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A Smart Teaching System for Autistic Children in Rural Area using MANET

V.Balaji, S.Kanaga Suba Raja, M.Vivekanandan

***Abstract* — These The most challenging and stressful issue faced by schools and parents in efforts to provide appropriate education for autistic children .The purpose of this research work was to contribute to the knowledge and implementation of best practices for children with autism and normal children in rural area using manet. Autism is development disability that affects the normal functioning of brain. It means that children with autism think differently because brains work differently. They may have different talking, learning or playing ability. Many software systems are good enough for a class for normal children, but the autistic fail to understand the teaching methodology. Hence the autistic children face various challenges in combining with normal children in the same class. We implement the novel web based teaching system which takes care of the field of interest and taste among the autistic children of a class and helps the teacher to teach in a class in a effective way to understand the concept for normal and autistic children in rural area using manet .Every village will be connected to mobile access point, were MAP will connect the rural area with the central database server which is located in urban area to provide e-learning.**

***Keywords* – ABA, Autism, E-Learning, Manet, MAP**

I. INTRODUCTION

Autism is a neurobiological disorder in which the communication and social interaction abilities of a child are impaired. Even though there is no medication available to cure this disorder completely, certain techniques may help children to overcome their inabilities. Although, this disorder is seen at an early age in children, it is not diagnosed before the child is three years old. Autistic children hardly make any eye contact and are sensitive to touch and sound.

The greatest challenge is to provide proper education to the autistic children in a right way so that they can develop their skills and contribute to the society being within their limitations. There are many schools available for autistic children with different style of teaching methodology in urban area. But this style of teaching does not reached in rural area due cost effectiveness. It is observed that autistic children do not understand verbal language. Instead, picture language is easy for them to understand. As autistic children do not like changes, therefore, it is necessary for parents to prepare them beforehand for a change in routine that is about to occur. Do not give instructions abruptly as it may confuse the child. The learning capabilities became different for each autistic child which led to different taste of interest. For example, an autistic child whose taste of interest is vehicles was attracted by car and truck. On other hand,the next autistic child who was attracted by animals. Any exertion on teaching methodology to an autistic child with somewhat they are not interested in was proved to be ineffective. Most of the schools provide effective education to normal child which fail for autistic child, because the taste for each child is different. Hence the taste among the autistic child is identified and designed the learning method according to their profile. In this paper, we focus on this particular problem and design a web based teaching system which can provide with a customized platform for every autistic child listening to the class. This software system takes care of field interest and taste of each child and releases the teacher from the responsibility of customizing the teaching for each of the students. Further, this system can be used in a classroom where there can be autistic children. So, it offers a platform for making the general schools able to accept the autistic children and assure them proper learning environment in rural area.

II. LITERATURE REVIEW

The number of teaching system followed earlier for autistic child. First basic technique is picture cards should be used. These have words written on them along with pictures. As their picture memory is fairly well-developed, they find it easier to understand and memorize the words. Children learn words by hearing the sound that they hear while the teacher speaks. Hence, proper pronunciations should be made by teachers to help the autistic child learn. A child may jumble up with words that are close to each other. For e.g., it may be difficult for a child to differentiate between consonants.[1]Interventions to support children with autism often include the use of visual supports, which are cognitive tools to enable learning and the production of language.

Although visual supports are effective in helping to diminish many of the challenges of autism, they are difficult and time-consuming to create, distribute, and use, which gives the results of a qualitative study focused on uncovering design guidelines for interactive visual supports that would address the many challenges inherent to current tools and practices.[2] The next technique explore the social and technical design issues involved in tracking the effectiveness of educational and therapeutic interventions for children with autism (CWA). Automated capture can be applied in a variety of settings to provide a means of keeping valuable records of interventions. And present the findings from qualitative studies and the designs of capture prototypes. These experiences lead to conclusions about specific considerations for building technologies to assist in the treatment of CWA. [3] Story Listening Systems (SLS), a model of technology and literacy development, are shown to promote language

skills development in children through storytelling with a virtual peer . However, SLS make several assumptions about children and they rely on children's oral storytelling and communication skills and to allowing children to create their own meaningful content using physical artifacts.[4].To Learn social competence skills through technology delivered cognitive behavioral therapy to autistic children [5].Learning and enhancement of normal language in kids & teenagers with an ASD using easy computer games focused on their personal needs[6].To investigate the behavior factor association, and to classify theses relation using classification based on the association (CBA) for ASD children ,which provide data analysis tool to aid doctors in the diagnosis process in the early intervention of autistic symptoms[7].The preliminary investigation into the automatic assessment of language impaired children's(LIC) prosodic skills in one grammatical aspects ,which asses LIC's prosodic skills confirms the clinical description of subject's communication impairment[8].A Virtual Reality(VR) based dynamic eye-tracking system, is capable of delivering individualized feedback based on a child's dynamic gaze patterns during VR based interaction[9].According to the domain experts, no one approach will best meet the needs of all autism children. Intuition, agility and a willingness to use a variety of approaches will best insure progress of each child [10].

III. Proposed Network Architecture

Considering the benefits and features of wireless sensor and wireless ad hoc networks, propose an efficient and cost effective framework for providing e-learning services to the rural areas especially for autistic children. In most of the developing countries, the governments are quite unable to provide education to the people of the rural and especially in.-remote areas. On the other hand, as most of the rural areas are either hard-to-reach or technologically lagging, they cannot get most of the benefits of education. In some cases, some rural areas are destitute of good education facilities, health care, food and disaster relief etc. In our framework, wireless technologies are used to bridge this gap between rural areas and the government. We also discuss how the education materials collected by Wireless Ad hoc Network could effectively be used In our proposed system, wireless Ad hoc networks are used for collecting various types of educational data profile in the field of interest from the autistic children in the first step. Each of the villages or rural areas has at least a communal point (CP) which is equipped with basic networking. Initially we established a basic wireless network setup in each rural area called communal point (CP). ie. CP1 to CPn which is shown in the below figure1.0, The 802.11 operates in different speed and bandwidth in which 802.11a supports up to 54Mbps of bandwidth which is must faster than 11Mbps bandwidth provided by 802.11b standard device. And also it offers 12 non-overlapping channel but the distance covered will be slightly less compare to 802.11b & 802.11g due to higher operating (ie.5Ghz).Eight available channels, less potential for RF interference than 802.11b and 802.11g.Better than 802.11b at supporting multimedia voice, video and large image application in densely populated user environment. Based on the need, any of these specifications is chosen for particular area for transmitting data from Communal Area (CP) to the MAPs. Then installed the web based learning system in each communal point (CP). A mobile access point is mounted in vehicle which performs basic profile upload and software download operations. Thus we have n number of communal point in rural area. This vehicle MAPS moves around the CP in the rural areas and collects profile data from the CP. The profile data indicate the field of interest for each autistic children. Thus a wireless adhoc network is automatically formed, when a vehicle MAP moves closer to the CP, which downloaded profile data from CP in to wireless mobile access point(MAP). Once the profile data gets downloaded into mobile access point. Again it forms wireless adhoc network, when the MAP move closer to CPDS in urban area and delivers profile data to CPDS using wifi radio transceiver. Then we create a update version of application and can exports the software to MAP, when it closer to CPDS server. Finally its get updated in rural area through MAPs. Thus the Vehicle MAP perform main task to ensure quick acquisition and delivery of profile data and software between rural and urban area.

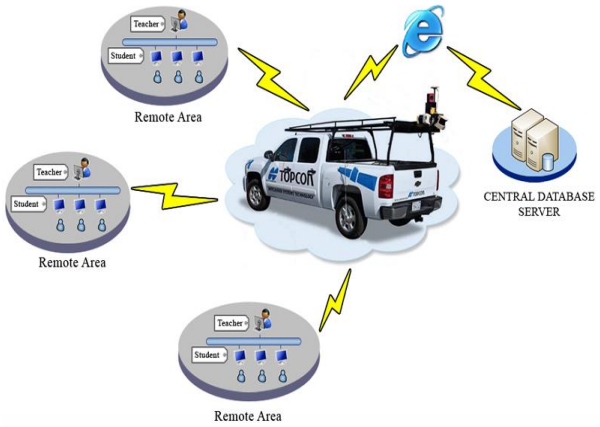

Fig.1.Proposed Network Architecture

IV. Proposed E-learning System

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We implement the novel web based e-learning system which take care of the field of interest and taste among the autistic children of a class and helps the teacher to taught in effective way to understand the concept for normal and autistic children in rural area. The proposed network architecture for E-learning system is shown in figure2.

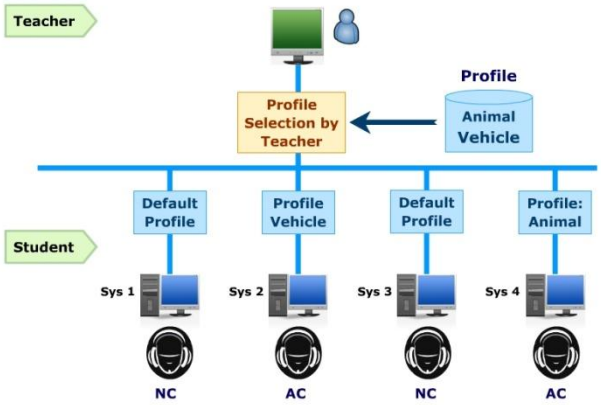

Fig.2. Proposed Network Layout for E-Learning System

The earlier work implement picture exchange technique for learning which become difficult to understand for autistic children, because the thinking process for autistic children is different .so we implement the applied behavior analysis (ABA), one of the effective learning methodology for autistic children. The figure3 shows the detailed network of the proposed system, in which there will be a computer before every child and the teacher. Each computer will be connected by LAN. Initially the teacher will select the profile for each student. This loads the corresponding interface in the screen. Thus each autistic child will get his favorite interface according to the profile loaded. On the other side the normal child will get default interface.

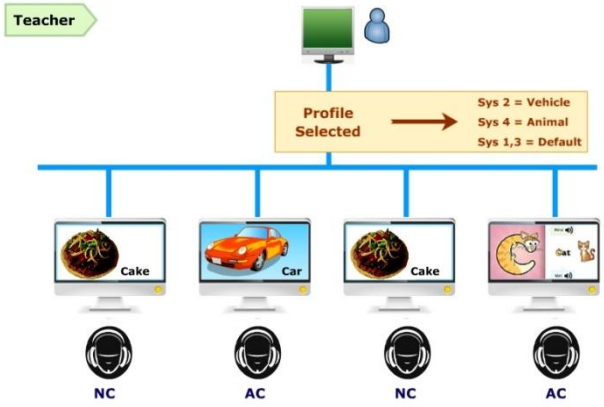

Fig.3. Detailed Network Layout for Proposed System

In proposed system we focus on basic alphabets from A to Z with pronunciation of word with sound for teaching. The class room should be equipped with the following components. Computers, LAN, Web server with WiFi radio receiver and with head phone and speakers .Initially the teacher will select the profile based on the interest of autistic children which is shown in Fig 4.

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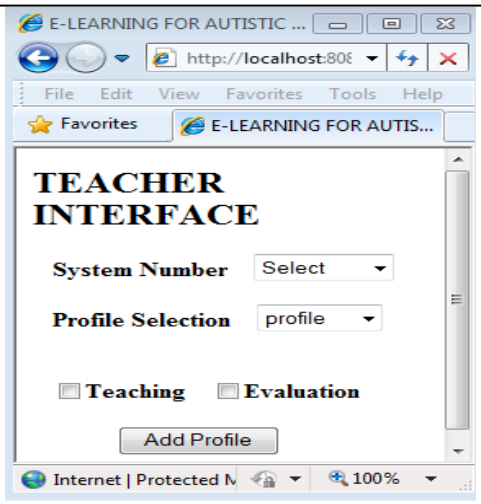

Fig.4. Teacher Interface

For Example if the teacher selects "C" Alphabet in his interface, then each student will get the corresponding interface. The sample teacher interface is shown figure 4.

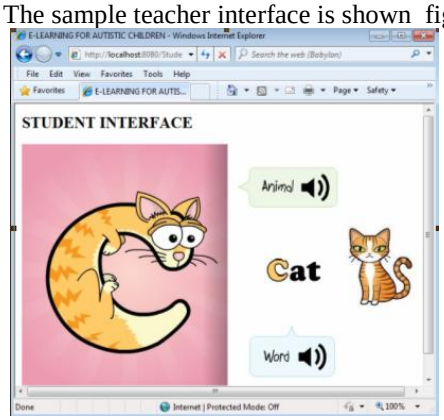

Fig.5. Student Interface

Autistic children will get interface with the field of interest; on the other hand the normal child will get the same interface. ie one autistic child will gets "C for Cat" because his field of interest is animal which is already selected by the teacher. And the next autistic child will get "C for Car". Because his field of interest is vehicle. The sample interface for autistic children is shown in figure 5. The autistic child interface consists of animated interface with pronunciation of word with sound.

V. Proposed Evaluation System

In the proposed evaluation system, two types of method which includes picture with sound and without sound. The students are given a letter and a set of picture before them. The picture will be display according to their profile and only one of those pictures has the same staring with the letter shown in the figure 6. The student should select the correct picture, after the completion of test the result will store and displayed in the teacher interface. We tested this E-learning system with a group of ten autistic and normal children in a school with training and non-training mode and the overall pass percentage is shown in the figure 7. With their field of interest and default profile. And also we applied the proposed E-learning technique to normal child with field of interest, which is shown in the figure 8

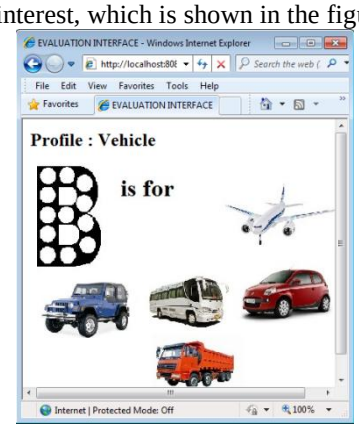

Fig.6. Evaluation Interface

Fig.7. Graph-Evaluation system for proposed

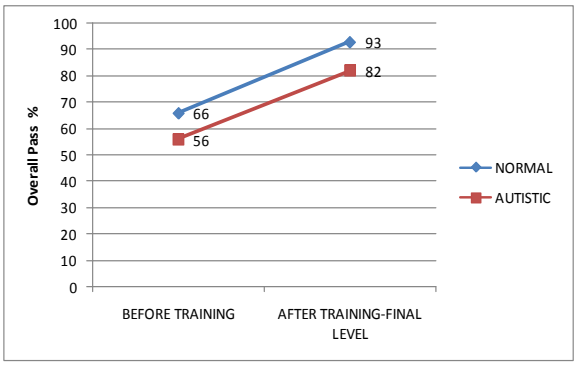

Fig.8. Proposed system applied to Normal and autistic children

VI. Future Works

Although this proposed work is specially for learning autistic child in the field of interest. We have planned to integrate learning, communication skills and basic knowledge like bathing, washing and toileting into a single platform. And also to transform the current system to the mobile platform which is the growing technology yet to survive in the latest world.

VII. CONCLUSION

Learning support service is the core element of assuring the quality education providing free teaching support for rural children especially for autistic disorder children in the field of interest is one kind of support service. This web based e-learning system provides the stepping stone for autistic and normal children for effective teaching and evaluation.

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AUTHOR'S PROFILE

V. Balaji
received his B.E degree in Computer Science & Engineering from Madras University in 1999 and received his M.E degree in Computer Science & Engineering from Anna University in 2005. He is currently working as Assistant professor in Easwari Engineering College, Chennai. He has 11 years of teaching experience and has guided many B.E and M.E projects.

S. Kanaga Suba Raja
completed his B.E.degree in Computer Science and Engineering under Manonmaniam Sundaranar University in the year 2003. He completed his M.E in Computer Science and Engineering under Anna University in the year 2006. Currently he is working in Easwari Engineering College, Chennai, Tamilnadu.

M. Vivekanandan
received his B.E degree in Computer Science & Engineering from Madras University in 1997 and received his M.E degree in Computer Science & Engineering from Anna University in 2004. He is currently working as Assistant professor in Easwari Engineering College, Chennai.