermore shifts in light of the strategies has been utilized for the expectation.

Extreme introvertedness Range Disarranges (ASD) speak to a complex extend of neurodevelopmental conditions characterized by challenges in social communication and monotonous behaviors. Diagnosing and understanding ASD involve the utilization of various existing methods that encompass clinical, behavioral, and neuroimaging approaches. These methods aim to provide a comprehensive understanding of the individual's functioning, behavior, and neurological profile to facilitate accurate diagnosis and personalized intervention strategies.

Early screening instruments are fundamental components of the existing strategies for recognizing ASD in youthful children. Screening rebellious just like the Adjusted Checklist for Autism in Little children (M-CHAT) help within the early recognizable proof of potential ASD related behaviors, enabling timely intervention and support. Early intervention has been shown to significantly improve outcomes for individuals with ASD, emphasizing the importance of early detection.

B.PROPOSED SYSTEM

In tackling the challenges associated with Autism Spectrum Disorder (ASD) classification and prediction, our proposed strategy centers around the implementation of innovative machine learning procedures. The primary objective is to overcome existing limitations and enhance the accuracy of ASD diagnosis. Our approach integrates Random Forest (RF), Decision Tree, and AdaBoost algorithms, supplemented by the strategic use of the grid search method. This combination aims to create a robust model that excels in performance and accuracy, contributing to more effective ASD identification

ADVANTAGES:

Improved Accuracy and Diagnostic Precision:

By leveraging progressed machine learning calculations such as Arbitrary Woodland, Choice Tree, Calculated Relapse, Bolster Vector Classifier (SVC), and K-Nearest Neighbors Classifier, in conjunction with methods like Network Look CV and Pipeline, the proposed framework upgrades exactness and demonstrative accuracy in ASD distinguishing proof. These algorithms analyze complex datasets and distinguish designs and affiliations that will not be recognizable through conventional demonstrative strategies alone, driving to more precise and opportune analyze.

Personalized Treatment Planning: The machine learning models within the proposed system facilitate personalized treatment planning by analyzing individual characteristics, response patterns, and genetic factors. This allows clinicians to tailor interventions, therapies, and support strategies to the unique needs and preferences of each individual with ASD, optimizing treatment effectiveness and improving outcomes.

Early Intervention and Support: Through the development of a user-friendly website accessible to doctors, patients, and the general public, the proposed system promotes early intervention and support for individuals with ASD. By providing accessible resources, educational materials, and diagnostic tools, the website facilitates early identification of ASD symptoms and encourages timely access to intervention services, maximizing the potential for positive developmental outcomes.

Enhanced Collaboration and Knowledge Sharing: The website serves as a centralized platform for disseminating research findings, facilitating collaboration among researchers, clinicians, policymakers, and individuals with ASD and their families. By fostering interdisciplinary collaboration and knowledge sharing, the proposed system accelerates innovation and progress in ASD research, leading to the development of more effective interventions and support services.

III. LITERATURE SURVEY

F Bonnet-Brilhault et al., [1] The ASD are complex neurobehavioral clutter by social and communication shortages and monotonous and stereotyped behaviors. It is presently accepted that natural variables may balance phenotypical expression of ASD that are related with the hereditary inclination. The conclusion of ASD can

be dependably made within the moment year of Life and shows up to be generally steady over time. In any case, determination of exceptionally youthful children can be very complex due to their clinical heterogeneity and shifting designs of onset that can contrast from the ordinary extreme introvertedness indications of an more seasoned child.

Ditza Antebi Zachor et al., [2] This study examined the applicability of the ESDM for preschool-aged children with ASD in a community child care setting, primarily using group-based mediations.

valsamma Eapen et al., [3] The Behavioral mediations for children with extreme introvertedness range disorders, the intercession behavioral is as it were treatment for youthful children with ASD s. This article portrays the center highlights of behavioral medicines, summarizes the prove base for viability, and gives proposals.

Patricia Manning-Courtney, Donna Murray, Kristen Currans et al., [4] Children on the Extreme introvertedness Range and the Utilize of Virtual Reality for Supporting Social Aptitudes Extreme introvertedness range clutters (ASDs) are characterized by contrasts in socio-pragmatic communication. These conditions are distributed inside a "spectrum" of phenotypic changeability with a few strategies for moving forward social abilities like enthusiastic preparing and conventional passionate preparing.

Alessandro Frolli, Giulia Savarese et al., [5] The Utilizing member information to amplify the prove base for seriously behavioral intercession for children with extreme introvertedness the assembled person members information from 16 bunch considers with children with extreme introvertedness, most children who are experienced behavioral intercession accomplished alter in IQ(29.8 percent) compared with 2.6percent and 8.7percent.

Sigmund Eldevik, Richard P Hastings et al., [6] This article summarizes the current writing on social abilities preparing for children and youths with extreme introvertedness range disarranges. The article portrays a few diverse strategies of social abilities preparing, together with a rundown of investigate discoveries on viability. Mediations depicted incorporate social aptitudes bunches, peer mentoring/training, social stories, and video modeling.

IV. METHODOLOGIES

MODULE1:data collection for random forest algorithm

MODULE2:real time data gathering and prognostics GUI design

MODULE3:applying random forest algorithm

```

In [4]: models = []

models.append(LstmClassifier())
models.append(MLPClassifier())
models.append(DecisionTreeClassifier())
models.append(SVMClassifier())
models.append(RandomForestClassifier())
models.append(XGBoostClassifier())

for name, model in models:
    model.fit(X_train, y_train)
    y_hat_test = model.predict(X_test).astype(int)
    y_hat_train = model.predict(X_train).astype(int)
    print(name, Accuracy score is : ', round(accuracy_score(y_hat_test, y_hat_test)),')

for name, model in models:
    y_hat_test = model.predict(X_test).astype(int)
    y_hat_train = model.predict(X_train).astype(int)
    print(name, Accuracy score is : ', round(accuracy_score(y_hat_test, y_hat_train),2))

Out[4]: LstmClassifier()
Out[4]: MLPClassifier()
Out[4]: DecisionTreeClassifier()
Out[4]: SVMClassifier()
Out[4]: RandomForestClassifier()
Out[4]: XGBoostClassifier()

In [14]: #Construct the pipeline
from sklearn.pipeline import Pipeline

pipe = Pipeline([('Classifier', RandomForestClassifier(max_depth=10))])

In [15]: grid = [
    ('Classifier__criterion', ['gini', 'entropy']),
    ('Classifier__max_depth', [None, 5, 10, 20]),
    ('Classifier__min_samples_split', [2, 4, 6, 10]),
    ('Classifier__min_samples_leaf', [1, 4, 8]),
    ('Classifier__class_weight', ['balanced'])
]

In [16]: cv = GridSearchCV(pipe, param_grid=grid,
                           cv=5, scoring='roc_auc', n_jobs=-1)
cv.fit(X_train, y_train)
y_hat_test = cv.predict(X_test)

Out[16]: GridSearchCV(estimator=Pipeline([('Classifier',
                                             RandomForestClassifier(max_depth=10)),
                                           ('preprocessor',
                                            StandardScaler())]),
                      param_grid=[
                        ('Classifier__class_weight', ['balanced']),
                        ('Classifier__criterion', ['gini', 'entropy']),
                        ('Classifier__max_depth', [None, 5, 10, 20]),
                        ('Classifier__min_samples_leaf', [1, 4, 8]),
                        ('Classifier__min_samples_split', [2, 4, 6, 10]),
                        ('Classifier__splitter', ['best', 'random']),
                        ('Classifier__verbose', [0, 10, 20, 30, 40]),
                        ('scoring', 'roc_auc')
                    ],
                      scoring='roc_auc')

In [17]: metrics(y_hat_test, y_train, y_hat_train, y_hat_test)

Out[17]:
accuracy_score = 0.8484848484848484 (with test Accuracy): 0.8484848484848484
accuracy_score.columns = ['Classifier', 'test Accuracy']

In [18]: accuracy_summary

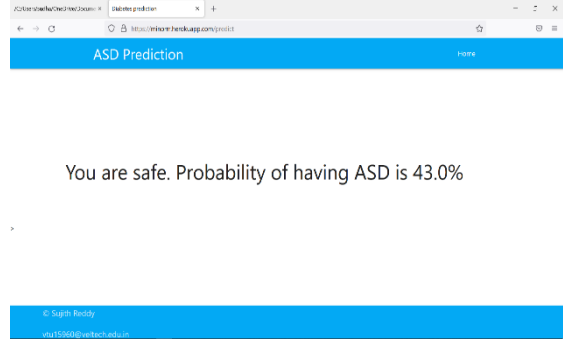
Out[18]:


| Classifier | test Accuracy          |      |
|------------|------------------------|------|
| 0          | Support Vector         | 0.81 |
| 1          | LstmClassifier         | 0.86 |
| 2          | XGBoostClassifier      | 0.86 |
| 3          | DecisionTreeClassifier | 0.86 |
| 4          | SVMClassifier          | 0.86 |
| 5          | SVCClassifier          | 0.78 |
| 6          | RandomForestClassifier | 0.84 |
| 7          | MLPClassifier          | 0.86 |
| 8          | SVCClassifier          | 0.81 |
| 9          | RandomForestClassifier | 0.86 |
| 10         | RandomForestClassifier | 0.86 |
| 11         | RandomForestClassifier | 0.86 |



In [19]: #Export pickle
# Save trained model to file
pickle.dump(pipe, open('data.pkl', 'wb'))

In [20]: #Load model from pickle
loaded_model = pickle.load(open('data.pkl', 'rb'))
loaded_model.predict(X_test)
    
```



V. CONCLUSION AND FEATURE ENHANCEMENT

This work used organised machine learning and fundamental learning techniques to identify an area of notable introversion and amplify clutter. The models used for ASD disclosure were analysed using distinct execution appraisal estimations on a non-clinical dataset consisting of three age groups: children, young people, and adults. When comparing the result with another later consider These comes about emphatically propose that an Irregular Woodland show can be executed for discovery of extreme introvertedness range clutter in expansion to improve the forecast prepare that choose in the event that the individual has extreme introvertedness range clutter or not additionally appearing the evaluated rate.

Our project can be enhanced further by adding the data base of patients that helps in frequent monitoring of patients and maintaining their health history. We can add feature to contact to doctors to directly if they proved that they having Autism Spectrum Disorder.

VI. REFERENCES

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