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A SMART GUIDING MODULE FOR THE AUTISTIC

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Abstract: Birth of a child is all what a certain! A moment to be cherished for parents. Whenever a child is born he's been checked with the parts and his physique so that he's not been touched upon by a disorder or a deformity in his mother, but still he seems to be ok with everything. Disorders develop gradually some are visible and some are not. So in this paper, I'll be dealing with the neurological disorder autism characterized by impaired social interaction, verbal and non-verbal communication, and restricted and repetitive behavior which is not visible as a wound or neither could be diagnosed. Although people with autism do not have exactly the same symptoms and deficits, they tend to share problems that affect their behavior in predictable ways. Autism is a complex neuro developmental disorder that manifests in children by the age of three. The degree may vary from mild to very severe and is hence it is known as Autism Spectrum Disorder. Government of India now recognizes autism as a disability. We proposed a project consists of Atmega 168 Microcontroller is a brain of the entire module and also the special Voice chip 9600 used to record and playback the voice recorded by the programmer. The LCD display is to show the input given by the special child. The voice input is stored in voice chip with the help of microphone. It converts audio signal into electrical signal. Power Supply unit provides +5v vcc to the entire unit. The specially designed keypad helps the children to give a proper input to the module. Loud speaker helps to hear the recorded voice stored in voice chip i.e it converts electrical signal into sound signal. Our project will help the autistic to get complete development in both education and their individual talents.

Keywords: Autism; autism spectrum disorder; pervasive developmental disorder; APR9600

I. INTRODUCTION

Autism, a member of the pervasive developmental disorders (PDDs), has been increasing dramatically since its description by Leo Kanner in 1943. First estimated to occur in 4 to 5 per 10,000 children, the incidence of autism is now 1 per 110 in the United States, and 1 per 64 in the United Kingdom, with similar incidences throughout the world. Searching information from 1943 to the present in PubMed and Ovid Medline databases, this review summarizes results that correlate the timing of changes in incidence with environmental changes. Autism could result from more than one cause, with different manifestations in different individuals that share common symptoms. Documented causes of autism include genetic mutations and/or deletions, viral infections, and encephalitis following vaccination. Therefore, autism is the result of genetic defects and/or inflammation of the brain. The inflammation could be caused by a defective placenta, immature blood-brain barrier, the immune response of the mother to infection while pregnant, a premature birth, encephalitis in the child after birth, or a toxic environment.

Autism Spectrum Disorder (ASD) is a condition that has for long been misdiagnosed and misunderstood. As a result, intervention for ASD has muddled along from psycho analytical approaches to the pharmaceutical to the current more appropriate educational practices. For many educators, ASD is seen as an enigmatic condition that is best skirted. ASD manifests as behaviours that are often odd, unusual, 'inappropriate', different from what are seen as accepted social norms, and so on. Hence someone who does not understand the condition finds the child with autism perplexing and therefore difficult to teach. There are of course differences in the way



children with autism develop: in their play, their communication, their social understanding, among others. Teachers who have not had the opportunity of getting informed on autism often feel unnecessarily scared and frightened of a child who shows unusual behaviours; when in reality the child is perhaps merely trying to convey distress, confusion or a basic need, through that behaviour. And as a result, instead of helping the child, such teachers end up aggravating the situation through their own fearful responses to the child's behaviour. A good and insightful teacher soon learns that children with autism are children like all others. They have the same need for appreciation and support and like all children they **have to be taught in a manner so that they can learn**. The teacher will come to understand that children with autism may not always show the same signs of external pleasure that non-autistic children do when they receive appreciation or achieve/acquire a skill; but will instead learn to watch out for, recognise and acknowledge the signs to express enjoyment and achievement that the child shows. If we can show appreciation to children in a manner that speaks to them, they then can blossom and grow. Every child with autism has the potential to learn and progress. How much of this potential the child reaches depends on great measure on a willing and understanding teacher and a welcoming and accommodating school. For the teacher the journey to help the child with ASD has to start with an open mind and a desire to understand the condition called ASD and to understand the child. Helping the child with ASD to learn is a challenge and for that very reason one of the most rewarding areas of work.

SYMPTOMS - No or little speech, Non-speech vocalizations, Delayed development of speech, Echolalia: speech consisting of literally repeating something heard. Delayed echolalia: repeating something heard at an earlier time. Confusion between the pronouns "I" and "You" and **CAUSES** - The exact causes of autistic spectrum disorders (ASD) are yet unknown. However, it is thought that several complex genetic and environmental factors are involved or, in some cases, an underlying condition that causes symptoms of ASD. The causes of ASD can be described in two ways:

a) Primary ASD (also known as idiopathic ASD) – no underlying medical condition can be found to explain the symptoms of ASD.

b) Secondary ASD– an underlying medical condition is thought to be responsible, or partially responsible, for the symptoms of ASD.

- Watches faces intently, responds to other people's expressions of emotion.
- Does not pay attention to or frightened of new faces. .
- Does not push down on legs when feet placed on a firm surface.
- Smiles at mother or primary care-givers voice, prefers them over all others.
- Does not show affection to primary care-giver, dislikes being cuddled.
- Can sit up without assistance, can pull self up to stand, walks holding on to furniture.
- Does not crawl, cannot stand when supported.
- Waves 'bye-bye' and points to objects. Does not use gestures such as waving or pointing.

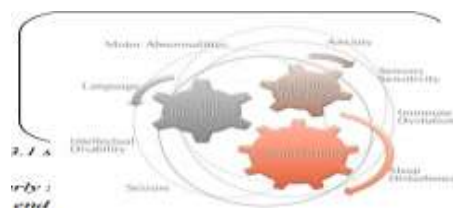


Fig1. ABOUT SYMPTOMS

- Has several single words by 15 to 18 months; uses simple phrases by 24 months. Does not speak; does not imitate actions, cannot follow simple instructions. Imitates behavior of others, excited about company of other children. Does not appear to know the function of common household object such as a telephone by 15 months By 36 months uses 4-5 word sentences, understands most sentences and instructions. Very limited speech, does not use short phrases, has difficulty in understanding simple instructions.

II. EDUCATION FOR AUTISTIC CHILDREN

- Setting clear classroom rules.
- Helping to teach social skills and play skills communicating clearly and giving children time to process information.
- Creating an ASD-friendly environment Support in the playground, including the buddy system and circle of friends.
- Lunch time clubs and structured activities.



III. BLOCK DIAGRAM OF MAIN HARDWARE MODULE

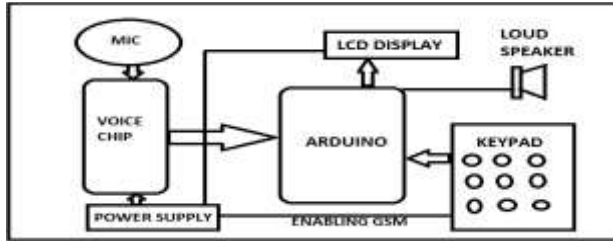


Fig2. BLOCK DIAGRAM OF MAIN HARDWARE MODULE

This block diagram consists of Arduino as the brain of the entire module and also the special Voice chip9600 used to record and playback the voice recorded by the programmer. The LCD display is to indicate input given by the special child. The voice input is stored in voice chip with the help of MIC which converts audio signal into electrical signal. Power Supply unit provides +5v vcc to the entire unit. The specially designed keypad helps the children to give a proper input to the module. The audio output can be heard from the loudspeaker via voice chip by enable GSM Module.

Features:

- Single-chip, high-quality voice recording & playback solution
- Non-volatile Flash memory technology
- User-Selectable messaging options
- User-friendly, easy-to-use operation
- Low power consumption

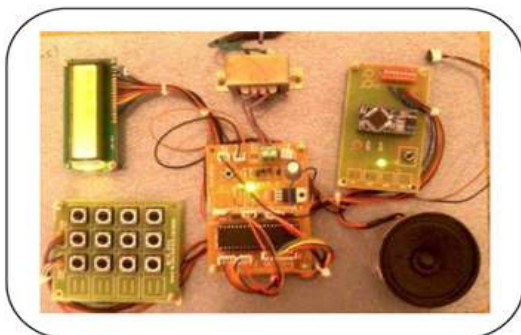


Fig3. APR9600 RE-RECORDING VOICE IC SINGLE-CHIP VOICE RECORDING &PLAYBACK DEVICE 60 SEC. DURATION

The APR9600 device offers true single-chip voice recording, non-volatile storage, and playback capability for 40 to 60 seconds. The device supports both random and sequential access of multiple messages. Sample rates are user-selectable, allowing designers to customize their design for unique quality and storage time needs. Integrated output amplifier, microphone amplifier, and AGC circuits greatly simplify system design. The device is ideal for use in portable voice recorders, toys, and many other consumer and industrial applications.

APLUS integrated achieves these high levels of storage capability by using its proprietary analog/multilevel storage technology implemented in an advanced Flash non-volatile memory process, where each memory cell can store 256 voltage levels. This technology enables the APR9600 device to reproduce voice signals in their natural form. It eliminates the need for encoding and compression, which often introduce distortion.

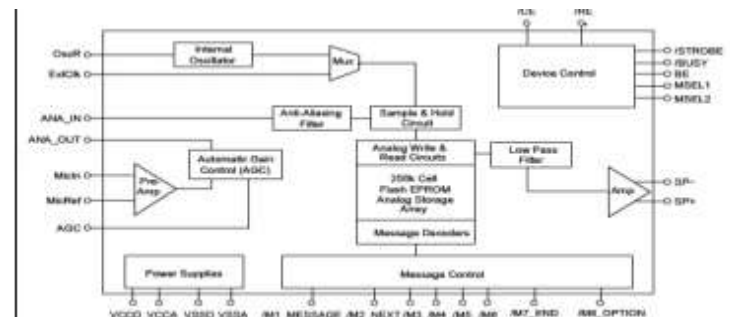


Fig4. BLOCK DIAGRAM OF APR9600

APR9600 is a low-cost high performance sound record/replay IC incorporating flash analogue storage technique. Recorded sound is retained even after power supply is removed from the module. The replayed sound exhibits high quality with a low noise level. Sampling rate for a 60 second recording period is 4.2 kHz that gives a sound record/replay bandwidth of 20Hz to 2.1 kHz. However, by changing an oscillation resistor, a sampling rate as high as 8.0 kHz can be achieved. This shortens the total length of sound recording to 32 seconds. Total sound recording time can be varied from 32 seconds to 60 seconds by changing the value of a single resistor. The IC can operate in one of two modes: serial mode and parallel mode. In serial access mode, sound can be recorded in 256 sections. In parallel access mode, sound can be recorded in 2, 4 or 8 sections. The IC can be controlled simply using push button keys. It is also possible to control the IC using external digital circuitry such as micro-controllers and computers.



The APR9600 has a 28 pin DIP package. Supply voltage is between 4.5V to 6.5V. During recording and replaying, current consumption is 25 mA. In idle mode, the current drops to 1 mA. The APR9600 experimental board is an assembled PCB board consisting of an APR9600 IC, an electret microphone, support components and necessary switches to allow users to explore all functions of the APR9600 chip. The oscillation resistor is chosen so that the total recording period is 60 seconds with a sampling rate of 4.2 kHz. The board measures 80mm by 55mm

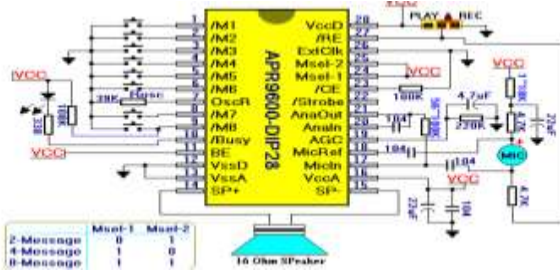


Fig5. PIN DIAGRAM OF APR9600

Mode Select1: This pin in conjunction with MSEL2 and /M8_OPTION sets record and playback operating mode.

Mode Select2: This pin in conjunction with MSEL1 and /M8_OPTION sets cord and playback operating mode.

IV. WORKING

IC Station team introduce you this APR9600 voice recording and playback system used in elevator based on the IC Station Mega2560 compatible with Arduino. It uses DC5V voltage to work. When you press the different keys, the loudspeaker will sound that which floor you arrive. This design uses a APR9600 voice chip as the core of the circuit and realizes the function of auto recording and playback. It uses power amplifier chip JRC286D to amplify the audio and enhance the volume. The voice recording and playback circuit is widely used in everyday life. For example, the leaving message and response of the telephone, game machine, and toy voice recording and playback, telling time of the clock or alarm, selling products and control of the household appliance, etc. The designed circuit control is easy, high-quality sound and big volume. It can be recorded and played for many times and has strong

ability of portability. It can be used in other are for a little modification. The voice recording and playback using the APR9600 chip as the core has the advantage on the price. It is worth of promoting. It is quite simple as the keypad is provided for the child to give some input which will be shown in the LCD .The voice input is stored in voice chip with the help of MIC. The audio output will be heard from the loudspeaker via voice chip by enabled GSM Module.

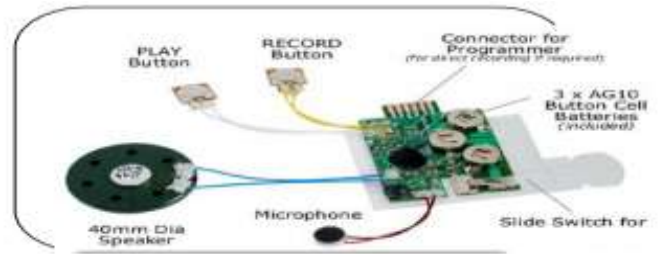


Fig6.WORKING OF APR9600

V. CONCLUSION

World Autism Awareness Day will be observed across the world including Bangladesh to raise awareness about autism The social welfare ministry will organize a discussion and cultural program participated by children with autism at Bangabandhu International Conference Centre where Prime Minister Sheikh Hasina will be present as the chief guest. Important buildings of different ministries, divisions, departments in the capital and districts will be lighted up blue on the occasion. Autism is a complex neuro-behavioral disorder that affects a person’s brain function. Autism affects girls and boys of all races and in all geographic regions and has a large impact on children, their families, communities and societies. Our project will help the autistic to get complete services in both education and awareness and also the embedded module consist of voice chip with recording and playback option to help the special children to express their feelings and needs based on the practice parents may have good communication with their children.

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