A DESIGN PROTOTYPIC SENSOR FOR PERCEPTUAL DISABILITIES

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Abstract— Embedded real time technology is widely used today in many safety-critical applications, researchers have only begun to explore its potential. Considering items such as ATM machine, washing machines and thermostats incorporate embedded processing capability, the number of such systems grown exponentially. However, unlike purely digital technologies, embedded systems are limited by more than our imagination.

In this scenario, they're also limited by the physical components used to perform its parameter up to the mark—considering their accuracy, size, weight, processing speed, and power requirements etc. Nevertheless, current trends favor the widespread deployment of embedded devices in the future. Humans basic requirement is cultivated eventually. For example Cell phones which permeate society, in processing and communication platform fast approaching ubiquity. And many different market sectors, which starts from game developers to the military application, with adequate motivation, create and refine new cognitive aspects, ensuring the availability of adequate R&D resources. One of the many areas in which embedded systems show great promise is gadget technologies, which address the special needs of those with impairments. Hence its necessary to built a grocery an embedded device. Prototypic sarcastic gadget which is a glove or hand shape material that can recognize basic hand gestures and convert them into speech using low-cost.

1 INTRODUCTION

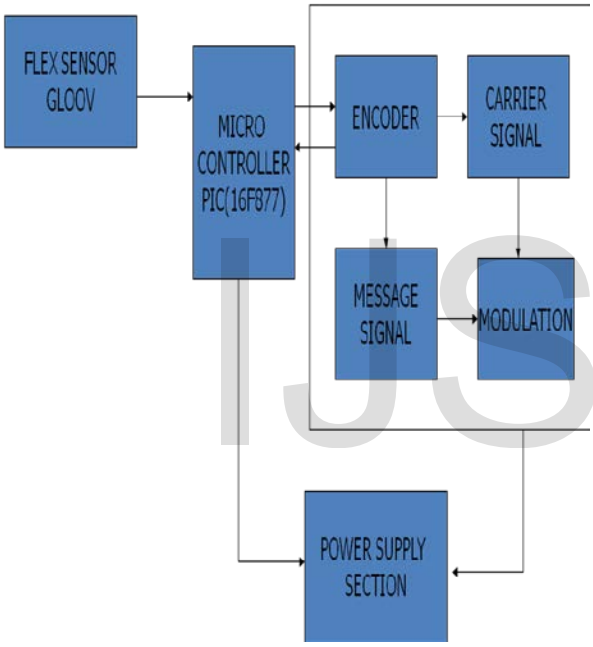
In general, perceptual disabilities includes various physically challenged illness. I myself considered deaf and dumb as perceptual disabilities. Deaf and dumb people have difficulty in communicating with others who don't understand sign language. Even those who do speak aloud typically have a "deaf voice" of which they are self-conscious and that can make them reticent. It's not a easy task trying to imitate series, ideas, phrases, sentences, or entire conversations. Gadgets technology, aims to lower this barrier to communication. . Although there's considerable research in both academia and industry on gesture recognition, most existing systems, are expensive. With this in mind, there is a necessity to set out the gadget to build a low-cost, portable gesture-to-speech glove a design prototype with the ultimate goal of developing a fully flexible and capable of ready-to-deploy system. Gadget technology is the primary requirements were the ability to recognize the Sign Language , alphabet, portability, and low

power consumption. Secondary considerations included a simple mechanism to consider the components which in turns minimize costs as well as implement a modular and exclusive design that could easily mold with other emerging trends.

II SYSTEM DESIGN

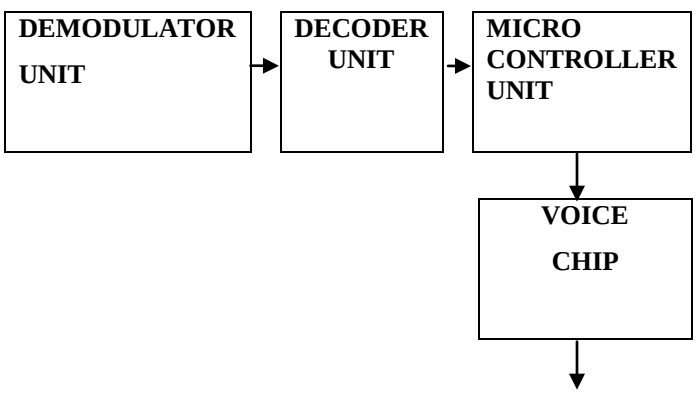
As Figure below, design prototypic is built around the following phenomenon

Typical transmitter unit



a) A design prototypic architecture for transmitter unit.

Typical receiver unit



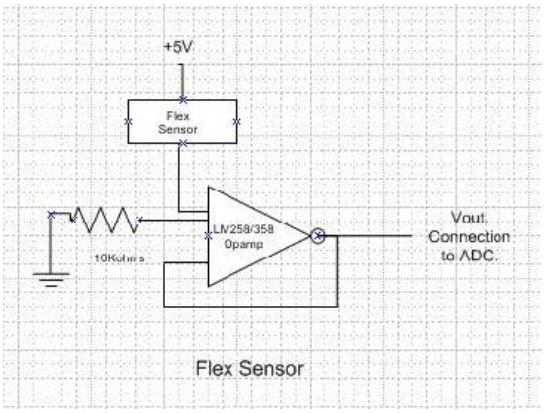
b)A design prototypic architecture for receiver unit

Major hard ware components are associated With the software. Only one component, the flex sensor glove itself, is a design prototypic sarcastic gadget, while the other two—the data microcontroller module and the supply section.. The software includes both embedded applications and embedded c language written in Keil micro vision which runs on and converts sensor data which is a degree of bend into recognized words r the sentence neeaded for day today life.

The design prototypic glove, is a normal cloth material glove fitted with flex sensors along the length of each finger and the thumb. The sensors output a stream of data that varies with degree of bend. The degree of bend is a analog signal which is converted in to digital form of pattern.Capturing the data provided by the flex sensors, quantizes it, and wirelessly streams it via a receiver which contains a loud speaker.Hence would be equally capable of running the system. The design prototypic sensor converts the quantized data into text via microcontroller and the coding language ,herewith which is predefined.

III HARDWARE

Step one was attaching the flex sensors to the glove r hand type material. LM258/LM358 op-amps which is defined for a flex sensor as shown



c)Flex sensor connected to LM258/LM358 op-amps

The research therefore fitted the design prototypic glove with only one sensor, for a total of five sensors. This limitation placed obvious constraints on what the glove could achieve, especially considering complexity and variations among individual users in performing the signs. However, felt that five sensors would be adequate to recognize a simplified set of signs. The sensors were fastened to the glove using basic attachment technology. They require a 5-volt input and output between 0 and 5 V, the resistivity varying with the sensor's degree of bend and the voltage output changing accordingly. The sensors connect to the Pic microcontroller which has the ability of converting analog signal to digital pattern.

Sentry device via three pin connectors (ground, live, and output). The device can activate the sensors from sleep mode, enabling them to power down when not in use and greatly decreasing power. Model example representation is shown below

d)Sensor attachment to the glove

IV SOFTWARE

Keil micro vision module converts the analog data received from the sensors to digital data, in the form of numbers . The design prototype sensor defines according to the degree of bend such as 45 degree, 60degree, 90degree etc will have a sentence or a word which is mandatory in day today life predefined in the coding language divides this data into segments that correspond to specific ranges of numeric values representing finger positions such as fully extended, fully bent, or partially bent. There are some discoveries, which quickly discovered that each sensor had unique characteristics, and thus its output stream wasn't always consistent with that of the other sensors, even at identical degrees of bend. To overcome this problem, they inserted a calibration routine in the Keil vision that requires each user to initially hold the glove in the open-palm position to record the data. Following that the calibration made a design prototypic sensor to recognize symbols by recording sensor data. while it is held that the glove in various sign positions,

Correlating these with specific signs, and mapping them to a database. During actual use, the system stores sensor data in an array for recognition. When the sensor data matches the set of values associated with a sign, Hand Talk recognizes that sign and outputs it as text. In the prototype version, the user forms a sign and then holds it for two seconds to ensure recognition. However, even using simple algorithms for sign recognition, the system is capable of recognizing signs more quickly. In the future, sophisticated algorithms enabled by more powerful sensors or phones and could support machine learning and on the sign recognition.

TOOLS USED

CONTROLLER:
8051
PIC
COMPILER
KEIL IDE
MPLAB IDE

V CONCLUSION

Embedded systems don't have to be expensive to be effective. With this here the design of sarcastic gadgets technology a research is carried out effectivelyThus the design prototypic sarcastic technology project illustrates the creative possibilities for innovative developers using inexpensive components. Work continues on the system. The next version of the glove will have between 20 and 30 separate sensors, including Pressure sensors and accelerometers for determining various parameters. To support this there is a design of adequate sensors focusing on advanced methodology increasing the number of inputs. If possible, they'll also build data segmentation into the hardware and some modification for processing. Major improvements in sign recognition algorithms are also on the progress.

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