# NCAIT Paper Presentation

* Good Morning Everyone, My Name is (Sriram / Manideep / Shiva Kiran / Sastry / Sanjay *) from Computer Science Dept, AMC Engg College.

* Good Morning Everyone, we are from AMC Engineering College (Computer Science Dept)

* We are a team of 4 members. Myself, "Sriram" and my team mates are "Shivakiran" and "Sanjay". And, we have successfully carried out this project under the guidance of Dr. Srividya Ganesan (Associate Professor, CSE Dept, AMC Engg College)

* ~~Introduction of the topic~~
* Title of the project is ~~Detect~~ "Prediction of ASD using M.L".

* Presentation is divided into 4 parts.
1) ~~Introduction~~ 2) ~~Methodology~~
3) ~~Result~~ 4) ~~Conclusion and finally~~ 5) ~~References~~.

1) I will start with the Introduction.
2) Then I will look at Methodology
3) Next, Result.
4) and finally Conclusion & References.

# → INTRODUCTION

* Introducing about the topic → ASD.
- ASD is a neurocognitive disorder which affects person's central nervous system which leads to decreased mental functioning such as interacting with others, no proper communication and also lack of ability to learn new things.

* Normal people can understand and respond to the actions happening around them, but autistic children lack these abilities.

- Autism ~~symptoms can be noticed generally appears~~ at an early stage of life, it can be noticed in first 2yrs of life.
* The facial characteristics of Autistic children are "broader upper face with wide eyes" "shorter middle region of the face (cheeks & nose)", and also wider mouth region.

- Symptoms of ASD can be identified at an early stage of life. (usually first 2 yrs of life)
↳ ASD diagonsis involves a significant amount of time and value.
↳ The early detection can come to great help to treat with proper medication.
↳ ASD disorder posses pervasive nature, which means the disorder if not identified and diagonised earlier would lead to complications in later stage of life.

* Types of Autism (ASD)
1) Autistic Disorder
2) Asperger Syndrome
3) Pervasive Development Disorder

* Explosion rate of ASD around the world is increasing at high rate.

* According to WHO, 1 out of every 160 children is affected by autism.
* Some of the affected individuals can live on their own, but some of them require life long care and support.
* Based on the research results, Autism seems to be strongly influenced by genetics.
* Therefore, our project aims to propose a prediction model using ML techniques; that could effectively predict the disorder using facial image.

## → EXISTING SYSTEM

* We have gone through various methods and procedures and their applications and outcomes were also studied.
* We noticed that, most of the general ML techniques that were used previously gave less accurate results with poor accuracy and efficiency.

* And also, the predicted results from various approaches were different to different dasets.

## → PROPOSED SYSTEM.

* Our proposed strategy mainly focuses on the use of appropriate ML procedures for ASD prediction, and in turn try to overcome the existing problem.

# Methodology

* Data plays a very important role in this project as it is the primary pre requisite.
* The data is collected from kaggle website
* For the research, an ASD, dataset with facial images were used. And this dataset is split into test, train & valid, containing ~~attributes~~ Autistic & Non-autistic attributes,

* ~~For this~~
* To implement the model data cleaning is must, as resizing of all the images and data augmentation.

(ppt)

(1) Haar Cascade classifier.

* It is one of the prominent object detection approaches.

(ppt).

ratio of 1:4

* Here, every image is converted to grayscale image, so that there only be 2 colors left i.e black, white which helps in edge detection. And

* Every feature is a solitary (single) value attained by subtracting the summation of white & black pixels.

(ppt)

* This is how haar cascade is used.

(ii) Support vector machine

* It works on creating linear decision boundaries to multiple classes.

(ppt) -> 2 points

* Here some of the data cleaning operations are performed like, flattening & image augmentation. Then using kernel regularization function, an svm model is created.

(ppt)

* This is how svm is used.

* In svm objects are classified with good precision & accuracy rate.

convolution: Math operation on two functions that produces a 3rd function which expresses how the shape of one is modified by other.

(iii) CNN :-

* In deep learning, a CNN is a class of deep neural networks, which is applied to analyze visual imagery. It uses a special technique called convolution.

(PPt) → point.

* VGG16
* VGG is a technique of CNN for image classification, which we used to predict ASD.

(PPt) → 4th point

* VGG16 can detect upto 1000 categories of image, but we removed last layer bcoz we have only 2 categories to detect.

(PPt) → 5th point

* As in SVM here also data cleanly is performed i.e image augmentation like zooming operations, flipping operations i.e vertical & horizontal so that, the features of the images are recorded by the algorithm.
* Then the model is trained.

Finally, this is how we implement all 3 algorithms to predict ASD.

let us discuss about the results from 3 algorithms that we have used

1st one - Haar cascade classifier

→ An Haar cascade classifier was generated using cascade Trainer GUI tool. the classifier is used to predict the results.

→ Figure represents the prediction of an autistic image. As rectangular box in the image depicts that the image is predicted as autistic

→ ~~this~~ Haar cascade classifier gave inconsistent results

Next one, support vector machine

→ An SVM model is generated by training the dataset

→ The SVM model uses kernel regularization function with L2 norm parameter by setting value to 0.01

→ Kernel regularization function allows to apply penalties on layer parameters during optimization. These penalties are summed into the loss function that the network optimizes

→ Here L2 norm forces the weights i.e the parameters to be small but does not make them zero

→ The figure shown is predicted as autistic image using the SVM mode

→ As we can see in the graph x-axis represents epoch values and y-axis represents accuracy values. And blue line indicates training loss in first graph and training

accuracy in second graph, the orange line indicates validation loss in first graph and validation accuracy. In the second graph validation accuracy has ~~to~~ reached to 50%.

Next one, Convolution Neural Network

→ 'CNN model is generated using the algorithm VGG16 i.e visual geometry group algorithm by collecting the weights from ImageNet database

→ ImageNet is nothing but the dataset with 14million Images for validation organised in 1000 categories

→ The below figure is predicted as autistic image using the VGG16 of CNN model

→ The following graph represents the training accuracy, training loss validation accuracy, and value loss for VGG16 of CNN

→ As we can see in second graph the validation accuracy has reached to 90%. ~~in con~~ which ~~so~~ is consistent of what we expected.

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Finally, coming to the conclusion part

By considering all the results we conclude that Haar Cascad classifier was able to predict the output with inconsistent results

SVM model was able to classify image but gave poor accuracy results of around 50 to 60% accuracy

the VGG16 model of CNN gave better accuracy of 90%. and hence we used VGG16 of CNN for further prediction because it gave better accuracy compared to SVM and haar Cascade classifier.

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These are the refrences that we have used for completing our paper. In which the first two papers are of our srividhya mam who guided us and supported us for completing this project.

Thank you