Increasing Speech Ability of the Autistic Children by an Interactive Computer Game

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Abstract

Autism is one of the most common development disorders in the world, which affects about one in every 150 kids. It is a lifelong disability with no known cure at this time. It affects the way a person communicates and relates to people around him. They face problem to communicate with other people. Speech disorder is one of the most common complexities of autistic children. Most of the children are unable to speak like normal children. They speak repeated, meaningless word, which is very harmful for their communication skills. Now a day?s computer plays an important role for teaching. So we proposed a method which increases the speech ability of autistic children by an interactive computer game. Our game helps autistic children to improve his verbal communication ability. As children likes to play computer games, so our game will be the perfect way to teach new words to autistic children or increase their fluency of known words. We provide a module with that helps children to also learn mathematics. Their progress can be evaluated through our game module.

Index terms— autism, interactive game, speech ability.

1 Introduction

utism is one of the autism spectrum disorders, a group of conditions that vary in their severity and the age at which a child first may show symptoms [16]. Autism spectrum disorders fall under a broader category known as pervasive developmental disorders (PDDs) **??**17]. PDDs cause delays in many areas of childhood development, such as the development of skills to communicate and interact socially. Autism typically is diagnosed during a child's second year and is life long, although symptoms may lessen over time [10]. There is no cure for autism, but appropriate treatments can help a child develop life skills to function more independently. Approximately one third to one half of individuals on the autism spectrum has significant difficulty using speech and language as an effective means of communication. These difficulties in speech production and processing can result in interpersonal interactions being overwhelming, confusing, stressful and are often misinterpreted as a general disinterest to engage in social interactions. Doctors, therapists, and special teachers usually help kids with autism to overcome many difficulties. However, the traditional methods of teaching clear speech to the autistic children suffer from being monotonous, laborious and not successful in many cases. Hence, we developed an interactive computer game which will be helpful to increase the speech ability of autistic children. During our two months of intervention with the autistic children of BN Ashar Alo School & Rehabilitation Centre at Chittagong, we checked the effectiveness of this therapy and got some encouraging results.

2 II.

3 Background and Present State of the Problem

Computer-based interventions are perhaps the most studied technology-based intervention for children with autism [6]. Computers have been used to teach a variety of skills, including how to recognize and predict

emotions, enhance problem solving, improve vocabulary, advance generative spelling, enhance vocal imitation, increase play related statements, and improve reading and communication skills. Additionally, researchers are working to present commonly used, low-technology interventions via computer. for example, social stories, an educational strategy developed by carol gray, have been presented in a multimedia, computer based format, and activity schedules are being developed in microsoft powerpoint and used to teach children with special needs. Although the results of these studies vary in terms of their positive gains for children with autism, the overall results are quite favorable. For example, developed and evaluated a computer-animated tutor to improve vocabulary and grammar in children with autism [1]. In their investigation, eight children were given initial assessment tests and tutorials, and were then reassessed 30 days following mastery of the vocabulary items. Data showed that students were able to identify significantly more items during test and recall 85% of the newly learned items at least 30 days after the completion of training. Vocabulary acquisition and knowledge is an important component of language competency, constituting both proficiency in oral communication and reading comprehension. Recent studies illustrate that the breadth and depth of vocabulary affects not only reading success but also overall success in school. Accordingly, the need to develop and strengthen vocabulary is an essential element of intervention programs for many children with autism; therefore, prevention programs to narrow the(D D D D D D D D)

gap of at-risk populations should begin as soon as possible after diagnosis. Unfortunately, these motivational environments necessary to develop language skills must overcome many inherent obstacles. The behavioral difficulties that speech therapists and instructors encounter, such as lack of cooperation, aggression, and lack of motivation to communicate, create difficult situations that are not optimal for learning. Computer-based instruction is emerging as a prevalent method to train and develop vocabulary knowledge for both native and secondlanguage learners and for individuals with special needs. An incentive to employing computer-controlled applications for training is the ease with which automated practice, feedback, and branching can be programmed. Another valuable component is the potential to present multiple sources of information, such as text, sound, and images, in parallel. Incorporating text and visual images of the vocabulary to be learned along with the actual definitions and sound of the vocabulary facilitates learning and improves memory for the target vocabulary. For example, found an increase in recall of second-language vocabulary when training consisted of combined presentations of spoken words, images, written words, and text relative to only a subset of these. So we propose a new method to improve the ability of speech of autistic children with an interactive computer game. We think this method will be more effective than previous method. a) Proposed Methodology Autistic children face a great trouble in communication due to their poor verbal skills. To increase the ability of speech previous method is proposed. As the previous method have some limitation. So in our method we try to recover those limitations. In our method we add some extra function those are not present in previous method. Those function are used to recover the limitations of previous method. User's gets more benefit by use this method which is shown in And the process is going on. When the game is finished then a window came up and showed up and user gets results. The user gets prize if he wins.

4 III.

5 Performance Evaluation

In Fig: 2 we show that our module works for different approaches to teach the autistic children. We consider here different fruits, animals identification, number (0-9) verification, alphabet (a-z, A -Z) identification etc.. We show that the number of steps decrease considerably than other traditional approach in Fig 3 **??** Most of the cases it takes single step. When unknown objects found or pronunciation of word is very hard generally on such cases two, three or four attempt are required. proposed. So, in our method we try to add some extra function those are not present in previous method. Those functions are used to recover the limitations of previous method. The future works of this game include using free & sophisticated graphics toolkit like OpenGL. We are also interested to include the introduction of Artificial Intelligence so that it can dynamically update the grammar file and picture from the environment. It might extract emotional data from the facial expression of the children. In future, we have a plan to implement this game in Mobile Platform so that it will also become widespread among middle & lower class people.

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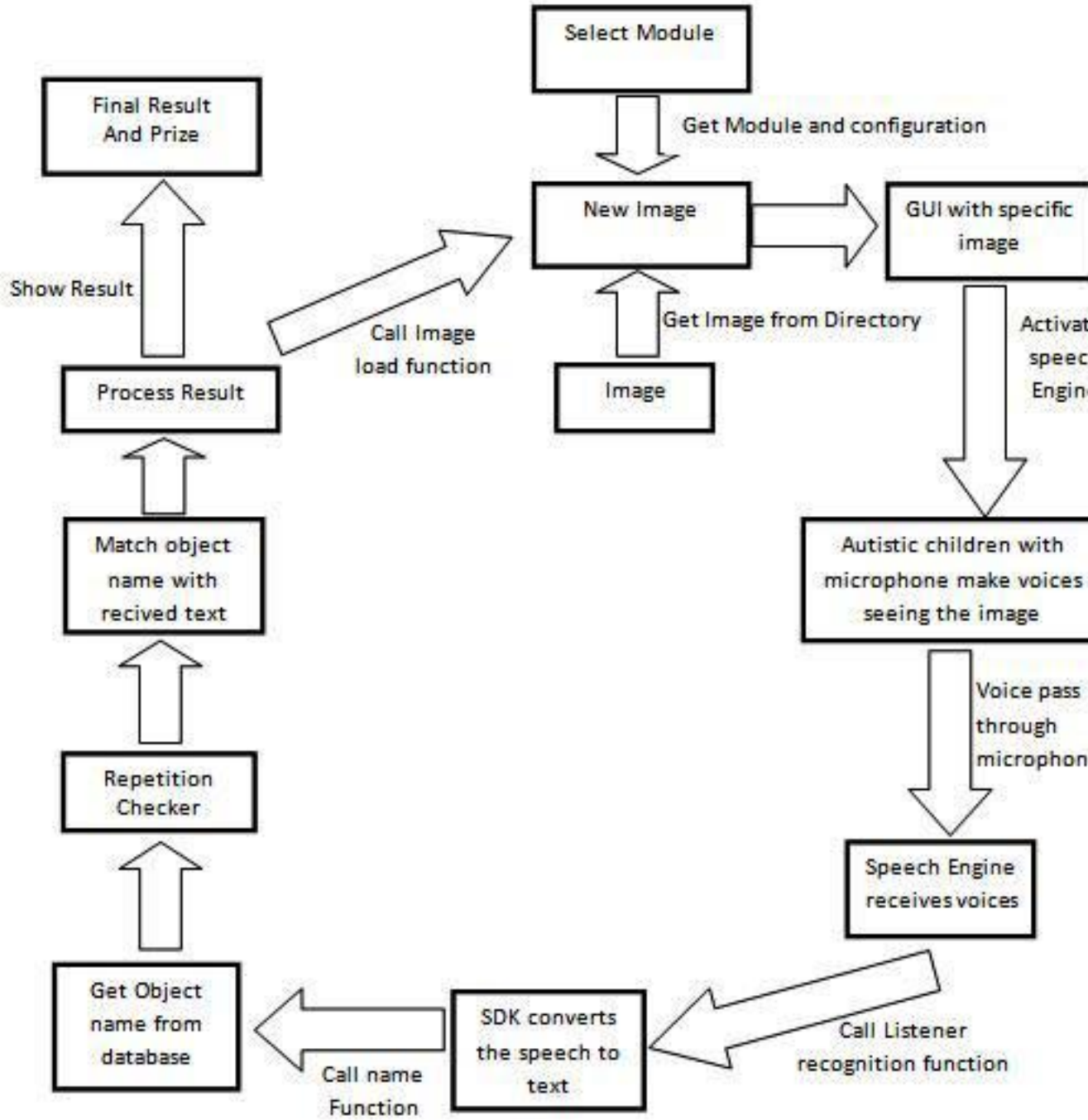
Figure 1: Fig. 1 .C



1

Figure 2: Figure 1 :

2

Figure 3: Figure 2 :

34

Figure 4: Figure 3 :Figure 4 :C

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Feature	Previous Method	My Method	New
Use Open source Technology	No	Yes	
Platform Independent	No	Yes	
Repetition Detection	No	Yes	
User Friendly	Yes	Yes	
Learn Math	No	Yes	
Database support	No	Yes	

Figure 5: Table 1 :

2

Figure 6: Table 2 :

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