Autism Screening

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Problem Statement

Autism Spectrum Disorders — umbrella diagram: Autism Disorder, Asperger's Syndrome, Rett's Disorder, Childhood Disintegrative Disorder, Pervasive Developmental Disorder - Not Otherwise Specified

Autism Spectrum Disorders

- Screening
- Diagnosis

Autism Spectrum Disorders is a neurological and developmental disorder that begins in childhood and lasts throughout a person's life. If affects social interactions, communication and learning. ASD is associated with very high healthcare costs which can be decreased with an early diagnosis. Healthcare professionals use screenings to assess all children to determine if further testing is needed to achieve a formal diagnosis. It is important to have an accurate screening process to decrease amount of unnecessary doctor appointments and healthcare costs.

Business Value

- Accurate Screening
- Healthcare Costs

Improving screening for autism spectrum disorders is important to decrease unnecessary doctor visits. A screening tool should be able to advise primary care providers whether to pursue formal diagnosis for a child or adult.

Methodology

Machine Learning Models
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- Logistic Regression
- Decision Tree
- Ensemble Methods
  - Random Forest
  - XGBoost
- Support Vector Machines
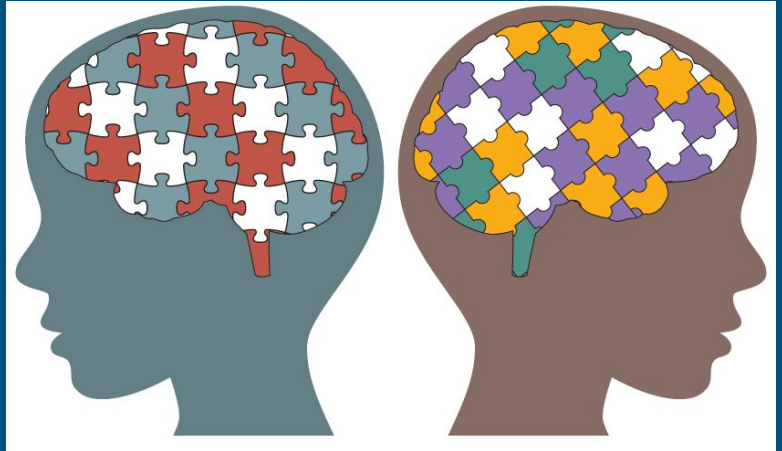
A dataset with several features of people with and without autism was used to train a model for classification. The dataset contained information from a screening questionnaire along with traits such as age, sex, ethnicity, etc. The classification techniques used were logistic regression, decision tree, random forest, XGBoost an support vector machines. All classification techniques were able to produce a model with 100% accuracy.

Recommendations

- Screening
- Referral
- Treatment

From the data, it is evident screening methods are very accurate on classifying patients that have autism spectrum disorder. Screenings should be performed during routine checkups with primary care providers. Given the information from the screening, patient's should be appropriately referred to be formally diagnosed and to begin treatment. Screening patients should decrease unnecessary referrals and speed up the diagnosis and treatment process for patients that have ASD.

Future Work

- Age levels
- More data

Although the models made from this dataset are very accurate, it would be beneficial to add more data to the model. Increasing age range within the dataset would allow for more accurate screening across all ages.