**SPEECH THERAPY ASSESSMENT FOR CHILDREN**

**Abstract:**

This report outlines the development of a mobile application aimed at addressing the speech therapy needs of children diagnosed with Autism Spectrum Disorder (ASD). ASD is a complex developmental condition characterized by communication challenges. Children with ASD often struggle with speech and language development, making early intervention crucial. The mobile application serves as a vital tool to assist these children in improving their communication skills.

The motivation behind this project stems from the pressing need to provide effective and accessible solutions for children with ASD. Traditional speech therapy methods often require extensive in-person sessions, which can be both logistically challenging and costly for families. Moreover, the variability in ASD symptoms demands personalized interventions. By leveraging technology and creating a user-friendly mobile app, the project aims to bridge these gaps, offering a cost-effective and customizable solution that empowers parents and caregivers to actively participate in the child's therapy journey.

The mobile application employs modern technologies, with a focus on Android development and utilization of articulatory phonetics in the Marathi language. The app features two core modules: an administrative section for customization and a user-friendly interface for children and their parents. The admin module allows for the addition, modification, or deletion of speech therapy content, including words, audio files, and assessment questions in Marathi. The user module offers children the opportunity to engage with speech therapy exercises in a gamified manner, listen to audio pronunciations, and undergo assessments to monitor progress. By combining technology, linguistic expertise, and a user-centered design, the project aims to provide an innovative and effective tool for addressing the unique speech therapy needs of children with ASD.

***Keywords****: ASD, autism, app development, react-native, speech therapy*

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**INTRODUCTION:**

### 1.1 MOTIVATION

### The primary motivation driving this project is the pressing need to address the speech and language development challenges faced by children diagnosed with Autism Spectrum Disorder (ASD). ASD is a complex developmental condition that often manifests in communication difficulties, making early intervention essential. Traditional methods of speech therapy are often constrained by geographic limitations and cost, hindering access to critical therapy services for many families. To bridge this gap, the project embarked on the development of a mobile application tailored to the unique needs of children with ASD, offering a convenient, cost-effective, and accessible solution.

### 1.2 NEED OF THE PROPOSED SYSTEM

The need for the proposed system can be outlined as follows:

1. Lack of concrete treatment on Autism: Autism is not defined by any clear symptoms; hence it lacks any concrete treatment. The treatment is thus varied depending upon the symptoms.
2. Use of technology: Despite the thriving technology sector, its integration into the medical industry for Autism treatment has been limited. However, the incorporation of React-Native, MongoDB, Cloudinary, and Power BI into the project leverages cutting-edge technology to address this gap and provide innovative solutions for Autism treatment.
3. No need for repeated follow ups: With the treatment available at one click on the mobile application.

### 1.3 BRIEF INTRODUCTION TO APPLICATION

### The developed application functions as a dual-purpose system, comprising an administrative module and a user module. It provides essential support to children with ASD and enables healthcare professionals to effectively monitor their progress. In terms of functionality, the application is designed to establish communication with a database for the secure storage of user data. The administrative module grants authorized users the ability to manage therapy content, which includes tasks such as adding, modifying, or deleting speech therapy materials and assessment questions specifically tailored to the Marathi language. Conversely, the user module offers children and their parents a user-friendly interface for participating in speech therapy exercises, listening to audio pronunciations, and undergoing assessments to track their progress.

### 1.4 REASON BEHIND MAKING THE APPLICATION

1. Aid Children with ASD: Develop the app to assist children with Autism Spectrum Disorder (ASD), specifically targeting speech and language challenges.
2. Empower Parents/Caregivers: Enable parents and caregivers to actively participate in therapy, reducing the need for frequent medical visits.
3. Utilize Modern Technology: Leverage Android and technology advancements to make therapy accessible and effective.
4. Streamline Administration: Simplify administrative tasks for healthcare professionals, allowing them to focus on patient care.
5. Customize Therapy: Tailor therapy materials to each child's specific needs, recognizing the variability in ASD symptoms.
6. Address Contemporary Needs: Respond to the growing demand for innovative medical solutions, especially in the context of ASD therapy.

## **LITERATURE SURVEY**

### 2.1 LITERATURE REVIEW

#### Table No 2.1: Comparison table of various applications and proposed application

|  |  |  |
| --- | --- | --- |
| Card Talk | Jellow Basic Aac Communicator | Proposed Application |
| No login required. | Login required for user. | Login required for admin but not for user. |
| Permission to record audio. | No option to record audio. | Take permission while recording audio. |
| The entire application is in English language. | The entire application is in English language. | The application is intended to use Marathi alphabets. |
| Categories include Tools, People, Vehicles, Place, Time, etc. | Categories include learning, people, places, etc. | Categories include Marathi alphabets. |

### 2.2 REVIEW OF EXISTING SYSTEM

Other referred applications:

Card Talk: Here no signup is required and takes permission to record audio.

Jellow Basic AAC Communicator: Login is required and there is no option to record audio.

These applications provide various features which will be beneficial to users. But even with these features there are certain required aspects which make these applications limited. One of them is language.

**There are many applications in English** **but very less or negligible applications intended to teach Marathi alphabets**.

#### **2.2.1 System Functions**

There are two modules within proposed application. They are:

1. Admin Module
2. User Module

#### **Admin Module:**

Login: Admin can use his name id and password to use the system.

The functionalities at the admin’s side are:

* Adding different cards: The admin can add different cards to a particular category.
* Editing existing cards: The admin can edit existing cards.
* Deleting cards: The admin can delete cards from a particular category.
* Creating a new category: The admin can create a new category of cards.
* Editing an existing category: The admin can edit existing cards.
* Deleting an existing category: The admin can delete a particular category.
* Changing the password: The admin can change his login password.
* Logout: The admin can logout of the application.
* Analysis: Admin can analyse the progress of patient.

#### **User Module:**

User Authentication: User have to login. The functionalities at the user’s side are:

* Viewing different cards: The user can view different cards belonging to a particular category.
* Listen to the audio: The user can listen to the audio of the pronunciation of a particular card.
* Assessment
* Assessment Result
* Session time recording

## **PROJECT STATEMENT**

### 3.1 PURPOSE BEHIND THE PROJECT

The project includes an application to assist children suffering from autism. The main aim of this project is to help the society using the recent technologies like Android which will also be a huge help to the medical industry.

The application will be a cost-effective solution and the parents themselves can monitor their child’s progress without having to go to the doctor. Its ease of use and accessibility impacts and benefits both the child and the doctor. The mobile application is the need of the hour.

### 3.2 DECISION OF SCOPE

### To achieve the objective, a user-friendly mobile phone application will be developed to effectively attain the desired outcome. The application will feature an intuitive user interface, simplifying its usage for both parents and children. Within the application, an administrative section will be incorporated, granting administrators the capability to add, modify, or remove categories within the existing set of Marathi language letters. Similarly, administrators will have the authority to manage words and associated audio files linked to specific letter categories by adding, deleting, or updating them. Users will have the option to select a word category, and clicking on the words will trigger the corresponding audio playback.

### 3.3 METHODOLOGY FOR SOLVING THIS PROPOSED SOLUTION

#### **Process Flow:**

1. Register – User can get registered themselves as Guest and admin can sign in as an admin.
2. Login - Once registered, admin can login using his credentials and user can sign in.
3. View Card/Category: The user can view card/category depending on what the person wants.
4. Edit/Delete Card/Category: The admin can edit/delete card belonging to a particular category or an entire category.
5. Assessment: Admin can arrange assessment for users and users can access assessment.
6. Progress: Admin can monitor user’s progress.

## **SYSTEM REQUIREMENTS AND SPECIFICATIONS**

**4.1 SOFTWARE REQUIREMENTS SPECIFICATIONS:**

### 4.1.1 Introduction

Intended Audience and Reading Suggestions: Users of the system are children, parents to assist their children and the administrator of the system. The members are assumed to have basic understanding and knowledge of computer and internal browsing while the administrator should have more knowledge so that he/she can resolve small problems and perform information.

The intended audience includes all stakeholders as mentioned below

1. Developers
2. Users/Designers
3. Testers
4. Documentation Writers

**4.1.2 User Classes and Characteristics**

There are two users in the system:

### User

* Go to the required app
* Sign in.
* Select category and study cards.
* Can able to give assessment.

### Admin

* Adding different cards
* Editing existing cards
* Deleting cards
* Creating a new category
* Editing an existing category
* Deleting an existing category
* Add Assessment questions
* Track progress
* Changing the password
* Logout

#### **4.1.3 Operating Environment**

The only requirement would be the internet connection, mobile phone and self-presence.

* Hardware Requirements:
* Display screen: For the user-system interaction.
* Output devices -display screen

### • Database-MongoDB

* Frontends – React Native
* Backend – Node.js
* Cloud Technology- Cloudinary
* Analysis: Power Bi

**4.1.4 External Interface Requirements**

#### **User Interfaces**

There are two kinds of users:

1. Admin - Admin will have the first interface to login. He/she will be provided an UI to enter Id and Password and the login button which will take admin to perform actions like to add/delete/modify the cards. In add section the admin can upload images and audio for a card as well as admin can add new category. In delete option the particular card will be deleted from app. And in modify option admin can modify the image or audio or spelling of a card. This page will also have a logout button which will logout the admin from this app.
2. User - User will have an option to login when he opens the app for the first time. Now the user will have to choose from one of the categories like barakhadi, sentences, words and many more. The cards will be displayed with images when the user clicks on a particular card the app will correctly pronounce the card.

#### **Hardware Interfaces**

This app is supported in all android as well as ios devices. The requirements are speaker and display to the device. This app has various functions as mentioned below:

1. Add – To perform this function one needs camera & microphone enabled device. When the admin clicks on add button the admin is given options to add new card to any category or create new category, then admin can click/upload the picture and add voice for that card.
2. Delete – When logged in as admin, he/she will have the ellipsis over each card. When clicked on it, it gives admin two options i.e., delete & modify. When clicked on delete button the card is deleted. Similarly, any category can be deleted.
3. Modify - When logged in as admin, he/she will have the ellipsis over each card. When clicked on it, it gives admin two options i.e., delete & modify. When clicked on modify button you are given options to modify image/audio or category. After performing the task when user clicks on save the modification is accomplished.
4. Listen – To listen to audio user/admin can click on any card and he/she will be able to learn the correct pronunciation for a given card*.*

#### **Software Interfaces**

The software database used in this project is MongoDB.

**Communication interfaces**

The machine needs to work properly and communicate with the database for proper functioning.

### Other Non-functional Requirements

#### **Performance Requirements**

The performance requirements for this app are that the user should be familiar with the basic functionalities of mobile phone and should be able to use them. The admin should place all the images and audio for a card very precisely because this may lead to learn the wrong pronunciation. For user he/she should wait for some milliseconds to listen the pronunciation. Admin should remember the password to login and make changes into the data of app. User can select continue as guest and proceed further for learning.

##### **4.1.5 Product Perspective**

1. The application is a single functional unit consisting of admin module and user module.
2. This application assist children suffering from autism and the parents themselves can monitor their child’s progress without having to go to the doctor.
3. The system communicates with the database for the storage of data.

**4.1.6 Product Function**

Some major product functionalities of the system are as follows:

#### **User**

* Go to the required app
* Sign in as a guest.
* Select category and study cards.

#### **Admin**

* Adding different cards
* Editing existing cards
* Deleting cards
* Creating a new category
* Editing an existing category
* Deleting an existing category
* Changing the password
* View Patient List
* Monitor Patient’s progress