

Smart Gloves For Disabled People

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Abstract- Each year, new technologies rise and fall, sometimes making an impact on our daily lives and other times barely leaving a trace. One category of emerging technologies that has the widest variety is the Internet of Things or IoT. IoT is regarded as hard-core for integrating various sensors, microcontrollers and all sorts of communication protocols and lays the foundation for futuristic communication standard i.e., Human-Things Interaction. Taking huge leaps in technologies with each passing year, the humans are making smart inventions every year to help themselves and for the ones who are affected by any disability. Arduino is a microcontroller for building digital devices and interactive objects that can sense and control objects in the physical and digital world. Arduino is design use a variety of microprocessors and controllers. The proposed work aims to solve the daily challenges faced by the people, who are unable to speak (dumb) or one who has recently undergone an accident and is unable to speak. It can also be used by elderly people, who find difficulty in speaking. With this wearable smart glove, dumb people or patient can easily communicate by just tapping the points on the glove by their thumb that results in 12 different commands that are both audible audio and image on any Android smartphone via an app. This can also be used in automation of day-to-day things like home appliances and many more.

I. INTRODUCTION

Smart Hand Gloves help disable people to live with normal people. A dumb person cannot speak then this smart glove helps him to convert his hand gesture into text and pre-recorded voices. This also help normal person to understand what He is trying say and reply accordingly. This Smart Glove has facility of Home Appliance control from which is a physically impaired person become independent to live. The glove is fitted with flex sensors along the length of each finger and the thumb. The flex sensors give output in the form of voltage variation that varies with degree of bend. This flex sensor output is given to the ADC channels of Microcontroller. It processes the signals and perform analog to digital signal conversion. Further the processed data is sent in a wireless manner to the receiver Section. In this section the gesture is recognized and the corresponding output is

displayed on LCD and simultaneously a speech output is play backed through Speaker.

II. RELATED WORK

Taking huge leaps in technologies with each passing year, the humans are making smart inventions every year to help themselves and for the ones who are affected by any disability. The project aims to make the communication for dumb people easy and hence proposing a sign interpreter, which automatically converts sign language into audio output. For the Dumb people, sign language is the only way of communication. With the help of sign language, physically impaired people express their thoughts to the other people. It is difficult for common people to understand the specific sign language therefore communication becomes difficult. The sign language recognition has become an empirical task, as it consists of various movements and gesture of the hands and therefore getting the right accuracy at a low-cost is a mammoth task. Instrumented gloves with audio out are the solution to this problem. The gloves attached with various sensors are worn for sign interpretation. Hence, the proposed system solves the problem and helps the dumb people in communication with the rest of the world at low cost.

III. PROPOSED WORK

The proposed system aims to solve the daily challenges faced by the people, who are unable to speak (dumb) or one who has recently undergone an accident and is unable to speak. It can also be used by elderly people, who find difficulty in speaking. Solves the issues of those people, who cannot learn or are unable to use ‘sign language’ to communicate with others by providing them a ‘virtual voice’. This wearable glove is both affordable and feasible. It is easy to wear and customizable according to one’s need. Can be used by people of any age group and also illiterate.

IV. BLOCK DIAGRAM

Above block diagram represents the complete architecture of Smart Gloves for Disable People where it includes components such as Flex Sensors, Arduino Mega, 16*2 LCD Screen, APR33A3 Voice Playback module,

Transmitter, Receiver with Electronic Switches. The Arduino Mega Microcontroller Board is the heart of smart gloves device, it has interfaced with flex sensor, voice module, transmitter, and LCD screen. This whole assembly works on voltage of 5 volts and 9 volts supplied by power supply block.

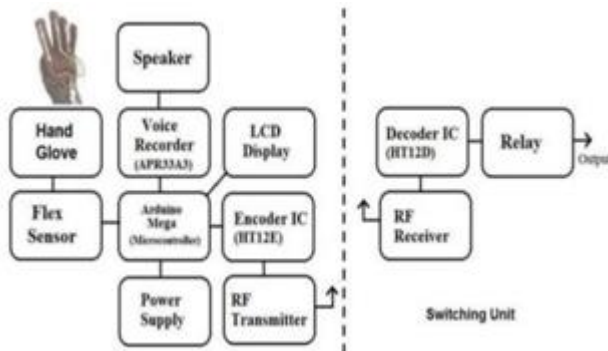


Fig 1. Block Diagram

V. WORKING PRINCIPLE

Transformer: The potential transformer will step down the power supply voltage (0-230V) to (0-15V and 0-9V) a level. If the secondary has less turns in the coil, then the primary, the secondary coil's voltage will decrease and the current or AMPS will increase or decrease depending upon the wire gauge. This is called a step-down transformer. Then the secondary of the potential transformer will be connected to the rectifier

Bridge Rectifier: When four diodes are connected as shown in figure, the circuit is called a bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners. Let us assume that the transformer is working properly and there is a positive potential, at point A and a negative potential at point B. the positive potential at point A will forward bias D3 and reverse bias D4. The negative potential at point B will forward bias D1 and reverse D2. At this time D3 and D1 are forward biased and will allow current flow to pass through them; D4 and D2 are reverse biased and will block current flow. The path for current flow is from point B through D1, up through Load, through D3, through the secondary of the transformer back to point B. One-half cycle later the polarity across the secondary of the transformer reverse, forward biasing D2 and D4 and reverse biasing D1 and D3. Current flow will now be from point A through D4, up through Load, through D2, through the secondary of transformer, and back to point A. Across D2 and D4. The current flow through Load is always in the same direction. In flowing through Load this current develops a voltage corresponding to that. Since current flows through the load during both half cycles of the applied voltage, this bridge

rectifier is a full-wave rectifier. One advantage of a bridge rectifier over a conventional full-wave rectifier is that with a given transformer the bridge rectifier produces a voltage output that is nearly twice that of the conventional half-wave circuit. This bridge rectifier always drops 1.4Volt of the input voltage because of the diode. We are using 1N4007 PN junction diode, its cut off region is 0. 7Volt. So any two diodes are always conducting, the total drop voltage is 1.4 volt.

Filter: If a Capacitor is added in parallel with the load resistor of a Rectifier to form a simple Filter Circuit, the output of the Rectifier will be transformed into a more stable DC Voltage. At first, the capacitor is charged to the peak value of the rectified Waveform. Beyond the peak, the capacitor is discharged through the load until the time at which the rectified voltage exceeds the capacitor voltage. Then the capacitor is charged again and the process repeats itself.

Voltage Regulator: Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustable set voltage. A fixed three-terminal voltage regulator has an unregulated dc input voltage, it is applied to one input terminal, a regulated dc output voltage from a third terminal, with the second terminal connected to ground.

VI. RESULT

As a solution to problem definition, our results are more realistic and affordable than another research paper had claimed. Our Smart Gloves Prototype not only displays the gesture into text, but it also able to convert in voices. The results of our prototype are mentioned below.

VII. CONCLUSION

This project is useful for dumb, deaf and blind people to communicate with one another and with the normal people. The dumb people use their specific standard sign language which is not easily understandable by any common people and blind people cannot see their gestures. This proposed system converts the sign language is translated into some text from also, to facilitate the deaf and dumb as well. It is also useful in operate home appliances by using gestures.

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