

## **Gesture Based Voice Command for Blind and Email Access for Dumb using Raspberry Pi**

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### **ABSTRACT**

*Now a day's s correspondence has turned out to be simple because of mix of correspondence innovations with web. Anyway visually impaired individuals think that it's hard to use this innovation on the grounds that to utilize the innovation they require visual recognition and in our nation around 2.89% of individuals are not ready to talk (stupid). Their correspondence with ordinary individuals are just utilizing the movement of their hands and articulations. Just couple of individuals are effectively ready to get the data from their movements, however the rest of the general population are not ready to get it their method for passing on the messages. So as to defeat the multifaceted nature of the visually impaired, idiotic and hard of hearing individuals this venture is proposed. This framework is primarily founded on accelerometer (movement sensor). Signal is fundamentally adata glove what's more, a microcontroller dependent on framework (Renesas) which changes over some predetermined developments into human unmistakable voice and produces an auto email with predefined pictures andsubjects.*

**Keywords: Accelerometer, Email Access, Gestures, Renesas Microcontroller and Raspberry Pi.**

### **I.INTRODUCTION**

A gesture is a movement, especially your hands, to express emotions or information, which are mostly used in communication between human beings. Research in advancement to plan to incorporate motions as an articulation in Human PC Connection (HCI). In human correspondence, the utilization of discourse and motionsare coordinated.

In this venture the framework is improvement for perceiving the motions and their transformations into voice yield and create auto email with predefined pictures and subjects. An instrumented information glove can be utilized for producing the motions which conveys some helpful data that helps the visually impaired, imbecilic and hard of hearing individuals to speak with typical individuals. The Renesas microcontroller gets the motion remotely, display some messages through LCD display and converts some specified movements into human recognizable voice. An effective communication is provided through email access between blind, dumb and deaf people.

## II. RELATED WORK

The quantity of looks into have been given clear suggestions that signal controlled advancements are presently in enthusiasm of the individuals. Despite the fact that there are a wide range of viewpoints and focuses to make reference to from the examination, in any case, this review ponder has more enthusiasm for the accompanying classes, as these are vital regions of motion based UI. After 35 long periods of research, scientists have been as yet working ceaselessly on motion based system. Most of inquires about depends available signals. Direct control by means of hand development is quick, yet restricted in number decisions. There looks into in view of body motion and finger point development. In early research, scientists utilized information gloves with microcontroller and associated with a gadget through wires. Head motions what's more, motions with voice were likewise in research, yet hand motion was primary overwhelming piece of signal control framework. Wheel chair users were exceptionally considered for accelerometer based motion controlled framework. Since from last 5 years examinations are primarily centered on old and impaired individuals. Researches have been shown many applications mainly for entrainment, tele-care, controlling home computerization, older or handicap care what's more, and tele-wellbeing. The above application demonstrates the most significance of more looks into dependent on motion control framework. A significant number of the application are to supplant customary information gadget like console and mouse, available application for debilitate people. Now a day's individuals can associate with any media utilizing signals to control wide range of utilizations. In 2003 we have signal based business items. Through infrared pillars, information glove, still camera, wired and many interconnected advancements like gloves, pendant, infrared flag arrangements gestures have been captured in recent years. Ubiquitous devices uses webcam video and vision techniques based on motion acknowledgment has been made it conceivable to catch any car signal for normal condition with 3D representation.

Many scientists are working in field of gesture recognition. The most recent overview of the work done in these field is portrayed in reference [2].

Reference [7] and [3] assesses the motion acknowledgment for human robot gathering and human robot helpful collaboration. Visual touchpad [3] gives the human obvious touch screen, less cost visual based data contraction this will allow the trades of the PC's, workstations, open stands introductions. By using camera we can get the 3D fingertips and the stereo vision can choose the partition among fingertip and visual touchpad. From this paper we have utilized fingertip motion with separate data.

Reference [6] presents a "banner level" to see the ability by examining the prosodic miracles of movements in addition to talk co-creation. Similarly, it shows a computational structure for enlightening reliable movement affirmation which represents the two ponders that get think and modified obligations prosodic synchronization. In this paper signs are utilized to control the wheel arrange utilizing two figuring's and flag affirmation.

Reference [8] discusses diverse classification for motion recognition, it can be done in different applications by using camera and numerous development sensor signs can be procured easily.

Reference [10] paper gives data about banner assertion to dumb and hard of hearing people and this structure is made with the assistance of microcontroller, to see the development we use information glove chart. For this we

require flex sensor, voice module and microcontroller. The sensors hand-off upon the overviewed of sign pictures, which utilizes the proportion of sensors in redesign AT89S52 is utilized as the microcontroller. For remote information pass on we can utilize Bluetooth contribute android advantageous coming about to assessing the equipment required for the assertion of signs, the glove is framed physically. Instead of microcontroller we are overriding Raspberry Pi3 appeared our dare to make it open remotely utilizing web.

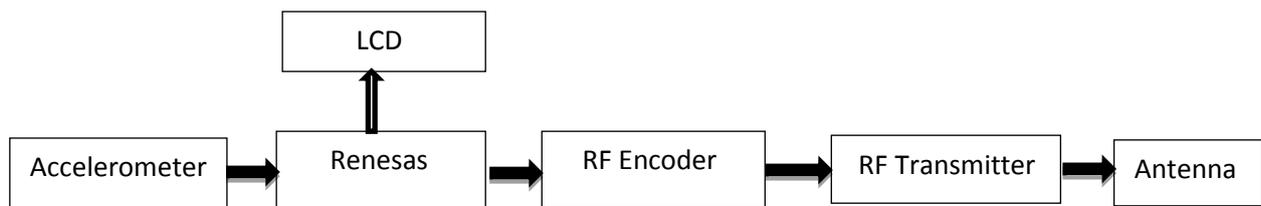
Reference [11] in human interface gadgets have dependably been a control for joint exertion between the human and moved world. We have been utilizing a mouse and console to interface with PCs. This has seen a traditional proportion of utilization in field of gaming clearing out held wired controllers, for occasions, joysticks rising above to trademark hand progressions which are consolidated into the redirection to deal with the computerized end. This paper intends to give a presented inconsequential effort strategy which does in like way in crude conditions without enormously multifaceted nature. It is recognized to using Accelerometer, Reed Switch and a Flex Sensor. From this paper we have data about sensors used to get the banner information to controlling the mouse and solace remotely.

### III. PROPOSED WORK

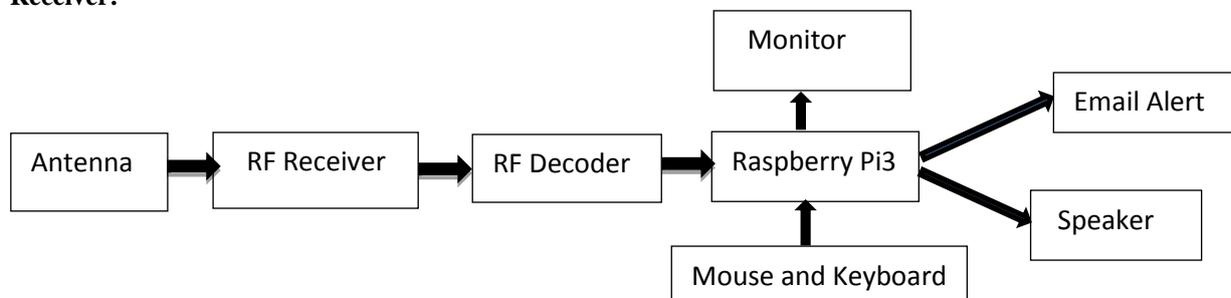
#### 3.1 Working of the Device

Many embedded system have been generously distinctive structures as per their utilities and capacities. In this venture, the framework is for the most part made out of Microcontroller RL78, RF Transmitter and Beneficiary, LCD, Accelerometer, Screen and Keyboard, Raspberry Pi3.

##### Transmitter:



##### Receiver:



**Fig 3.1 Block Diagram of Gesture Based Voice Command for Blind and Email Access for Dumb.**

This framework depends on the movement sensor (accelerometer). Motion is essentially adata glove and a microcontroller based system. Initialize all the devices like LCD, Accelerometer, Renesas, RF Transmitter and Receiver, Raspberry Pi and Speaker.

Accelerometer detects all the hand movements and generate some commands through gesture for communication purpose. Renesas converts the hand movements to text and the message is displayed on LCD. Based on the data received from accelerometer, microcontroller will send those commands to collector end through receiving wire. At the collector end, the directions are prepared by raspberry pi3 and creates an auto email with predefined pictures as for each motion and subject to concern individual with whom theblind, dumb and deaf people to impart. At the same time the voice yield is gotten for some of signal through speaker.

### 3.2 Software Description

CubeSuite+ is an integrated development environment (IDE) used to write program code, some part of the code it write (generates) itself.

Renesas Flash Programmer is to dumb code into Renesas chip using NAND Flash.

Raspbian is a Debian-based PC working framework for Raspberry Pi. There are several versions of Raspbian including Raspbian stretch and Raspbian Jessie. The operating system is still under active development. Raspbian is highly optimized for the Raspberry Pi line's low-performance ARM CPU's.

### 3.3 Hardware Description

#### 3.3.1 Accelerometer

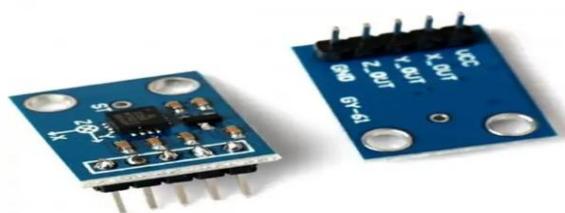


Fig 3.3.1 Accelerometer Model

The ADXL335 is called as accelerometer sensor or also a tilt sensor it is a little, slim, low power, total 3 get to quickening agent with flag adapted voltage yields.This model is breakout board for ADXL335 as it is almost impossible to use the sensor directly in our project. The ADXL IC works on 3.3Volt but our module has on board 3.3Volt voltage regulator so we can directly give 5Volt to the module.

#### 3.3.2 Renesas Microcontroller

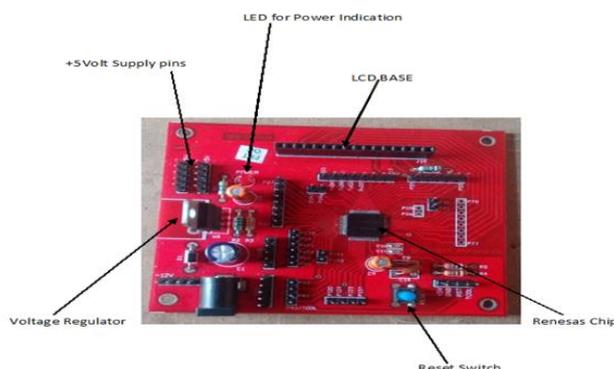


Fig 3.3.2 Renesas Microcontroller Model

Renesas has a 3 sections:

1. Power Section- Acts as a regulator to slow down power supply.
2. Control Section- To control other components by input and output.
3. Communication Section- To dump using NAND Flash.

Specifications:

It is a 16 bit microcontroller (IC: R5F100LE), 64pins in that 58pins is used for general purpose input output (GPIO) and remaining 6pins are reserved pins for LCD, 10 bit ADC, 8 channels, 12V input voltage but operating voltage is 5V, 3 UART, 11 ports, 8 timers, 12 interrupts, 4KB RAM, 64KB ROM, clock frequency is 32MHZ.

### 3.3.3 LCD (16X2)

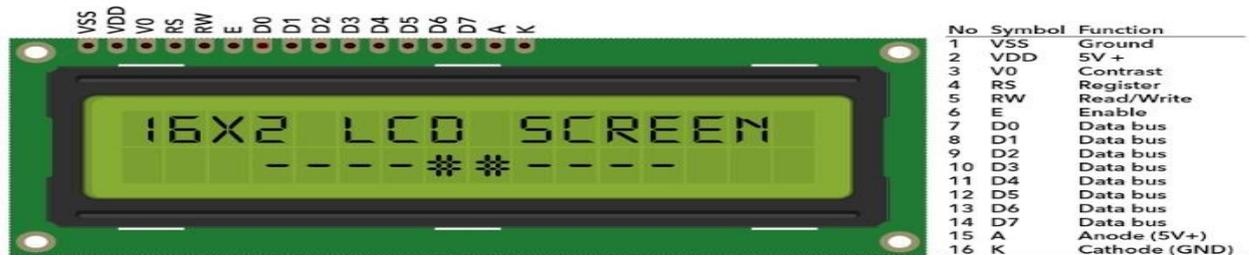


Fig 3.3.3 Liquid Crystal Display (LCD) Model

We use 16X2 LCD (Liquid Crystal Display), address of 1<sup>st</sup> row is 0x80 and address of 2<sup>nd</sup> row is 0xC0.

### 3.3.4 Raspberry Pi3

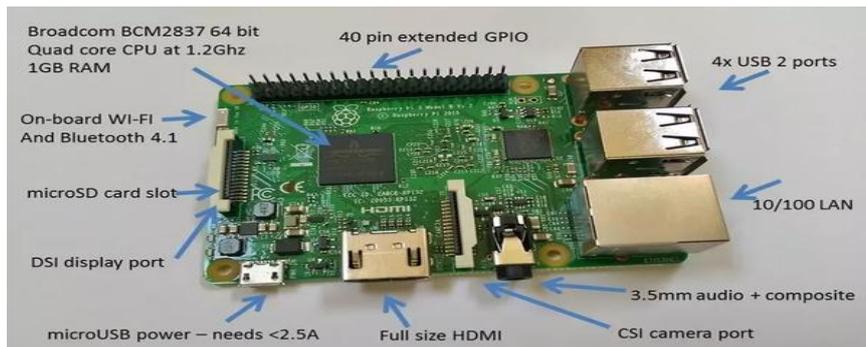


Fig 3.3.4 Raspberry Pi3 Model

It is a general purpose computer and it is usually with LINUX operating system or credit card sized computer. The Raspbian Pi3 model B is Broadcom BCM287 system on chip (SOC).

#### IV. HARDWARE AND SOFTWARE REQUIREMENTS

Table 4.1 Hardware and Software Requirements

Hardware Requirements	Software Requirements
Accelerometer	CubeSuite+
Renesas Microcontroller (R5F100LE)	Renesas Flash Programmer
LCD	Raspbian OS
RF Transmitter	
RF Receiver	
Raspberry Pi3	
Speaker	

#### V. RESULTS

The developed prototype using Renesas Microcontroller and Accelerometer Sensor is shown below.



Fig 5. Prototype Developed

In this proposed work we have set threshold values between  $\leq 145$  to  $> 180$ , here we have created four commands for dumb, blind and deaf people, the commands with set threshold values is as follows,

1.  $\geq 180$ : command: Good Morning
2.  $\leq 145$ : command: Exam Stress
3.  $\leq 150$ : command: Good Luck
4.  $\geq 185$ : command: Thank You



Fig 5.1 Command 1

The result shown above is for command 1 with set value  $\geq 180$  and the command, “Good Morning” is displayed on LCD board.



**Fig 5.2 Command 2**

The result shown above is for command 2 with set value  $\leq 145$  and the command, “Exam Stress” is displayed on LCD board.



**Fig 5.3 Command 3**

The result shown above is for command 3 with set value  $\leq 150$  and the command, “Good Luck” is displayed on LCD board.



**Fig 5.4 Command 4**

The result shown above is for command 4 with set value  $\geq 185$  and the command, "Thank You" is displayed on LCD board.

## VI. CONCLUSION

From the above study, it can be concluded that the structure and working of a framework which is valuable for visually impaired, idiotic and hard of hearing individuals to speak with each other and with the typical individuals. The idiotic and hard of hearing uses standard communication via gestures which isn't actually justifiable by typical individuals and visually impaired individuals can't see their motions. This framework changes over the communication via gestures into voice which is effectively justifiable by visually impaired and ordinary individuals. The communication through signing is converted into some content structure, pictures and sent through email to encourage the dumb and deaf people.

## VII. ACKNOWLEDGEMENT

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