DHAVNIBODH: APPLICATION FOR MISARTICULATION CHILDREN IN HINDI

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ABSTRACT

Many kids in India have trouble talking right, pronouncing words correctly, and having a slurry of languages, which makes it hard for them to communicate and make friends. The usual ways to help them talk better often don't work well for Indian languages like Hindi. They can also be boring for both the kids and the people helping them. So, we came up with a new idea: DhavniBodh, an app for children facing issues with articulation, is in Hindi. This app is made just for kids who need help talking better in Hindi, and it can also be integrated with doctors treating children who are having issues with articulation. It gives them tests to see what they need help with, fun activities to practice, learning from sound, improving themselves with gamified content, and a way to talk to experts for advice. Our app makes talking practice more fun and easier for Indian kids who need and are having problems speaking. In addition, this problem in children can be identified late by parents; even the doctors are very few, and treatment is costly. "DhavniBodh," makes a significant impact on children, along with helping speech therapists and practitioners track their patient improvement.

Keywords: Misarticulation Therapy Materials, Materials In Hindi, Articulation, Speech Therapy, Mobile Application, Children, Learning.

I. INTRODUCTION

In India, many children face difficulties in speaking clearly, which is known as misarticulation. As per Annual Report[2] Census 2011 data reveals around 19,98,692 individuals with speech disabilities, with 11,22,987 being males and 8,75,705 females. It occurs when children struggle to produce certain sounds correctly. This challenge is quite common, especially in languages like Hindi. For instance, sounds such as 's', 'r', and 'l' can be particularly tricky for some children. Misarticulation not only affects their ability to communicate effectively but also impacts their educational progress and social interactions.

Data on misarticulation reveals that approximately 8-10% of preschool-aged children in India experience this issue. This statistic sheds light on the significant number of children who require assistance with their speech development. Misarticulation goes beyond just mispronouncing sounds; it can hinder a child's ability to learn essential skills like reading, writing, and spelling. Additionally, it can lead to social challenges, as children may feel hesitant or excluded from conversations with their peers.

However, accessing support for misarticulation can be challenging for many families across India. The availability of speech therapists is limited, especially in rural areas, where the ratio of therapists to the population can be as high as one therapist for every 250,000 people. This scarcity of resources means that numerous children who could benefit from therapy may not receive timely intervention. Moreover, the cost of therapy can be prohibitive for some families, further exacerbating the issue of accessibility.

Another significant barrier to effective therapy is the lack of resources tailored to Indian languages. Many existing therapy materials and techniques are designed for English-speaking populations and may not be suitable for addressing misarticulation in Hindi . This mismatch between available resources and linguistic diversity makes it challenging for therapists to provide culturally and linguistically appropriate interventions, hindering the progress of children with misarticulation issues.

To address these challenges, our research aims to develop a specialized solution: a user-friendly app for smartphones and tablets. This app is designed specifically for children who require support with misarticulation

in Hindi . It will feature engaging games and activities that make speech practice enjoyable and accessible. Additionally, the app will provide a platform for children to communicate with qualified therapists, bridging the gap between families and therapy services.

Our goal is to make speech therapy more accessible and effective for every child in India, regardless of their geographical location or socioeconomic status. By leveraging technology and incorporating evidence-based practices, we aim to empower children to improve their speech skills confidently and comfortably. Through collaboration with educators, therapists, and families, we aspire to create a supportive environment where every child has the opportunity to thrive and succeed.

In summary, misarticulation poses significant challenges for many children in India, impacting their communication, education, and social development. Addressing this issue requires innovative solutions that prioritize accessibility, cultural relevance, and effectiveness. Our research endeavors to meet these needs by developing a tailored app that empowers children to overcome misarticulation challenges and reach their full potential in speech and language development.

II. PROBLEM STATEMENT

In India, many children face challenges in speaking clearly, impacting their communication and learning. Current speech therapy options are limited, along with that the treatments are very less in Indian regional languages ,thus often requiring adaptation from English resources. Additionally, existing methods can burden doctors and lack personalized solutions.

III. RELATED WORK

In recent studies, researchers [1]Ranjan and Banik (2014) developed a comprehensive word list in Hindi aimed at add-dressing articulation errors among children with hearing im-pairment. Their work underscores the importance of tailored linguistic resources for effective therapy.

Government reports [2]highlight the significant prevalence of speech disabilities among individuals in India, in as per census data 2011 emphasizing the pressing need for accessible and culturally relevant interventions.

Bansal and Kumaraswamy [3] introduced a Revised Picture Articulation Test in Hindi, a notable contribution to the field. Their test serves as a valuable tool for assessing speech sound disorders in Hindi-speaking populations.

Moreover, R.Bhat et al.[4] proposed the digitization of the Hindi Photo Articulation Test, aiming to enhance the accessibility and efficiency of diagnosing speech sound disorders. Their innovative approach demonstrates the potential of techno-logy in advancing diagnostic practices.

Additionally, Deshmukh et al.[5] presented pioneering work in developing therapy materials specifically tailored for children with misarticulation issues in Hindi. Their focus on culturally sensitive interventions highlights the importance of addressing linguistic diversity in therapeutic contexts. Along with this we visited the hospital in our locality where we learn how physically the doctors give treatments using various techniques like showing the picture of their family and tell them to recognize that picture, ask them to pronounce that and also to make them learn give some small rewards by which children can practice, pronounce, try to speak so that doctors can understand their improvement.

IV. PROPOSED SYSTEM

Our proposed system, developed as an Android application, emerges as a response to the pressing need to address articulation challenges among children in Hindi-speaking regions. The aim is to provide an accessible, engaging, and effective platform for enhancing articulation skills.

Position Level: At the foundation of our app lies the Position Level, which introduces children to the various positions within words where sounds are produced. By familiarizing them with the mechanics of speech production, this level lays the groundwork for understanding and improving articulation.

Phoneme Level: Moving beyond the basic understanding of sound positions, the Phoneme Level categorizes words based on the position of sounds—initial, medial, or final. This segmentation enables children to target specific areas of articulation difficulty and practice producing sounds in different word contexts.

Picture Level: The Picture Level harnesses the power of visual aids to reinforce word associations and aid memory retention. Through word-related images, children not only engage more deeply with the vocabulary but also develop stronger connections between words and their respective sounds.

Video Level: Dynamic visual learning is facilitated at the Video Level, where children are presented with video content that demonstrates correct articulation techniques. By observing and imitating these techniques, children can refine their own articulatory skills in a more interactive and engaging manner.

Hindi Language-based Activities: Recognizing the importance of linguistic and cultural relevance, our app offers a range of activities tailored specifically to the needs of Hindi-speaking children. From basic sound recognition exercises to more advanced syllable stress patterns, these activities are designed to provide targeted support for articulation improvement.

Performance Evaluation: Central to our system is a robust performance evaluation mechanism that provides children with valuable feedback on their progress. A reward system is integrated to incentivize continued engagement, while graphical representations of test results ensure that children, parents, and educators alike can easily track and understand progress over time.

In our solution, we have provided a list of activities for each domain, like Listening of sounds and understanding the move-ment of sound production once the children is used to the sound, they can test from basic level, that is, from pronunciation of single letter with a word like a to 'angur (in Hindi)', a to 'aam (in Hindi)' like that for each letters. After testing, the children were able to test the pronunciation of picture to make it sound as like what doctors do in hospitals with children. Then there are various activities like Listening to and identifying words, Testing word recognition abilities, Practicing syllable stress patterns, Listening to words with stress patterns, and testing word component recognition abilities. Our proposed system represents a convergence of linguistic expertise and interactive technology, with the ultimate goal of empowering children to overcome articulation challenges with confidence. By providing a platform that is not only accessible and engaging but also culturally relevant, we aim to facilitate meaningful and lasting improvements in articulation skills among Hindi-speaking children.

V.　　OBJECTIVE OF PROPOSED SYSTEM

The aim of our system is to help children with speech challenges in Hindi-speaking communities. Through engaging activities, it assists in recognizing sounds, words, and stress patterns in syllables. The system offers personalized learning experiences tailored to individual needs, fostering better communication skills. Additionally, it facilitates easy access to consultations with doctors, ensuring timely support and guidance for parents and children facing speech difficulties.

VI.　　SYSTEM ARCHITECTURE
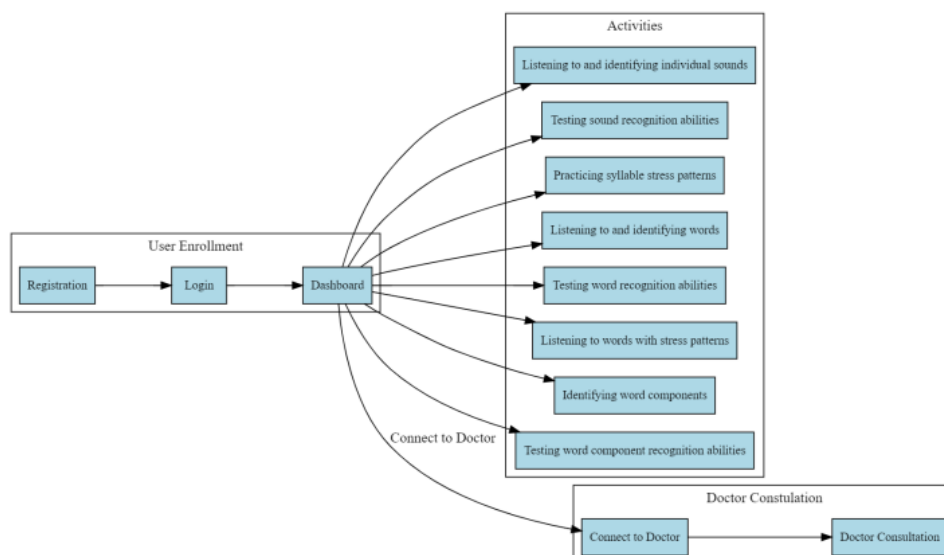
Fig. System Architecture of our application

VII.   REQUIREMENTS

A. Technology Stack

i. Java

ii. XML

iii. Canvas(for image editing)

B. Tools Required For Development

i. Android Studio

ii. Emulator/ Mobile Device

VIII.   APPLICATIONS / USE CASES

The proposed system will serve a broad spectrum of individuals and professionals involved in speech therapy and language learning. It will cater to individuals struggling with speech disorders, language enthusiasts seeking improvement, and adults aiming to reduce their accents. Additionally, it will support professionals like Speech Therapists, Audiologists, and Special Education Programs. Parents, guardians, and tutors looking for tools to aid their children's development will also benefit. Furthermore, it will extend its services to individuals in recovery from strokes or trauma, as well as various educational programs seeking effective language improvement tools.

IX.   CONCLUSION

In conclusion, "DhavniBodh" offers a comprehensive solution for addressing speech disorders and language learning challenges among Hindi-speaking children. By leveraging technology and tailored content, it provides a user-friendly platform for individuals, parents, and professionals alike. With features such as personalized therapy materials, video content, access to professional consultations, and a wide range of activities focusing on articulation of Hindi alphabets, words, sentences, story reading skills, and dialogue reading skills, it aims to enhance the effectiveness and accessibility of speech therapy for specially abled children. Moreover, the inclusion of an audible and pictorial dictionary of Hindi words enriches the learning experience and promotes better understanding.

Looking ahead, there is significant potential for further development and expansion of the system. Future iterations could include the refinement of existing activities and the addition of new features based on user feedback and ongoing research. Integration of advanced technologies such as machine learning and artificial intelligence could enable more personalized learning experiences and adaptive therapy plans tailored to individual needs. Collaboration with educational institutions, speech therapists, and other stakeholders will be essential for continual improvement and validation of the system's effectiveness. Additionally, efforts to make the solution available across different platforms and devices will contribute to its widespread adoption and impact in addressing speech disorders and promoting language learning among specially abled children in the Indian context.

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