Autism Spectrum Disorder Prediction in Kids Using CNN

N.NAVEEN KUMAR
Associate Professor,Department of Information Technology,
Jawaharlal Nehru Technological University Hyderabad, India.

SADA
MCA Student ,Department of Information Technology,
Jawaharlal Nehru Technological University Hyderabad, India

ABSTRACT

Autism is a severe developmental spectrum disorder that puts constraints on communicating linguistic, cognitive, and social interaction skills. Autism spectrum disorder screening detects potential autistic traits in an individual where the early diagnosis shortens the process and has more accurate results. The methods used to predict Autism by doctors involve physical identification of facial features, questioners, Fine motor skills, MRI scans, etc. In the case of widespread developmental abnormalities, the parents feel inadequate to step out in public, and this traditional diagnosis approach requires more time and money. As a result, it is comparable to employing a timely ASD test that aids medical experts and tells individuals whether or not to follow a formal clinical diagnosis. A diagnostic method that can determine a child's likelihood of developing ASD offers the chance to intervene before full symptoms appear.In comparison to the conventional method of diagnosis, the suggested model employs a convolution neural network classifier that helps predict early autistic symptoms in children based on face features in photos with the least amount of time, money, and accuracy. With the aid of the transfer learning technique, the Convolutional Neural Network classifier can identify autism in facial images.

Keywords: MachineLearning,Deep Learning,Keras,Facial Features

---

. **INTRODUCTION**

Communication, social commerce, and behavior issues are hallmarks of autism, an experimental disorder. It spans a wide range of strictness, from light to severe. Improving outcomes necessitates early intervention and opinion. Treatments like speech and ABA therapy can help manage symptoms and improve development, even while the precise cause is unknown.

OBJECTIVES

1. To explore the current diagnostic approaches for Autism Spectrum Disorder (ASD) and highlight their limitations, such as time and cost.
2. To propose a more efficient and accurate diagnostic tool using advanced machine learning techniques, particularly convolutional neural networks (CNN), to predict ASD risk based on facial features in images.
3. To contribute to the early detection of ASD, enabling healthcare professionals to make informed decisions regarding further clinical diagnosis and intervention.
4. To evaluate the effectiveness and potential impact of the proposed model on reducing the diagnostic time and cost associated with traditional me

METHODOLOGY

Dataset Description

The dataset employed in this study is the Autism Dataset, sourced from the Kaggle platform, which provides publicly available datasets for research purposes. This dataset consists of 6,400 images, each with a resolution of 176 × 208 pixels.The dataset is divided into two main parts:

Training Set : 5121 images.

Testing Set : 1279 images.

Model Architecture

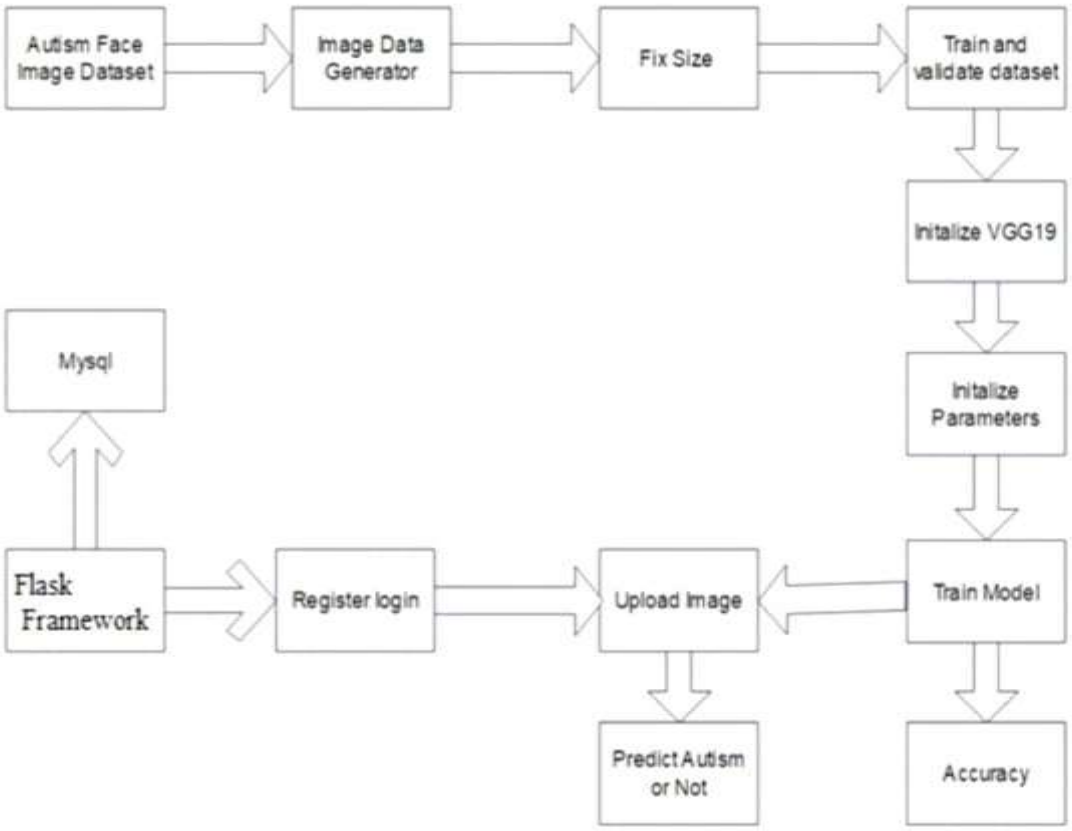

Fig.1:System Architecture

This flowchart outlines a system for predicting Autism Spectrum Disorder (ASD) using facial images. It starts with an autism face image dataset, which is processed through an image data generator and resized. The model is trained and validated using VGG19, a deep learning architecture. The system uses Flask for user registration, login, and image upload, with MySQL for database management. Finally, the model predicts whether a person has autism or not and displays the accuracy of the prediction.

.

System Setup

- Coding Language: Python
- Front-End: HTML, CSS
- Back-End: Flask
- Designing Tools: HTML, CSS, JavaScript
- Database: MySQL
- Application: Anaconda
- Operating System: Windows 7 Ultimate
- Processor: Pentium – IV
- RAM: 4 GB
- Hard Disk: 20 GB

OUTPUTSCREENS

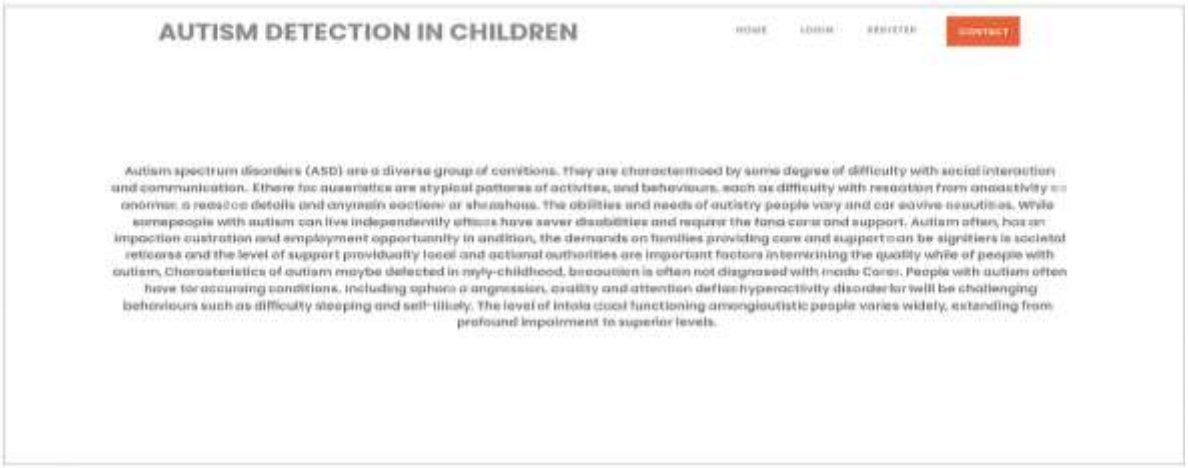

Fig.2:Home Screen Interface

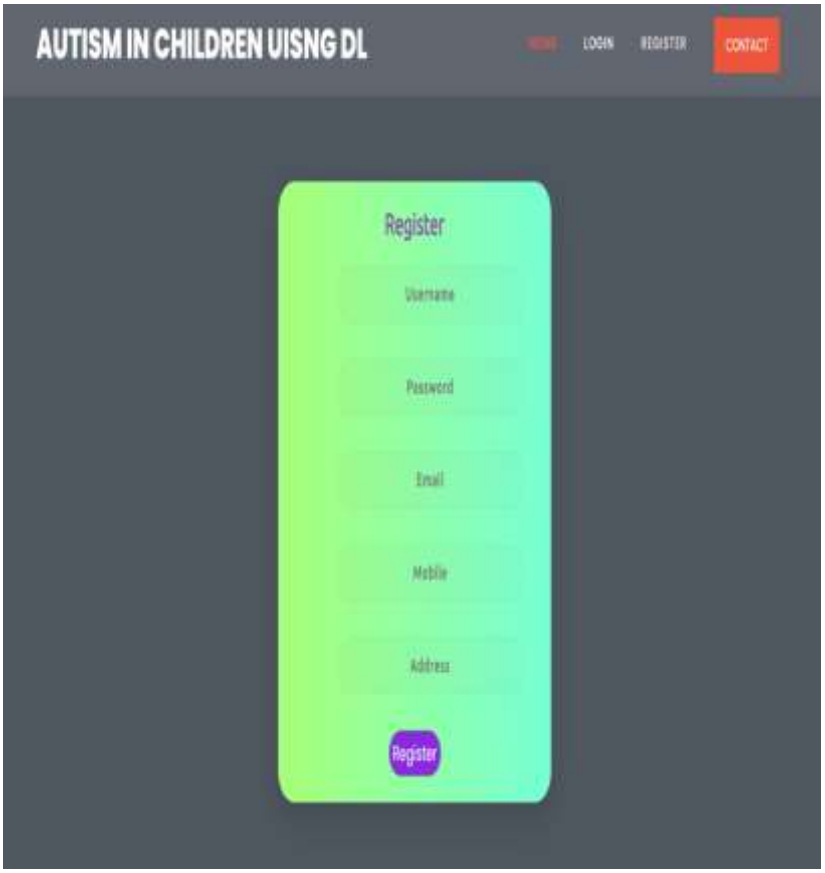

Fig.3:User Registration Form

Fig.4:Login Page

Fig.5: Dashboard

Fig.6 Upload Image Page

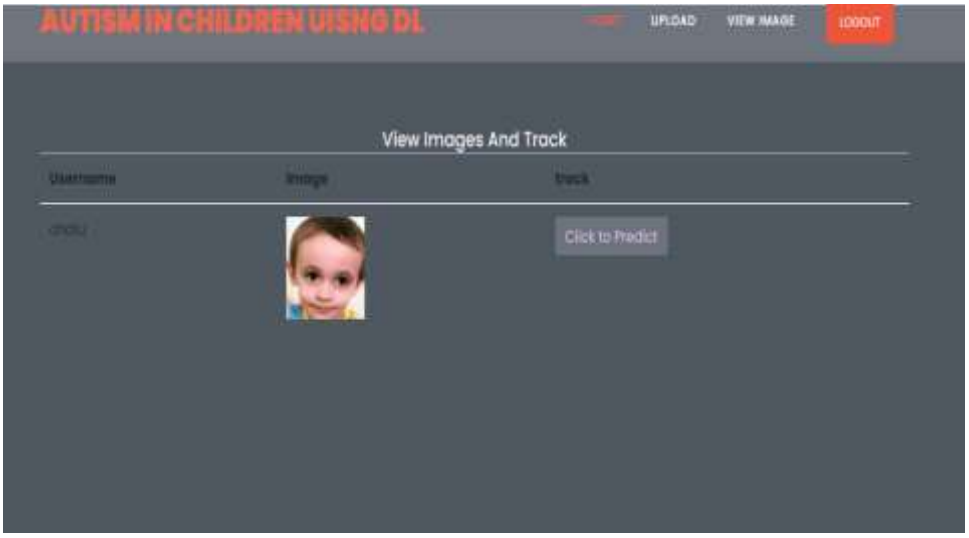

Fig.7: *View and Track Interface*

Fig 8*: Result page*

CONCLUSION

The examination for autism in the initial stage of early ages with the help of classification models will absolutely add undeniably, in tackling the issue of making a right assessment. This work is deliberate on the developing a classification model on a dataset of pictures utilizing deep learning methods like convolutional neural network with added VGG 19 learning procedures, and the current study gives a novel way to deal with diagnosing Autism with the facial picture, which can be utilized as a kind of perspective for future examination, A screening tool that could recognize ASD hazard during outset offers the chance for mediation before the full symptoms are noticeable like an online web application whereby guardians or parents could submit pictures of their kid and get a returned likelihood of the potential of Autism. This utilized in relationship with existing symptomatic questioners would give a high precision screening to Autism. Guardians or parents could then be spurred to look for a total clinical analysis.

REFERENCES

1. WHO. (2018). Autism spectrum disorders. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/autism-spectrum-disorders
2. Autism Spectrum Disorder, 299.00(F84.0), Diagnostic and Statistical Manual of Mental Disorders, 5th ed. American Psychiatric Association, American Psychiatric Pub, 2013.
3. C. M. Corsello, “Early intervention in autism,” Infants & Young Children, vol. 18, no. 2, pp. 74-85, 2005.
4. https://www.webmd.com/brain/autism/understanding-autism-basics

5. Thabtah, Fadi. "Machine learning in autistic spectrum disorder behavioral research: A review and ways forward. (2018) " Informatics for Health and Social Care: 1-20.
6. Lord C, Risi S, DiLavore PS, Shulman C, Thurm A, Pickles A. Autism from 2 to 9 years of age. Arch Gen Psychiatry. 2006 Jun;63(6):694-701.
7. Hyman SL, Levey SE, Myers SM, Council on Children with Disabilities, Section on Developmental and Behavioral Pediatrics. Identification, Evaluation, and Management of Children with Autism Spectrum Disorder. Pediatrics. 2020 Jan;145(1).
8. JA. Kosmicki, V. Sochat, M. Duda, and DP. Wall, "Searching for a minimal set of behaviors for autism detection feature selection-based machine learning," Translational Psychiatry, vol. 5, no. 514, pp. 1-7
9. Vaishali, R., and R. Sasikala. "A machine learning-based approach to classify Autism with optimum behavior sets. (2018) " International Journal of Engineering & Technology 7(4): 18.
10. Fadi Thabtah. (2017). "Autism spectrum disorder screening: machine learning adaptation and DSM-5 fulfillment." In Proceedings of the 1st International Conference on Medical and Health Informatics, pp. 1-6. ACM.
11. M. S. Mythili, and AR Mohamed Shanavas. (2014) "A study on autism spectrum disorders using classification techniques." International Journal of Soft Computing and Engineering (IJSCE), 4: 88-91
12. M. Thomas, and A. Chandran, "Artificial Neural Network for Diagnosing Autism Spectrum Disorder," In Proc. 2nd International Conference on Trends in Electronics and Informatics Proceedings, 2018, pp. 930-933
13. D. Bone, M.S. Goodwin, M.P. Black, C. Lee, K. Audhkhasi, and S. Narayanan, "Applying machine learning to facilitate autism diagnostics: Pitfalls and promises," J Autism Dev Disord, vol. 45, no.5 pp. 1121-1136, May 2015.
14. S. N.M. Rad, and C. Furtanello, "Applying deep learning to Stereotypical Motor Movement Detection" In Proc. IEEE 16th International Conference on Data Mining Workshops,2016, pp. 1235-1242