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# AUTISM AT EASE: AN ASSISTIVE TOOL FOR AUTISTIC CHILDREN

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***ABSTRACT****--Autism Spectrum Disorder (ASD) is the widespread deficiency among the children, but now a days due to the development of sophisticated technologies a focus is made on the people who are suffering from autism and how to predict the same at earlier stages. So, based on the children's mentality and their actions, the identification of the problem whether it is serious or normal is predicted. This project provides a feasibility to understand the current status of the patient from the information which is collected from their parents/guardians related with their social development, communication difficulties and weird behavior activities in the society. Further, the necessity learning is provided to enhance their mindsets with the planned activities. This project deals with a development of an android mobile application in regional language which is related to rectify the problems to limited extent by making their minds refresh by engaging them in online activities. This mobile application may help the parents, doctors to assist their children to some extent.*

***Keywords****-- Autism, Sophisticated, Communication, Behavior, Social Development and Mobile Application.*

## I. INTRODUCTION

Out of all the physical and mental diseases and disorders Autism is one of the major disorders in the world. It is neurodevelopment disorder of the brain function which will be seen in between (6-14) age group of children. As we all know if we want to achieve anything, we need knowledge and skills. Without those things no one can't find themselves in the line of success. In this disorder it effects on the intellectual ability and physical health issues like sleeping, eating, digestion etc. By this affects and drawbacks in the people in their childhood can't achieve anything. So, the researchers and scientists made a decision to make this right.

After the survey the researchers got to know that the era of the Autism got doubled from last ten years compared to previous years. Autism showed predominantly increasing in the children which was commonly found in boys than girls roughly and found at severe stage in the adults too. Researchers thought the only way to detect whether the child is suffering from Autism through behavioural, social and communication interactions only.

While coming to the behavioural skills there will be a weird behaviour in the child. Children will react in the different way for the normal things this may cause a little confusion in the child's mind to give which response for that appropriate situation. And next coming to the social skill this is all about gesture and postures in verbal or non-verbal situation. The Autistic kid may find difficulty to give answer in a way which will be inappropriate. This may give problem in communication interactions. Out of all those skills lack of communication skill is a major drawback in the child. Because without natural speechmeans no talking and it is also difficult to survive and

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improve themselves. Finally, the child feels uncomfortable around crowded areas and conscious of his own will be lost. Education makes the special challenge to autistic children due to conceptual and operational skills.

In this mobile application we are going to keep a screening test for the parent/guardian about their children. The screening test consists of three modules like behavioral, communication and social. Based on the screening test, the application will provide a screening results for the respective screening modules. On the basis of screening results whether their child will take the test or not, If the child's Autism rate is in risk means this application provides a cognitive skill games to mitigate their Autism. And also it provides some sort of assignments, signs of Autism, symptoms and treatment for the Autistic children to make easy for parents to recognize.

## II. Literature Review

***Raafat et al., 2017 (2017)*** work done behind this application is about the monitoring and treating of a person suffering from autism. The treatment is divided into various small operations where the patient has to accomplish the improvement day by day slowly through this procedure and the parents can also put a track on the child condition and performance ability whether he or she can accomplish it or not. The GPS tracking also implemented with this to help the people to monitor in their own smart phone where they can monitor their children by using the location so that the child will be in a complete observation of their parents and stay under a safe zone.

***Disseroet et al., (2015)*** main objective is to help the children who are suffering with ASD with android based mobile application called DISSERO. The domain that they took is totally based on the android only. DISSERO applicationspecific features are to aid them to needs and perk up communicational abilities and community structs. Wards's parents and mentors need not deal with the lunatic behavior.

***Naseer et al., (2013)*** application provides the survey on proper education to autistic children and develop their skills and knowledge by providing the effective education to normal children. The system executes on random generated application of the independent platform and further, if there is any benefit occurred through this application and also if autistic children need more technological support then they will develop according to their results.

***Khondaker et al., (2016).*** The main objective of this application is to help the children who have autism neurodevelopment disorder.

This system is in cloud environment integrated structure with child and adult specific feasibility. This Smart Autism helps at different stages of age by three layered assessment process as screening, evaluating and confirming whether the rate of autism in children is high or less. And by the help of the feedback questionnaire they will know whether they have to improvise the application that they developed.

## III. Methodology

***Text to Speech*** Algorithm***:***

We need to instantiate an object of this class and also specify the **initListener.**

Text Mode Algorithm Listener

do

- Object Creator and Speech and Text Online Listener Installation
- Overriding the main function rough Speech &
- On and Input the status bar for speech creation.

done

We have to specify the properties for TextToSpeech object , such as its language ,pitch etc. Language can be set by calling **setLanguage()** method. Languages like Telugu, English, Hindi etc.

```
ttobj.setLanguage(Locale.UK);
```

***Analysis Algorithm:***

```
Int value=n;
private void function() {
    if (mQuestionNumber < n) {
}
   e
   l
   s
   e

   {
            if (mQuestionNumber > n/2) {
                    output = "No Risk Detected";
            }
            else {
                if (mQuestionNumber > 0 &&
                                                    mQuestionNu
                mber < n/2 ){ output = "Low Risk Detected";
                 }
                else {
                        if
                        (mQuestionNumbe
                        r < 0) { output =
                        "High Risk
                        Detected";
                       }
                    }
          }
```

This algorithm is designed based on the dataset used in the application to analyse the screening test for the parents/guardian. Risk detection is done based on the code mentioned above.

***Functional Requirements:***



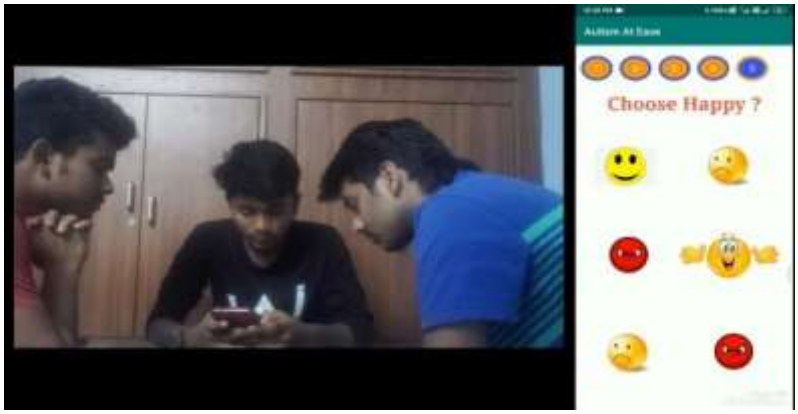

**Table 1:** Behavioral Questionnaire and its Resultants

| S. No | Questions(yes) | Risk status | Play activity or not |
|---|---|---|---|
| 1 | 1-4 | Moderate Risk Detected | Low Risk Detected. Play Activity (By Child). |
| 2 | >3 | High Risk Detected | High Risk Detected. Play Activity (By Child). |
| 3 | 0-1 | Low Risk Detected | No Risk Detected. |

**Table 2:** ommunication Questionnaire and its Resultants

| S. No | Questions(yes) | Risk status | Play activity or not |
|---|---|---|---|
| 1 | 1-7 | Moderate Risk Detected | Low Risk Detected. Play Activity (By Child). |
| 2 | 0-1 | High Risk Detected | High Risk Detected. Play Activity (By Child). |
| 3 | >7 | Low Risk Detected | No Risk Detected. |

**Table 3:** Soial Questionnaire and its Resultants:

| S. No | Questions(yes) | Risk status | Play activity or not |
|---|---|---|---|
| 1 | 4-10 | Moderate Risk Detected | Low Risk Detected. Play Activity (By Child). |
| 2 | 0-4 | High Risk Detected | High Risk Detected. Play Activity (By Child). |
| 3 | >10 | Low Risk Detected | No Risk Detected. |

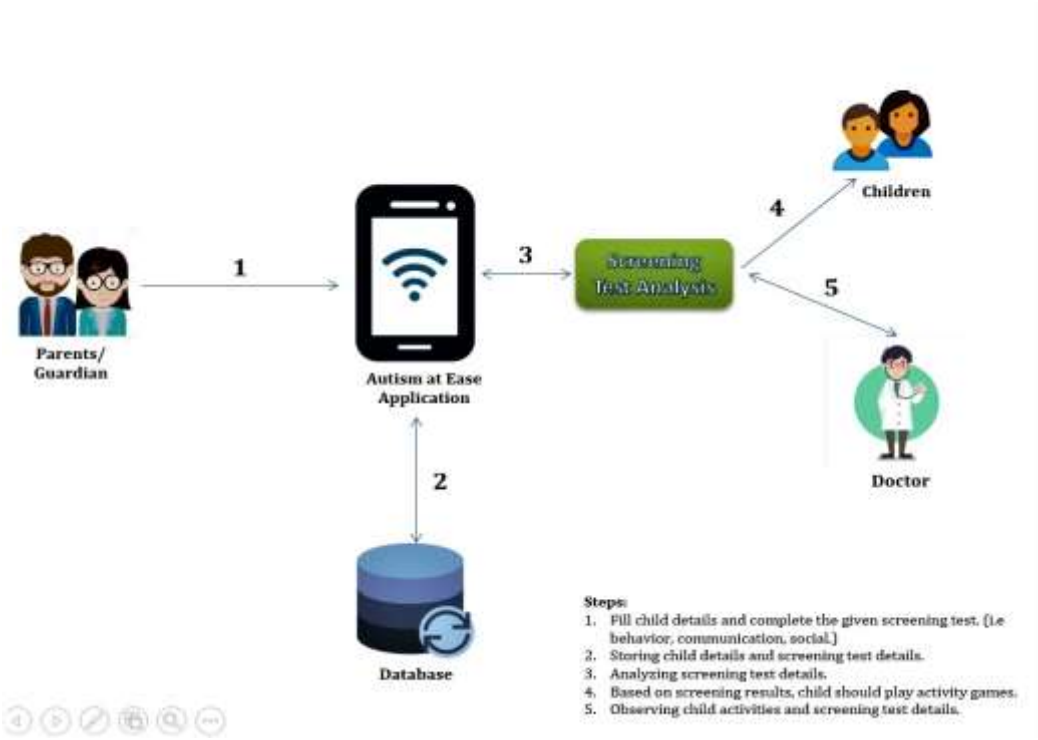


**Figure 2:** User Interface and Structural Representation

This application starts when parent/guardian logins, it shows the home page. The home page consists of various modules like children practice tests, screening test and results pages. When parent/guardian enters the screening test, they should give details about their respective child. Once they submit their child details, it navigates to screening test page, which consists of three types of screening, i.e.., behavioural screening, communication screening and social screening. These screening test consists of different types of questionnaire related to their child. once they complete the screening tests, we can show the screening results on results activity. In that, it shows child name, type of screening, screening results and suggestions related to child, like high risk detected, low risk detected and moderate risk.

If the child got high risk/moderate risk, he/she has to play some cognitive skill games to minimize the risk of autism. Cognitive skill games like identification games, pattern games, mimics, sensing games. Identification games includes emotions, shapes, colours and drag and drop games. In order to play games by child, this application provides practice tests before they play cognitive skill games.

This application also provides some instructions to the child like brushing the teeth washing the hands and scheduling the daily routine. The main motto of this application is to diagnose, monitoring and assisting the child and to reduce the autism. And also, it provides the signs of autism, symptoms and treatment for the autistic children.

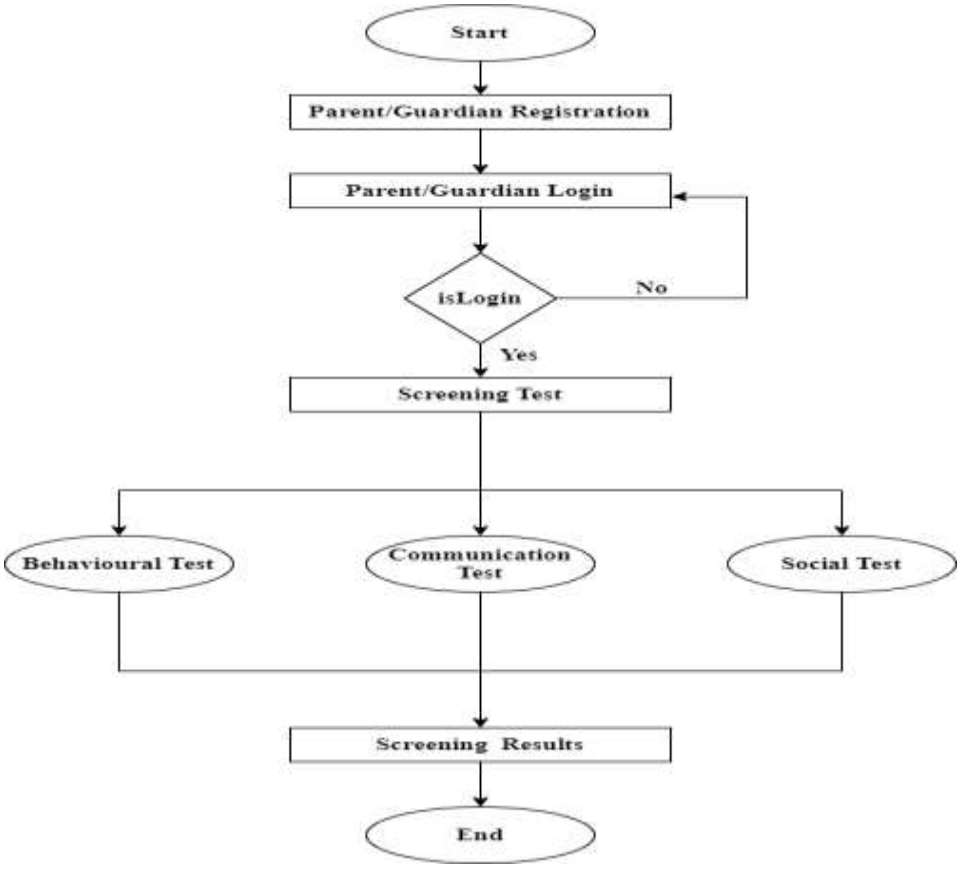


**Figure 3:** Activity and Interface of Parents / Guardian Module

Firstly, Parent/Guardian should register with their details in the application, once they complete the registration, login should be done with those credentials. After login, they should fill the details of their child. Then, parent/guardian have to take the screening test which includes behavioural test, communication test, social test. The test results are displayed in the screening results activity.

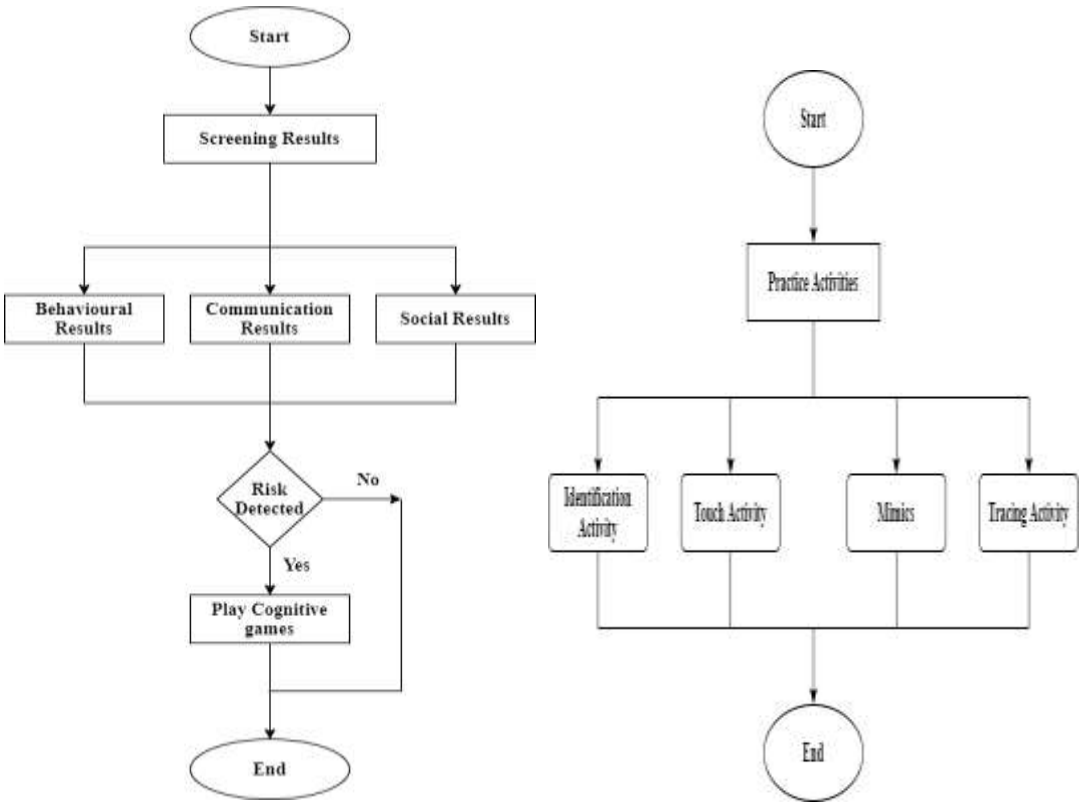


**Figure 4:** Activity and Interface of Children Module

Depending upon the score secured in the screening test of the parent/guardian, the child should play cognitive games under the parent's/guardian supervision. Those cognitive games include Identification activities, touch based activities, mimicking, tracing activities.

## IV. MAJOR OUTCOMES

- Complete analysis on the various skill activities which could be identified in ASDs
- Ability to learn through guide and mentor support
- Mind relief in all aspects and consuming time under proper co-relation with existing data
- Identification of Images, Shapes, Colors and Math in a simple way
- Mostly, the app is implemented in both Voice and Text Mode for easy and feasible mode
- Less Harm
- Low cost and more effective and available in Google Playstore for free of cost.
- Helps and useful for all ASDs ranging age 8 to 15

## V. RESULTS

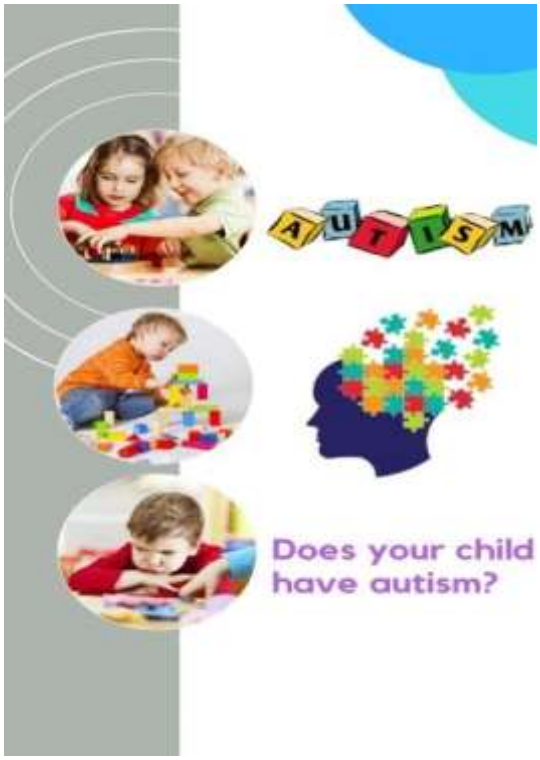


**Figure 1.1:** explains the logo of the application


**Figure 1.2:** represents the Login and Sign Up


**Figure 1.3:** represents Registration from mentor and guides

**Figure 1.3:** Represents the Search Facility


**Figure 1.5:** is for the autistic childs details entry


**Figure 1.6:** represents the sample Questionnaire


**Figure 1.7:** represents various Questionnaire in all formats


**Figure 1.8:** Identification of the disk and disease activation levels for Low Risk.


**Figure 1.9:** Identification of the disk and disease activation levels for High Risk.


**Figure 1.10:** deals with the program, mainly works as database for images and helps to monitor and know the phases of thinking of the autistic child that we are dealing


**Figure 1.11:** shows the various gaming modules included for the autistic children to


**Figure 1.12:** shows the gaming modules of choose the colour

play and learn which makes functional position of the brain**.**

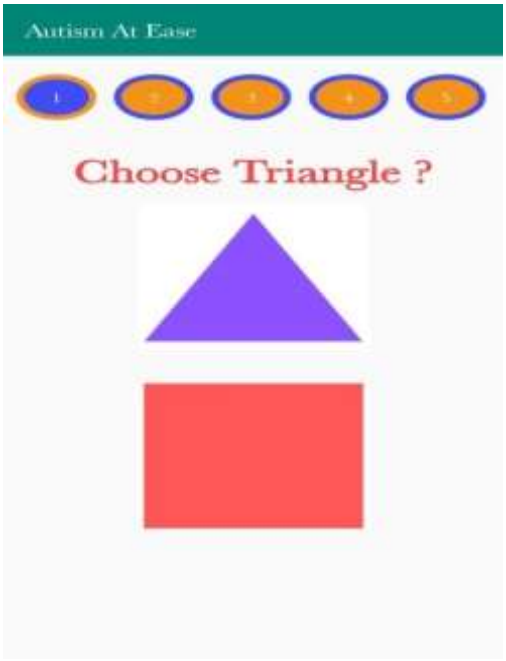


**Figure 1.13:** shows the gaming modules for choose of the shape and its colour

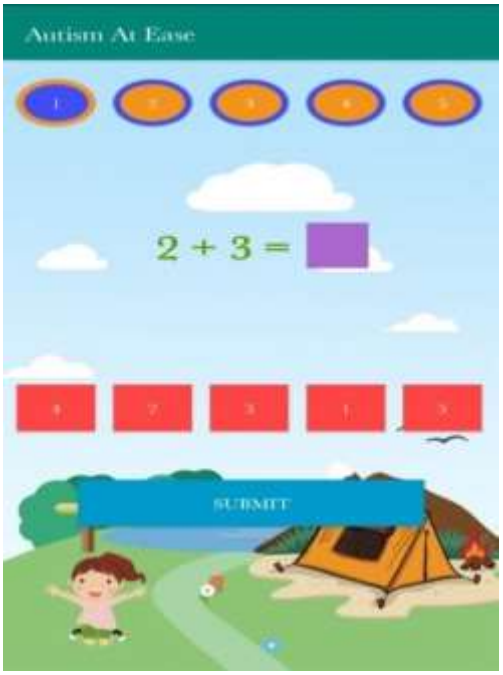


**Figure 1.14:** shows the gaming modules for mathematical approach on rhythmic match


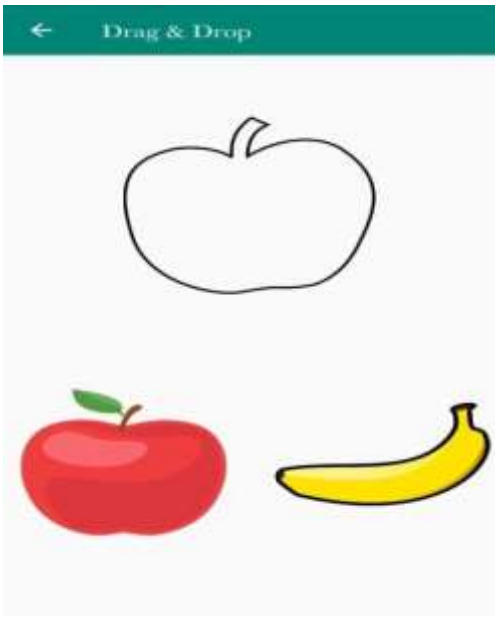


**Figure 1.16:** shows the gaming modules matching and locating the address module.

**Fig ure1.15:** shows the gaming modules of identification of the emojis along with their emotions

## VI. CONCLUSION

A mobile application has been designed for ASD children entitled **Autism at ease,** the use of this app has enough features to improve their behavioral, communication & social skills. Autism at ease has an skill to watch, assist and control the children by cognitive skill games, having and add embedded value for this design work for medical treatment in a computer professional way. This application enriches and give a new face trend for emotion and learning practice for this ASDs.

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