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Chatting Box for Physically Challenged using Zigbee.

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Abstract:

The wireless communication technologies are rapidly spreading many new areas, including the automation and the importance of the use of wireless technologies in the data acquisition, building control, Healthcare, monitoring systems and automation of manufacturing processes will grow.After seeing many people around me a thought to chat by any simple device by using our technology with low cost and easy usage to give a alternative way to chat for them brought me to do this system. This system details how to build a device which having touch pad to send messages LCD displays the messages.

In coming days is to face new challenges. Hence every field prefers automated control systems. Especially in the field of electronics automated systems are doing better performance. As Zigbee is the upcoming technology in wireless field, we had tried to demonstrate its way of functionality and various aspects like kinds, advantages and disadvantages using a small application of controlling the any kind of electronic devices and machines. The zig-bee technology is broadly adopted for bulk and fast data transmission over a dedicated channel.

Keywords:

Wireless, voice recognition, ZigBee, low power, low-cost, LCD Display, Data Transmission, Monitor and Control

Introduction:

Augmentative and alternative communication (AAC) is an umbrella term that encompasses the communication methods used to supplement or replace speech or writing for those with impairments in the production or comprehension of spoken or written language. AAC is used by those with a wide range of speech and language impairments, including congenital impairments such as cerebral palsy,intellectual impairment and autism, and acquired conditions such as amyotrophic lateral sclerosis and Parkinson's disease. AAC can be a permanent addition to a person's communication or a temporary aid.

An AAC aid is any "device, either electronic or non-electronic, that is used to transmit or receive messages"; such aids range from communication books to speech generating devices. Since the skills, areas of difficulty and communication needs of AAC users vary greatly, an equally diverse range of communication aids and devices is required.

Low-tech:

Low-tech communication aids are defined as those that do not need batteries, electricity or electronics. These are often very simple communication boards or books, from which the user selects letters, words, phrases, pictures, and/or symbols to communicate a message. Depending on physical abilities and limitations, users may indicate the appropriate message with a body part, light pointer, eye-gaze direction, or a head/mouth stick. Alternatively, they may indicate yes or no while a listener scans through possible options.

High-tech:

High-tech AAC aids permit the storage and retrieval of electronic messages, with most allowing the user to communicate using speech output. Such devices are known as speech generating devices (SGD) or voice output communication aids (VOCA). A device's speech output may be digitized and/or synthesized: digitized systems play recorded words or phrases and are generally more intelligible while synthesized speech uses text-to-speech software that can be harder to understand but that permits the user to spell words and speak novel messages.

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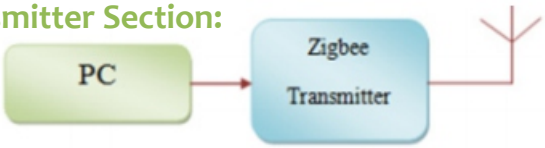
High-tech systems may be dedicated devices developed solely for AAC, or non-dedicated devices such as computers that run additional software to allow them to function as AAC devices. They may be static or dynamic in form. Static communication devices have symbols in fixed positions on paper overlays, which are changed manually. To increase the vocabulary available, some static devices have multiple levels, with different words appearing on different levels. On dynamic AAC devices, the user can change the symbols available using page links to navigate to appropriate pages of vocabulary and messages.

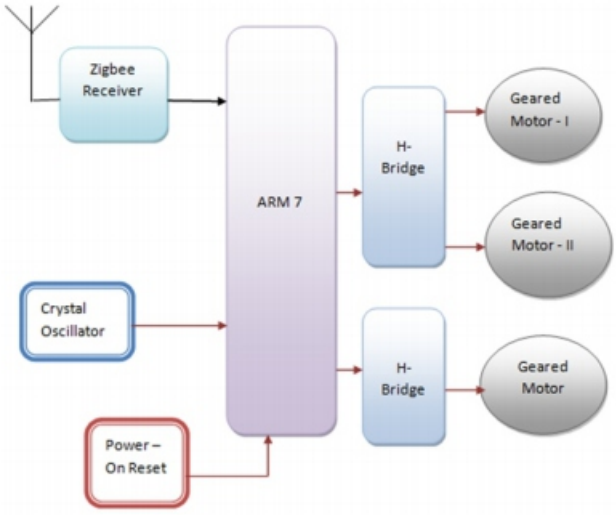
High-tech devices vary in the amount of information that they can store, as well as their size, weight and thus their portability. Access methods depend on the abilities of the user, and may include the use of direct selection of symbols on the screen or keyboard with a body part, pointer, adapted mice or joysticks, or indirect selection using switches and scanning. Devices with voice output offer its user the advantage of more communicative power, including the ability to initiate conversation with communication partners who are at a distance. However, they typically require programming, and tend to be unreliable. Because of the latter, low tech systems often recommended as a backup in case of device failure.

Zigbee is the name of a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4 standard for wireless personal area networks (WPANs), such as wireless headphones connecting with cell phones via short range radio. Advances in mobile communications are paving way for many interesting applications using embedded systems. The mobile phone is one of the marvels of the last decade of the 20'h century. It is a very powerful embedded system that provides voice communication while we are on the move. The Personal Digital Assistants and the palmtops can now be used to access multimedia services over the Internet. Mobile communication infrastructure such as base station controllers, mobile switching centers are also powerful embedded systems.

Transmitter Section:



Receiver Section:



In this system we have two sections, one is transmitter another one receiver, and in transmitting section we have controller, touch screen, zigbee. in receiver section we have controller, touch screen, zigbee.in transmitted section whichever the data that we pressed on the touch screen pad will be taken by the controller. Then processor gives the received data to the zigbee module .Then zigbee converts the receive data into the form of rf digitals waves and transmits that waves in certain range.In receiving section whenever zigbee comes in the rf range of data waves of the transmitter, it receives the data and gives to the pc through max232 and displays the data transmitted by the transmitting section.

Controller:

The ARM7TDMI-S is a general purpose 32-bit microprocessor, which offers high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, and the instruction set and related decode mechanism are much simpler than those of microprogrammed Complex Instruction Set Computers (CISC). This simplicity results in a high instruction throughput and impressive real-time interrupt response from a small and cost-effective processor core.(1) Pipeline techniques are employed so that all parts of the processing and memory systems can operate continuously. Typically, while one instruction is being executed, its successor is being decoded, and a third instruction is being fetched from memory.

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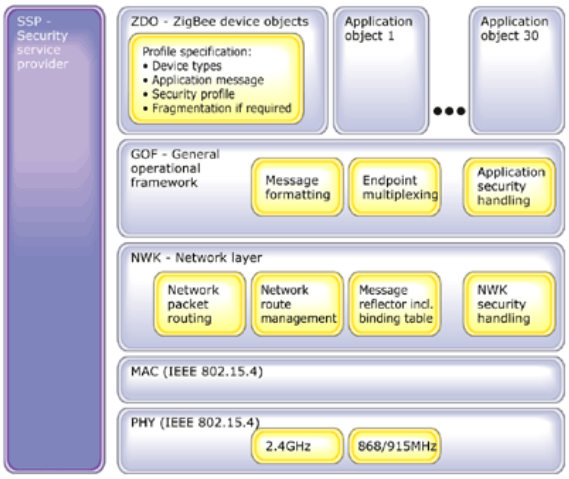
The ARM7TDMI-S processor also employs a unique architectural strategy known as Thumb, which makes it ideally suited to high-volume applications with memory restrictions, or applications where code density is an issue. The key idea behind Thumb is that of a superreduced instruction set. Essentially, the ARM7TDMI-S processor has two instruction sets:

- The standard 32-bit ARM set.
- A 16-bit Thumb set.



ZigBee is a home-area network designed specifically to replace the proliferation of individual remote controls. ZigBee was created to satisfy the market's need for a cost-effective, standards-based wireless network that supports low data rates, low power consumption, security, and reliability. It may be helpful to think of IEEE 802.15.4 as the physical radio and ZigBee as the logical network and application software. Following the standard Open Systems Interconnection (OSI) reference model, ZigBee's protocol stack is structured in layers. The first two layers, physical (PHY) and media access (MAC), are defined by the IEEE 802.15.4 standard. The layers above them are defined by the ZigBee Alliance.

Implementation Plan :

This describes how I will build my project; and what steps I will need to follow

- Use small Z16 kit, get one from system admin.
- Acquire all components (LED, buttons, ZNEO Power, APR9600 text-to-speech IC, small LCD, and internal memory).
- Test APR9600 text-to-speech IC if needed.
- Building ZNEO power, and test life time if itcontinues after more than 1 hour.
- Check Display LED to confirm it is okay.
- Test Device driver (audio).
- Use 4 buttons.
- Text display on the APR9600 text-to-speech if it is okay.
- Draw simple milestone chart.
- Record all the 8alphabets in each ic which can be replayed when text is given.

Conclusion:

The system is designed for elderly and disabled people so that they can monitor, control and communicate with their limited ability. The wireless part of the system has been implemented by using Zigbee RF modules. Hence, the system is highly efficient and it consumes low power. Thus literature survey to advanced embedded Chatting box for physically challenging persons has been done and their data sheets corresponding to the Chatting box, i.e mainly controller, A/D converters and related software keil is been verified with a demo program with interfacing modules as leds,and manly speak jet ic which acts like main interfacing component for the physically challenged to text to speech converter, hardware implementation has to be done for verifying its functional properties.

Finally it may be one of the useful devices for deaf people to understand what the others are saying by LCD display and dumb people can speak with the help of this device. In future an Ic which may be inbuilt with all speaking futures can be used instead of APR9600 ic and may be more useful for physically challenging persons.

The future for Augmentative and alternative communication will not be driven by advances in technology, but rather by how well we can take advantage of those advancements for the enhancement of communicative opportunities for individuals who have complex communication needs.

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