

**AN INTERACTIVE APPLICATION FOR AUTISTIC CHILDREN: USE, LEARNING  
AND ENTERTAINMENT**

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This Report Presented in Partial Fulfillment of the Requirements for the Degree  
of Bachelor of Science in Computer Science and Engineering.

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**DAFFODIL INTERNATIONAL UNIVERSITY**

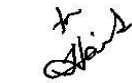
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## APPROVAL

This Project/internship titled “An Interactive Application For Autistic Children: Use, Learning And Entertainment”, submitted by Nepa Rani, ID No: 161-15-7612 ,Proshanta Kumar Roy, ID No: 161-15-6997, Abdullah Nahean Chodhury , ID No: 161-15-6855 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 06-12-2020.

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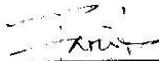
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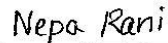
We therefore declare that, this project has been finished by us under the supervision of **Abdus Sattar, Assistant Professor, Department of CSE** Daffodil International University. We also announce that neither this project nor any piece of this task has been submitted somewhere else for award of any degree or diploma.

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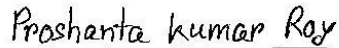


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## **ABSTRACT**

Autistic children are the cause of thinking of their parents. Every parents of autistic kid want their child can learn like normal children. Now a days everything is technology based. Like normal children an autistic child can't interact with technology like smartphone and computer. They can't learn through smartphone and computer. For overcoming these obstacle's, we came through an idea in which we will research on how to develop an interaction between computer and autistic children that they can use, learn, entertain in their own comfortable way. In our research we will examine some number of autistic children by giving them smart device we observed how they interact with these, how they want to interact with these, which features make them bore. Based on this research we tried to make an application. There will be an autistic children friendly learning interface and they will be entertained.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

Autism is a complex condition that includes problems with communication and behavior. Now many children are affected of autism. Autistic children face many problems with learning and communication. Their mental condition is not developing normally [1].

Every autistic children's parent wants their child to live like a normal child. Now a days everything is technology based. Like normal children an autistic child cannot interact with technology like smartphone and computer. They cannot use these. They cannot learn through smartphone and computer.

In our research we will examine some number of autistic children by giving them smartphone and computer. We will follow how they interact with these, how they want to interact with these, which features make them bore. Based on this research we will try to make an application. After completing this research, we hope we will be able to make an interface in which autistic children can easily use smartphone or computer. There will be an autistic children friendly learning interface and they will be entertained.

### 1.2 Motivation

In our country 1 in 59 children [2] are suffering from Autism Spectrum disorders. Ours is an age of modern science. Available smartphone and computer-based entertainment is not autism children friendly. For overcoming these obstacles, we came through an idea in which we will research on how to develop an interaction between computer and autistic children that they can use, learn, and entertain in their own comfortable way.

### 1.3 Rationale of the study

Autistic children cannot behave like normal children. They cannot express their emotions and feeling properly. It is very tough for their caregivers like parents, teachers to handle them. Sometimes parents cannot give enough time to teach their children. Autism kids want to learn with fun and entertainment. Very often time's teachers cannot teach them with entertainment so that autistic children lost interest while learning.

## **1.4 Research Question**

We think using smart device applications autistic children can learn with entertainment, less time consuming. They can learn anytime, anywhere. To reach our goal we solved some research questions. Our research questions were the followings:

1. How a smart device application can help autistic children in their education system?
2. How it can improve their mental growth, efficiency and ability?

## **1.5 Expected Outcome**

After completing this research, we hope we will be able to make an interface in which autistic children can easily use smartphone or computer. There will be an autistic children friendly learning interface and they will be entertained.

## **1.6 Report Layout**

Our objective is to develop a smart device application for autistic kids and show the difference of regular education system and smart device-based education system. The report is organized in a way that in the next chapter we will know about the background studies and some related works about the system we are proposing here. Then we will discuss about the research methodology of our work and after that the chapter will contain the experimental analysis of our application.

## **CHAPTER 2 BACKGROUND**

### **2.1 Introduction**

In this era smartphones are available in almost every family. Parents trying to teach their children by smartphones through various applications. There are many applications that can help autistic children to develop their mental condition. Autistic children wants to learn with entertainment. Smartphone users in our country are increasing day by day. In this chapter we will try to give the overall concept of our research based project.

### **2.2 Literature Review:**

Science and technology have brought different changes in education sector day by day. For autistic children there are many research and smart device applications are available for the autistic children. In this chapter we will discuss about this briefly.

The first one discusses about the development of an interactive and portable learning tool. It will be very useful and hold an important contribution to the autistic children. This paper serve the basic education in a combined educative environment [3].

The second one discusses about a sequence of customized games designed for smart devices. The goal of this paper is to help autistic children to improve their educational skills using smart devices. They developed an apparatus that can give month to month examinations of the passionate advancement of the client while playing a game; these outcomes will accordingly be imparted to the guardians and educators with the end goal of progressively productive instructing [4].

And the last one examines about a system that includes a way to deal with tackle issues in regards to chemical imbalance location for various age gathering of individuals in a single stage. In this structure individuals can add nearby screening devices to make it a compelling and socially delicate framework. The 3 layer appraisal procedure will screen and confirm chemical imbalance adequately. In addition, the cloud supervisor screens and deals with the whole framework midway to store data for future reference and help the client [5].

## 2.3 Related Works

### Speak through Pictures-Autism

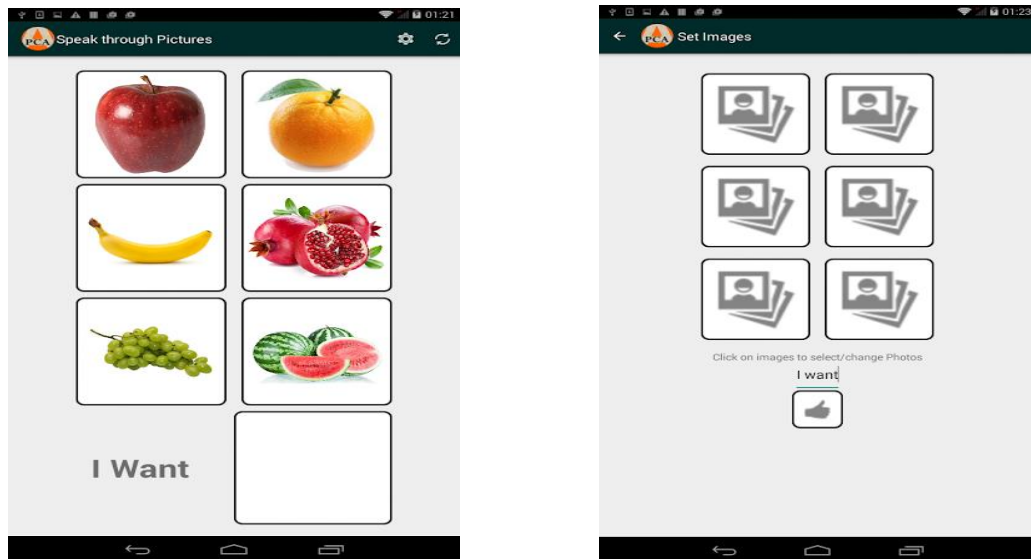


Figure 2.3.1: Speak through Pictures-Autism app[6]

This app can help the children with chemical imbalance as well as discourse defer issues. In this application you can choose your own photos from telephone or tablet display and children can relocate the photos. Here you can likewise alter the content as per your need [6].

### Autism Read & Write

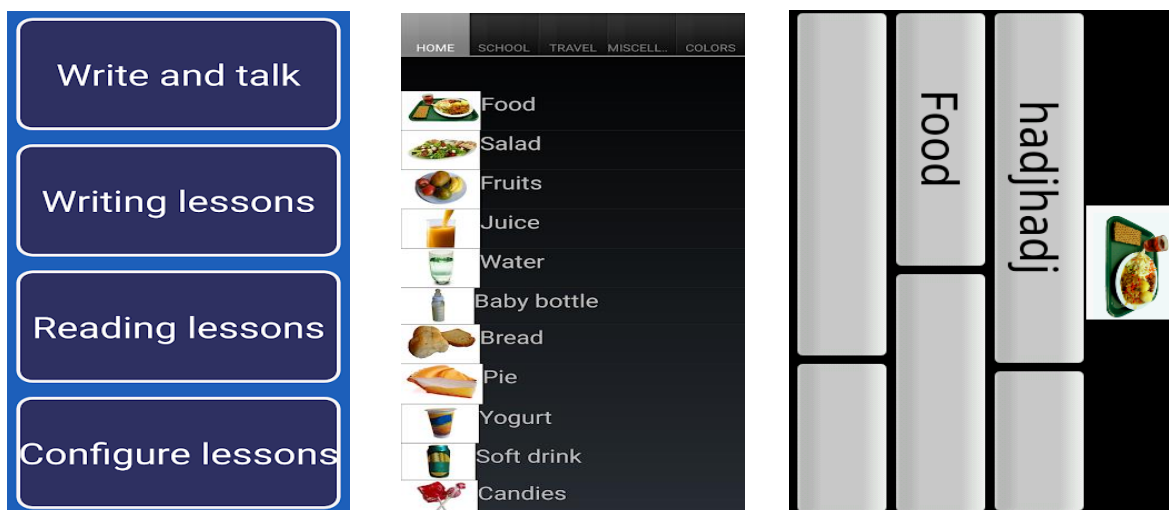


Figure 2.3.2: Autism Read and Write app [7]

This application is proposed to help ASD kids to gain proficiency with the essential of perusing and composing. The perusing and composing exercises have various degrees of multifaceted nature. During the exercises, on the off chance that you need to bounce the exercise concerning a word or picture, at that point push on the picture of reference, situated at the top community for understanding exercises and at upper ideal for composing exercise [7].

## Talking Pictures: Autism, CP



Figure 2.3.3: Talking Pictures: Autism, CP app [8]

The application is intended to encourage correspondence with nonspeaking youngsters determined to have chemical imbalance, mental impediment, cerebral paralysis, and so forth alalia the application is very easy to utilize for each essential want of the kid on the screen there is an image. By tapping on the picture, de-pending on the setting, a caution sounds or discourse synthesizer will talk the expression, which is set up for this image [8].

## Autism Speech DiegoSays



Figure 2.3.4: Autism Speech DiegoSays app [9]

This application speaks to a brisk and down to earth type of showing your youngster the nuts and bolts of communication. The correspondence is the most significant component for expanding the autonomy and progress of your youngster. This application utilizes the fundamental needs of your kid so as to improve his relational abilities [9].

## SymboTalk-AAC Talker

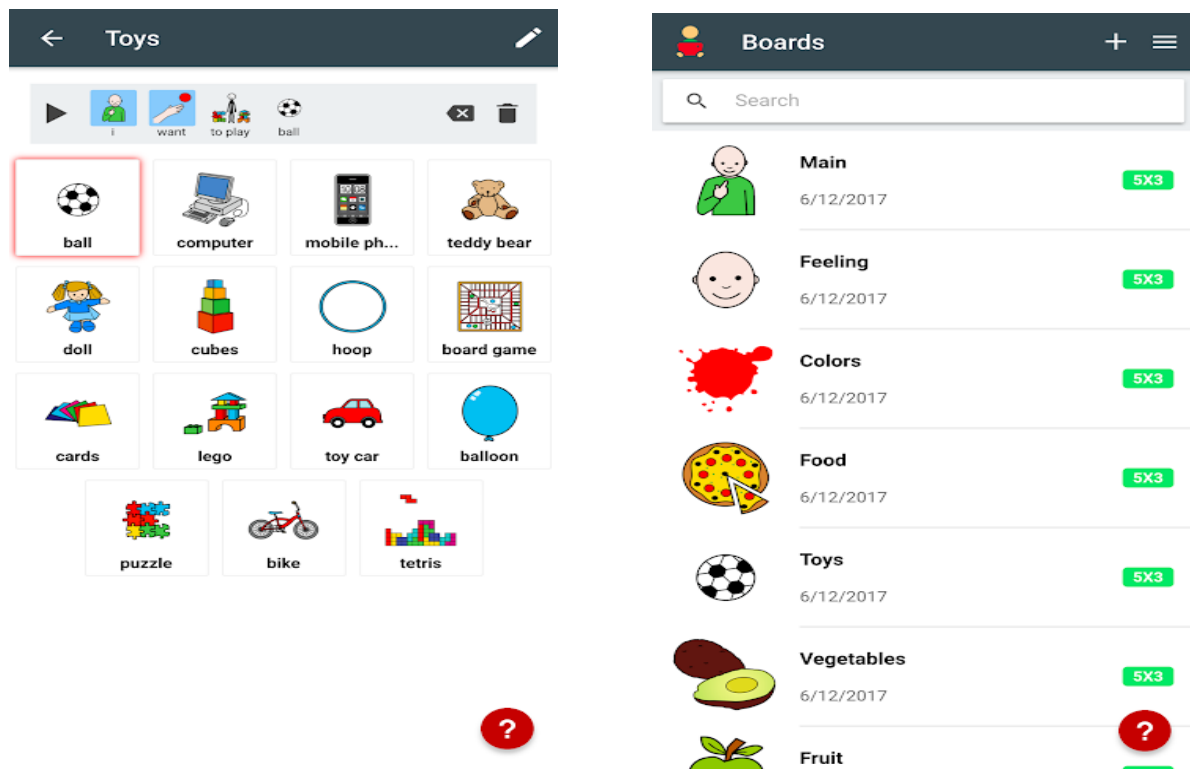


Figure 2.3.5: SymboTalk-AAC Talker [10]

SymboTalk is an application that discussions for you by tapping on images (pictures or symbols). The application has pre-characterized correspondence sheets from various everyday issues, each board contains images. Tapping on an image peruses it out loud and adds it to a sentence which can likewise be perused. Along these lines SymboTalk can be your voice and talk for you. The application intended for those who's physical or state of mind doesn't enable them to represent themselves [10].

## Leelo AAC-Autism Speech App for Non-Verbals

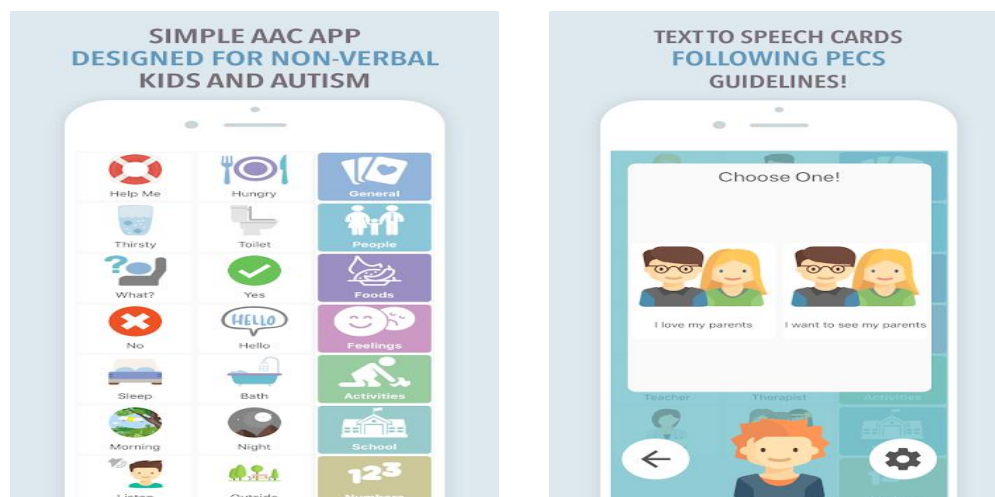


Figure 2.3.6: Leelo AAC -Autism Speech App for Non-Verbal's app [11]

Leeloo is an application that encourages non-verbal children to speak with their folks, educators and companions. Leeloo is created with the AAC (Augmentative and Alternative Communication) and PECS (Picture Exchange Communication System) standards. Which are solid procedures for autism treatment and chemical imbalance treatment in correspondence. In this application, there is a card for each word that your child may need to use in every day. What's more, every card is coordinated with an authoritative vector image about the expression or word your child attempting to impart [11].

## Emotion Learning for Autistic



Figure 2.3.7: Emotion Learning for Autistic app [12]

This game commits to the medically introverted youngsters with the goal that one can identify the facial enthusiastic expressions. There will be demonstrated countenances of a few passionate articulation. Player need to identify the correct. This game will assist kids with learning the feeling face. In this manner, youngsters will be created, all things considered, which will comprehend individuals [12].

## 2.4 Research Summary

In our study we try to find how an autistic child can learn with smart device application with entertainment.

## 2.5 Challenges

There is no work that can be successful without challenges. In our work we also face some challenges. First of all we went some autism schools and discuss with parents and teachers about their habit, lifestyles, teaching style and entertainment. We try to find which technology they are using for them. We spent some time with autistic kids to know how they can use smart devices. We gave them some similar applications like our application and we observe that which application they like more. Based on this observation we make some changes in our application such as

including a puzzle game.

We also faced many other challenges like,

1. Adding kid's friendly background music
2. Adding autism friendly interface



## CHAPTER 3 RESEARCH METHODOLOGY

### 3.1 Data Collection Procedure

We went two autism school. We talked with some parents and teacher. We collect some important information from them. Then we talked with some autistic children.

### 3.2 On-site Observation

On location perceptions are one of the best instruments with the examiner where the investigator personally goes to the site and finds the working of the framework. As a spectator, the investigator can increase direct information on the exercises, activities, procedures of the framework on location, subsequently here the job of an expert is of a data searcher. We visited two autistic school for collecting information [14].



Figure 3.2.1: Autistic children in school [15].

### 3.3 Interview

We asked some questions to teachers and parents. We collected data from this session. Questions and answers are given bellow.

#### Questions for teachers:

1: How they teach their students?

Answer: Autistic children love entertainment .They teach their students with pictures and sometimes with toys. For memorizing anything they don't create pressure and they teach again and again.

2. What types of game does like to play?

Answer: There are different types of autistic children. Different children play different games. Some love playing with toys like cars, dolls, lego, sensory toys etc. Some loves to play with musical toys and playing smart device games. Most of the autistic children like puzzle games.

3. Is involved in any extracurricular activities?

Answer: There are some talented kids. Some of them are interested in playing musical instruments. Some children likes to draw. Some are loves to singing and dancing.

4. What changes occur in behavior during the class?

Answer: After a certain it is very difficult to handle them. Sometimes they become very angry and behave rudely.

5. How long they can hold their attention?

Answer: They cannot hold attention like a normal children. After sometimes teachers give a short break for children's refreshment and again they start teaching.

### **Questions for parents:**

1. What does like to do during his/her spare time?

Answer: They typically love to watch TV, sleep, playing during their spare time.

2. What does like to do alone? With friends?

Answer: They does not like to be alone. When they are alone they do different things like sometimes they play with their toys, sometime they listen music. With friends they typically play with each other with their toys.

3. Tell us about their daily activities? Answer: Parents face difficulties to know what children want. Because they cannot express like normal children. Typically they follows their surrounding people. For example when they see someone is brushing they also try to express that they want to brush.

### 3.4 Class diagram

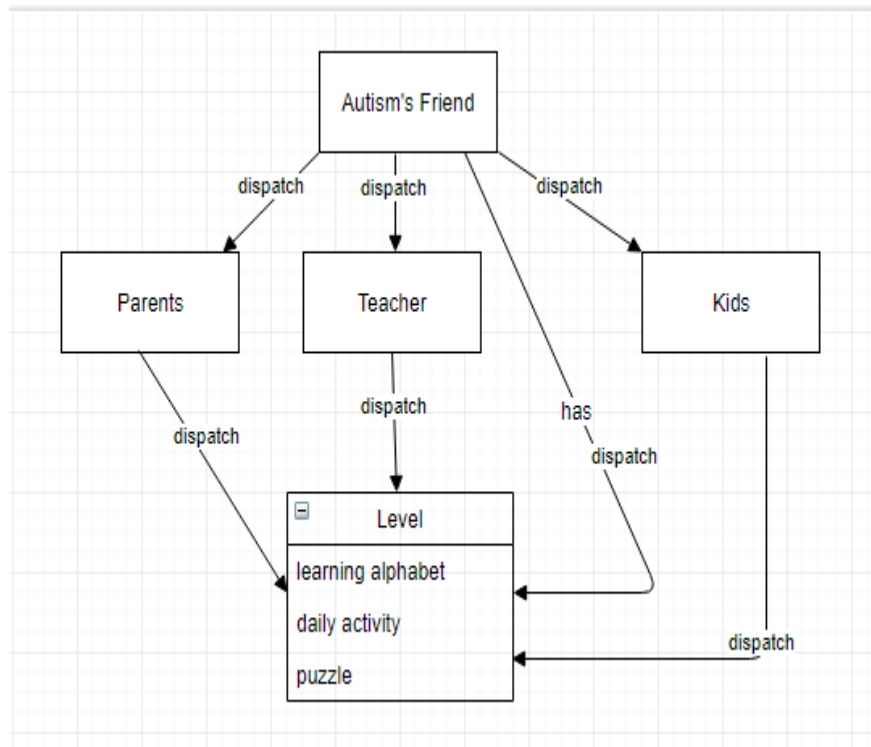


Figure 3.4.1: Class diagram

### 3.5 Activity diagram

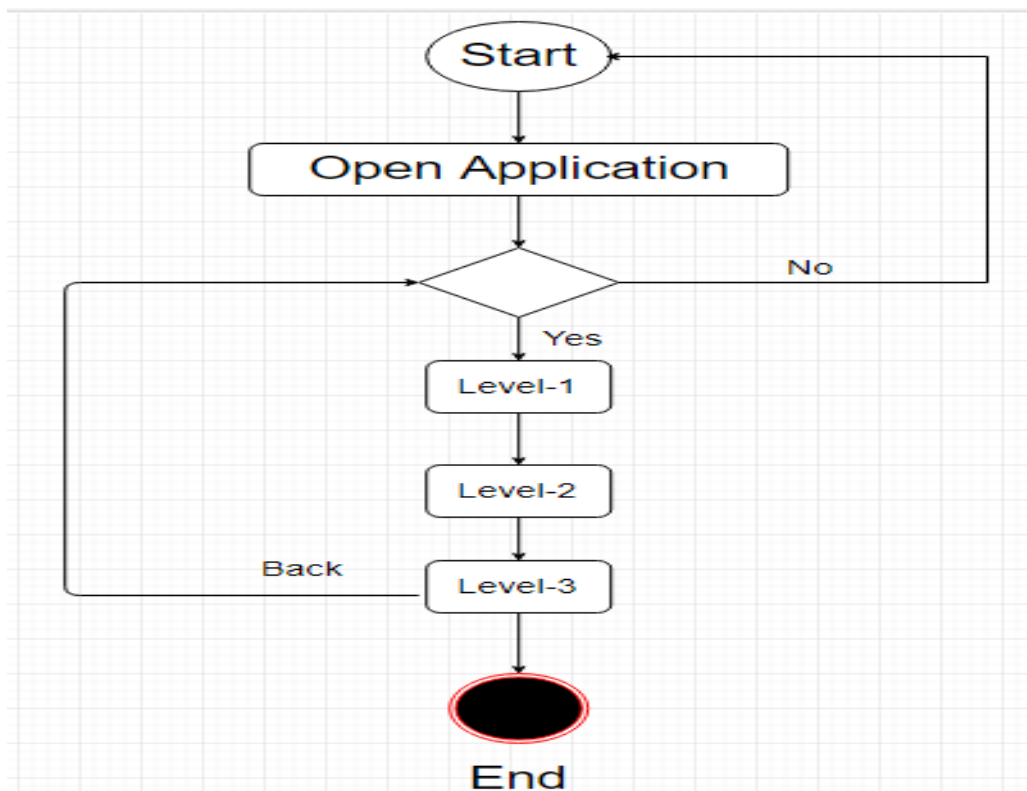


Figure 3.5.1: Activity diagram

## CHAPTER 4 IMPLEMENTATION AND TESTING

### 4.1 Introduction

In this chapter we will discuss about our experiment result and will discuss about various pros and cons of our system.

### 4.2 Experimental Results

After our study on their lifestyle, habit we make an android application called “Autism’s Friend”. We include three easy features in our application according their needs. These are:

1. Alphabet learning with relevant pictures and music.
2. Learning daily activities.
3. A puzzle games of learning human body parts.

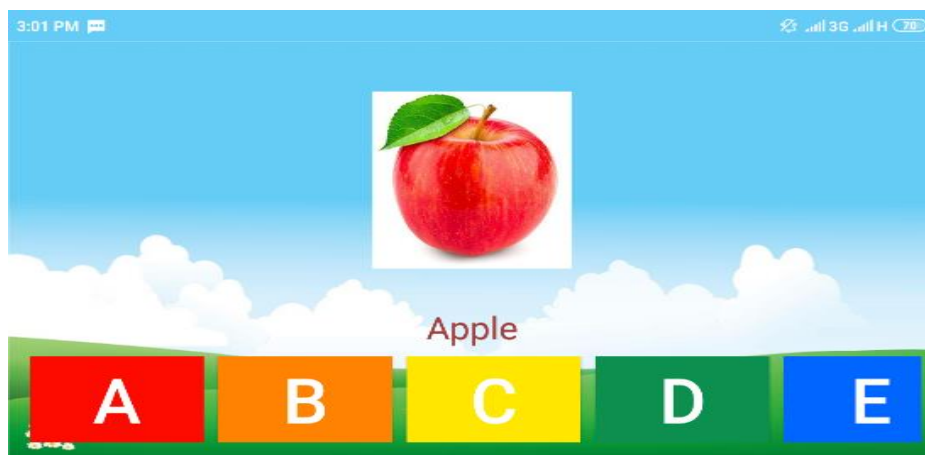


Figure 4.2.1: Alphabet learning with picture and music.



Figure 4.2.2: Learning daily activities with picture and voice.

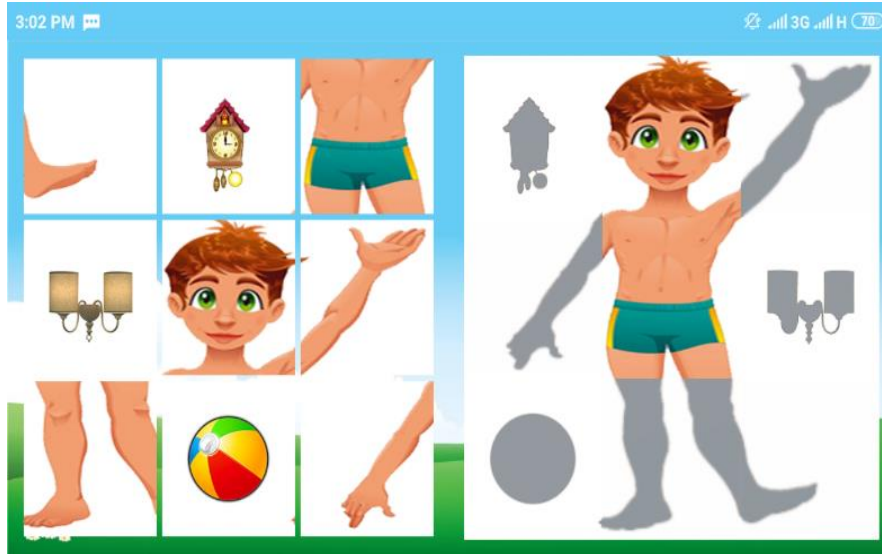


Figure 4.2.3: Puzzle game of matching body parts

### 4.3 Descriptive Analysis

From our study on different applications and some related papers we get that learning with entertainment is more effective for autistic children. In our application we have added some features with music and pictures. Besides learning alphabets they can also be familiar with many relevant pictures. From daily activities we add only regular activities which they need most. We also add a puzzle game that can help them to develop mental growth with matching different parts of human body.

### 4.4 Summary

From our study we observe that learning with entertainment is more appropriate for autistic kids. From traditional paper books they cannot learn properly. Through application they can learn with delightful mind.

## **CHAPTER 5**

### **CONCLUSION AND FUTURE WORK**

#### **5.1 Conclusion**

For any family having an autistic child is a challenge. Mental imbalance range issue is a neurological and formative issue that starts right off the bat in youth and keeps going all through an individual's life. It influences how an individual demonstrates and cooperates with others, conveys, and learns [13]. From this study we observed that autistic children's love to learn with entertainment. For their betterment we try to develop an entertaining and learning app. We hope using this application autistic children can learn like normal children.

#### **5.2 Future Work**

In future we will work on the development of our application. We will try to add some features that can make their daily life easy. We have to work on it to find some less expensive way to include these special features.

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## Interactive Application

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