Helping Hearing-Imparedin Emergency Situations: A Deep Learning-Based Approach

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Abstract : In urban Sign language is a nonverbal form of communication method which is found among all deaf and dumb communities in world. Normal people do not learn the sign language. It causes barrier in communication between deaf dumb and normal people. Therefore system is being proposed with the use of accelerometer and voice play technology. System includes two modules. First module is a hand glove with sensors and microcontroller to convert hand gestures to auditory speech. Second module is Mobile based gesture data send via bluetooth to the mobile phone.

Keywords : **Arduino, Underground Cable Fault, Ohm's Law, Fault Detection, Fault Localization, GSM Communication.**

I. INTRODUCTION

Being disabled shouldn't mean being disqualified from having access to each side of life. According to census 2011, In India there are 1,640,868 citizens who can't speak as well as 1,261,722 citizens who can't listen. More than 70% of Deaf population of India is working in Government as well as Private sectors. For communication they are dependent on Sign Languages. In India most popularly Indian Sign Language is used. This sign language is also used in many other countries in South Asian Region.

In rest of the population of India very few citizens are able to use Indian Sign Language, as they really don't need to learn sign language. This causes a communication barrier between Deaf Dumb and Normal person. This leads to disqualification of hearing impaired from main stream of the society. To overcome this problem a communication assistant is required, to convert Sign Language to auditory speech. Some systems were previously developed to achieve same outcome but they had disadvantages such as being non-portable, practically not implantable or expensive. All previous systems were focused on one way communication.

Hand gestures are commonly utilized in our daily lives as a means of interaction and communication. They provide an intuitive and effective method for human-machine interaction compared to traditional tools, such as a keyboard and mouse. Hand gesture recognition has shown great potential for various applications, such as sign language, remote control, virtual reality and games, healthcare, and medical rehabilitation.

II. EASE OF USE

EMBEDDED SYSTEMS

An Embedded System is simply a combination of computer hardware and software, either fixed in operability or programmable, which is designed to perform a specific function. It is called an embedded system because it is embedded in a much complex device to control, enhance or assist the operation of that device. Take, for example, any latest car. The automatic transmission, GPS navigation, sunroof, radio, anti-lock brakes inside the car are all embedded systems.

Although embedded systems have the potential to perform a number of functions, they serve the best when used to perform a single key function. Engineers who specialize in developing embedded systems have strong

knowledge of programming and electronics. Read on to know the characteristics of embedded systems and eligibility, skills set & career prospects for embedded systems.

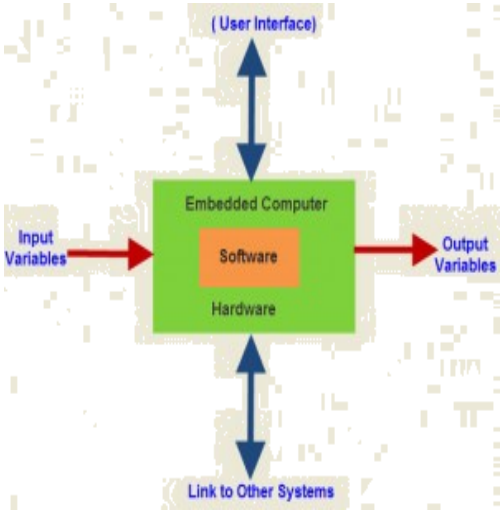


Fig. Embedded System

MAJOR CHARACTERISTICS OF EMBEDDED SYSTEMS

Embedded systems usually vary from the general purpose computer systems in a lot ways. Major characteristics of such systems are as follows:

1. Single Key function: Unlike software like Microsoft Word & Excel or a database, an embedded system runs a single program repeatedly.
2. Direct interaction with the real world: Embedded systems usually communicate with the real world environment through sensors and user interfaces. The users of embedded systems can directly control or modify their attributes when needed.
3. Operate under tight boundaries: Embedded systems have restricted resources in terms power consumption, memory and interfaces for connecting with other systems.
4. Developed on “reactive” principles: Since embedded systems are developed to serve a dedicated function, they are generally built using reactive principles such that their operation is stimulated by an external action.
5. High reliability: Embedded systems are integrated in machines and are expected to work continuously for years without issues and in some cases even recover on their own.

DISADVANTAGES

Power is still wasted in the acquisition and processing of the acceleration and pressure signals when the fall detector moves with the wearer during normal physical activities.

A passive vibration sensor and a passive tilt sensor work with more consuming power.

III. PROPOSED SYSTEM

HAND GLOVE

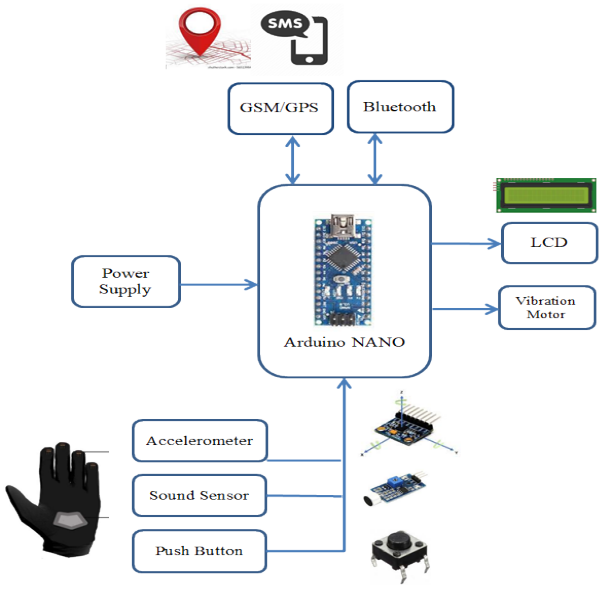


Fig: Block Diagram of System

The proposed wearable device which called as smart glove, it convert the hand gesture data to speech signal. The hand glove contains the two sensors, flex and accelerometer sensor. It converts the gesture into motion data to microcontroller. The bluetooth attached microcontroller, the mobile application collects the data's from the hand glove and converts the data to speech signals.

Flexion sensors, (from Latin flexure, 'to bend') also called bend sensors, measure the amount of deflection caused by bending the sensor. There are various ways of sensing deflection, from strain-gauges

To hall-effect sensors

The three most common types of flexion sensors are:

Conductive ink-based

Fiber-optic

Conductive fabric/thread/polymer-based

Bluetooth: It operates in the unlicensed radio frequency (RF) bands – 868, 915 and 2400 MHz These three bands provide a total of 27 channels with RF data rates of 20, 40 and 250kbps, respectively. Bluetooth protocols are use in embedded applications requiring low data rates and low power consumption.

Virtual reality

At Google I/O on May 2016, Google announced Daydream, a virtual reality platform that relies on a Smartphone and provides VR capabilities through a virtual reality headset and controller designed by Google itself.

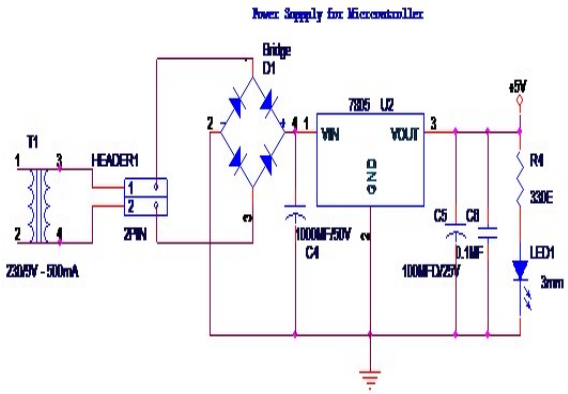
Hardware development:

The main hardware platform for Android is the ARM (ARMv7 and ARMv8-A architectures), with x86 and MIPS architectures also officially supported in later versions of Android. The unofficial Android-x86 project provided support for the x86 architectures ahead of the official support.

IV. HARDWARE DETAILS

Power Supplies

A power supply (sometimes known as a power supply unit or PSU) is a device or system that supplies electrical or other types of energy to an output load or group of loads. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.



Block diagram of power supply

Transformer

A transformer is a device that transfers electrical energy from one circuit to another through inductively coupled wires.

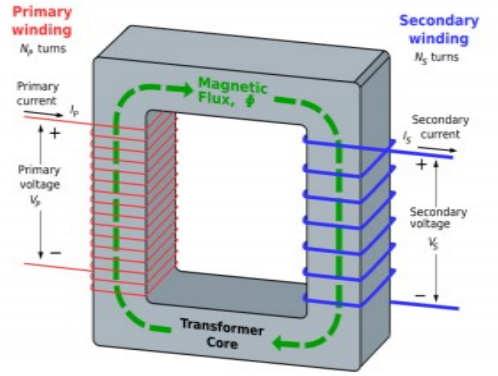
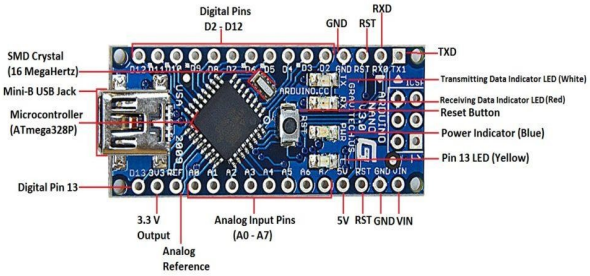


Fig: An ideal step-down transformer

A simplified an ideal step-down transformer design is shown in the above figure. A current passing through the primary coil creates a magnetic field.

ARDUINO NANO PINOUT DESCRIPTION

Taking this pin-out diagram below as reference, we shall discuss all the functionalities of each and every pin.



We can infer from the image that Arduino Nano got 36 pins in total. We will see all the pins section wise as well as a detailed format at last.

V. CONCLUSION

- This project aims to lower the communication gap between the mute community and additionally the standard world.
- This system converts the language in associate passing voice that's well explicable by blind and ancient people.
- The experimental analysis perfectly paired with the mobile application to convert the hang gesture to speech conversion.

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