Wireless Voice Operating Lift Control System with Safety Care

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Abstract*: This project presents the design and construction of voice operated lift/elevator control system. This system acts as human-machine communication system. Speech recognition is the process of recognizing the spoken words to take the necessary actions accordingly. User can also control the electrical devices like fan, door etc with the help of voice recognition system. The main purpose of designing this project is to operate the Elevator by using voice commands. This device is very helpful for paralysis, short height people and physically challenged persons. SpeechRecognition could be a system that functions to convertauditory communication into the computer file. Thesystem input is human speech. The main purpose ofcoming up with this method is to control the Elevator bymistreatment voice commands by the user. It aims at serving to unfit, short height folks and physicallychallenged persons. This projected system is incrediblyabundant convenient throughout COVID-19 pandemic.*

Keywords: Internet of Things,Transportation Management, GPS Location Tracking, GSM, Accident Alert,

I. INTRODUCTION

The main aim of this project is to design and construct a voice operated lift/elevator control system. This system acts as human-machine communication system. Speech recognition is the process of recognizing the spoken words to take the necessary actions accordingly. Elevator is become the main part of our day-to-day life. Elevator is become a transport device that is very common to us now a days. We use it every day to move goods or peoples vertically in a high building such as shopping center, working office, hotel and many more things. Elevator is a very useful device that moves people in the shortest time to desired floor. Lift is the vital part of everyone's life living in large buildings, and moreover it is the necessary thing in large buildings or any big construction having number of floors to move from one floor to another. Now a day it is becoming prestigious thing for the malls, shopping Markets, colleges, hospitals, hotels. Which are having two or three floors or more than that. So we are trying to make it more automatic through our project. Speech recognition model is the method by which the elevator can be controlled .and by Speech recognition model we will get input to controlling the elevator. Whenever we are dealing with voice control, the first term come in our mind is Speech Recognition i.e. system should know or understand human voice as input to the speech recognition model. Speech recognition is a technology in which the system will understand the words but not its meaning of the words given by the speech of any person to speech recognition module. Speech is a best and ideal method to controlling the elevator. In this project we are also going to give indication to the security in emergency situation. In emergency situation means in case of lift failure .it may be the fault because of power failure or may more reasons of power failure .in emergency condition it will indicate to the security person and that time buzzer will ringing on. [1] 2. Literature survey Vrajesh Prajapati and Mehta at. el.: Voice recognized elevator, we have given the information which describes the voice operated elevator which is also easy in language and important for user. This voice operated elevator mainly useful for handicapped person (blind). Elevator operated on voice so maintenance cost for keypad which is use previously also reduce. A voice recognition program and its connection with the controller can supply sufficient number of commands necessary for the elevator control on which the elevator will operated. The old elevators were having many drawbacks like there was key press problem and time required to press one key was also more. Voice operated elevator is saving time

Elevators are taken into account Associate in nursinginescapable a part of our society. But Elevators primarilybased on it needs humans' physical interaction for itsmovement. So considering completely different aspects ofautomatic

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DOI: 10.48175/568

ISSN
2581-9429
IJARSCT

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technology we have a tendency to came up with aconcept of planning the elevator that may be automaticwhich can perform all the task mistreatment voicecommands of users as input rather than physical input withsimply giving a voice command the user can reach thedestined floor.Manual work which might give an ease to the user toachieve their destined floor throughout peak hours and canconjointly provide a ease to physically-challengedindividuals. Elevators are controller devices that use switchmechanism for operation. Either the person wishes to travelin down or upward direction, uses the computer keyboard orperhaps for Associate in emergency stop or to open & shutthe elevator door.In today's life we will notice a colossal kind ofhousing complexes packed in procurable location with multistorage building capability. This project higher fits for blind,unfit and physically challenged people. Trying toward current scenario of COVID-19. Manually operated elevateencompasses a high rate of spreading the virus. Theessential explanation for planning this method is to performelevator operation via voice directions. Speech recognitionsystems are the crucial a part of the project. The speechrecognition of the elevator system permits thecommunication mechanism between the users and also thePIC microcontroller primarily based mechanism.

II. LITERATURE SURVEY

Vrajesh Prajapati and Mehta at. el.: Voice recognizedelevator, we have given the information which describes thevoice operated elevator which is also easy in language andimportant for user. This voice operated elevator mainly usefulfor handicapped person (blind).Elevator operated on voice so maintenance cost for keypadwhich is use previously also reduces. A voice recognition program and its connection with the controller can supplysufficient number of commands necessary for the elevatorcontrol on which the elevator will operated. The old elevatorswhere having many drawbacks like there were key pressproblem and time required to press one key was also more. Voice operated elevator is saving time. [2]

A Survey Paper on Design & Control of an Elevator for Smart City Application it is concluded that the design and control of three floor elevator for smart city application. The main requirement of the multi storage buildings are elevators. Elevators ease the work human being and keep them in the comfortable zone. One can make the better use of PLC in the designing of the elevator control system. This control is based on the input that is received from the operator as well as from the sensors. Elevator control system is needed to control all the functions of the elevator. It is the one which guides the elevator car, Elevator car is one which actually carries the passengers between the different floors; it also controls the opening and closing of doors at different floor, and the safety switches are also controlled by the elevator control system. The ladder logic programming is used to simulate the proposed system. Because of use of PLC, elevator systems are getting better, faster, stronger and better-quality elevators are produced. Hence more importance is given to the design of an elevator control system.

In paper design and implementation of Embedded based elevator control System it is concluded that the elevator control system is one of the important aspects in electronics control module in automotive application. In this investigation elevator control system is designed with different control strategies. First the elevator control system is implemented for multi-storage building. This implementation is based on FPGA based Fuzzy logic controller for intelligent control of elevator group system. This proposed approach is based on algorithm which is developed to reduce the amount of computation required by focusing only on relevant rules and ignoring those which are irrelevant to the condition for better performance of the group of elevator system. Here only two inputs are considered i.e. elevator car distance and number of stops. Based on these data, fuzzy controller can calculate the Performance Index (PI) of each elevator car, the car which has maximum PI gives the answer to the hall calls. This would facilitate reducing the Average Waiting Time (AWT) of the passenger. In the second level, the dispatching algorithm is implemented for multi-storage building. Here six types of dispatching algorithms are considered. Based on the traffic situation and condition, one algorithm out of six is operated, that facilitates reducing the Average Waiting Time of the passenger and also reduces the power consumption of the elevator system. The hardware part of the work comprises a simple D. C. Motor, which can control the up and down movement of the elevator car. This D. C. Motor is controlled through the MC9S12DP256B microcontroller. Here four floor elevator systems have been considered and every floor has two switches, one switch is used for up movement and another switch is used for down movement. Based on the switch pressed, the elevator car can move either in upward or downward direction. Here two sensors are used in every floor. One sensor is used for detecting the elevator car when elevator car reached to its destination floor. This sensor

detects the car and stops the D.C. Motor. At the same time, another sensor is used for opening and closing the door. Finally, a novel fuzzy based PID controller algorithm is implemented using MC9S12dp256B microcontroller. This algorithm is mainly used for maintaining the constant speed of D.C. Motor with different load conditions.

In paper Voice Operated Elevator with Emergency Indicator it is concluded that elevator is the main part in day to day life .it become transport devices that we are using every day .elevator is useful to move goods and persons. In this project, we are using the microcontroller AT89S52. on this microcontroller the elevator controller is constructed to simulate as elevator in the real elevator. This project dissertation documents the results of a research on a microcontroller-based elevator control system. It provides useful data to those who want to carry out a elevator Control system research. This System is operated on the Voice of any person which will help the handicap person to Travel form one place to another without any help of other. Microcontroller is become main part of each application now a days. Application in each and every automation control like Hand-held communication devices Remote controllers,, automatic and automobiles, security system, telephone printing machines, indicating ,measuring instruments and products of day to day life. The project described here being also a microcontroller based, used for security purpose and in emergency condition. The use of microcontroller in this project is to store the data which is using in the programming for purpose of moving the elevator, process data that will be according to the user wishes.

In paper elevator control system project, it is concluded that as part of the requirements in a juniorlevel measurements & instrumentation course (for an Electrical and Computer Engineering Technology program), students are required to design and implement an elevator control system project. The elevator simulator is pre-built and equipped with a car that travels through three floors, a car hoist system that uses a 12-volt DC motor, floor sensors to detect the position of the car, and an elevator call pushbutton on each floor. Terminal strips are provided for I/O connections. Students are required to use a National Instruments data acquisition system with analog I/O and digital I/O capability. The objective of the project is for students to design the software (using LabVIEW) and hardware interfacing electronics for the simulated elevator control system such that it mimics the operation of a typical elevator. This paper provides a detailed listing of the engineering requirements for the system and the functional test procedure for verifying proper operation of the system. Examples of student work are provided, along with a project assessment. This project is also linked to several ABET criteria and can be used for assessment of the same. Recommendations are provided to help ensure student success on the project. This project has been found to effectively integrate both hardware and software design, while utilizing information covered from many prerequisite courses. Due to the slow response characteristics of this system, this PC-based control project lends itself well to this application.
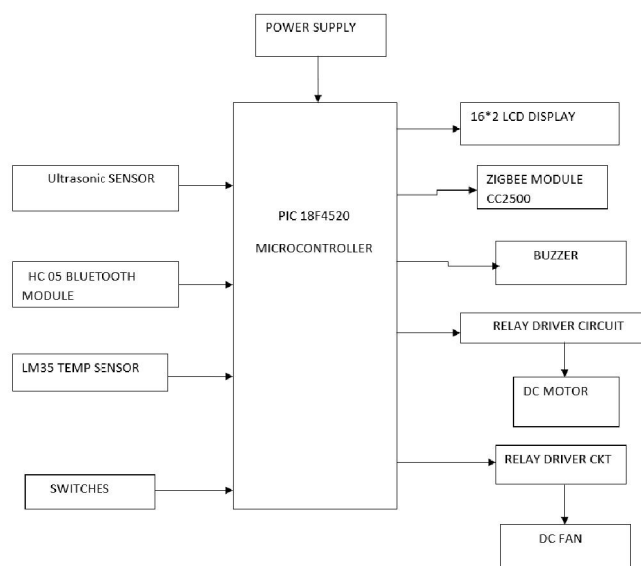
III. PROPOSED SYSTEM

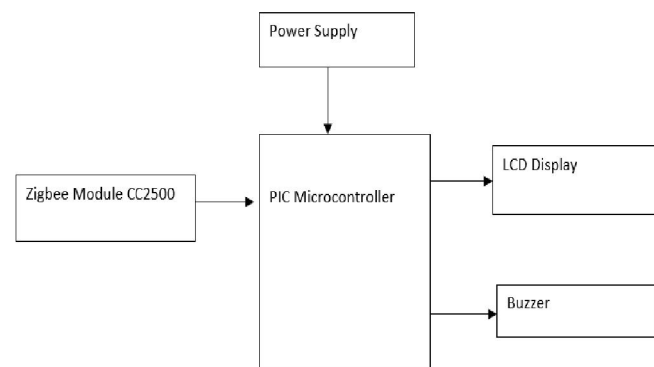Fig. 1. Block Diagram (Lift Unit)

Fig. 2. Block Diagram (Security Cabin Unit)

voice operated system is the main part of this project. Voice to text convertor software is communication mechanism between the user and microcontroller. The project makes the use of DC motor for the moving of lift. Microcontroller is programmed, with the help of embedded C programming. The microcontroller is capable of communicating with all input and output modules of elevator.

The Bluetooth module is used for the wireless connection between the user and controller.

The aim of the implementation is to demonstrate the use of smart elevators using Smartphone. This system makes use of a DC motor for moving the elevator based on the voice/speech commands given by the user on their Smartphone. With the help of embedded C programming, the microcontroller is programmed. The microcontroller can communicate with all lift modules input and output.The voice recognition system, which is the microcontroller's input module, takes the user's voice instructions on the smartphone as input and assesses whether the command is to rise up or downwards. The similar voice-based commands also used to turn on/off the fan inside the elevator. Also, LCD display is available for visual information of operations being performed for the person in the elevator.

This HC-06 Bluetooth module is the most and easiest way to go wireless technology. This module allows you to wirelessly extend your serial interface, hence any program running on your laptop feels its controlling local serial port which is over a wireless Bluetooth link.

The four pins are +5v, GND, TXD, RXD. Supply voltage should be 3.3v-6v.

PIC 18f4520 Microcontroller

It is an 8-bit enhanced flash PIC microcontroller that comes with nanowatt technology and is based on RISC architecture. Many electronic applications house this controller and cover wide areas ranging from home appliances, industrial automation, security system and end-user products. This microcontroller has made a renowned place in the market and becomes a major concern for university students for designing their projects, setting them free from the use of a plethora of components for a specific purpose, as this controller comes with inbuilt peripheral with the ability to perform multiple functions on a single chip.

Data Memory up to 4k bytesn Data register map - with 12-bit address bus 000-FFF

Divided into 256-byte banks

There are total of F banks

Half of bank 0 and half ofbank 15 form a virtual (oraccess) bank that is accessibleno matter which bank isselected – this selection isdone via 8-bit

Program memory is 16-bits wide accessed through a separate program data bus and address bus inside the PIC18.

Program memory stores the program and also static data in the system.

On-chip   External

On-chip program memory is either PROM or EEPROM.

The PROM version is called OTP (one-time programmable) (PIC18C) The EEPROM version is called Flash memory (PIC18F).

IJARSCT

ISSN (Online) 2581-9429

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Impact Factor: 7.301

Volume 3, Issue 8, May 2023

Maximum size for program memory is 2M n Program memory addresses are 21-bit address starting at location 0x000000

Fig. 3. PIC18f4520

Bluetooth Module HC05

Bluetooth wireless technology is becoming a popular standard in the communication. it is one of the fastest growing fields in the wireless technologies. It is convenient, easy to use and has the bandwidth to meet most of today's demands for mobile and personal communications. Bluetooth technology handles the wireless part of the communication channel; it transmits and receives data wirelessly between these devices. It delivers the received data and receives the data to be transmitted to and from a host system through a host controller interface (HCI). The most popular host controller interface today is either a UART or a USB. Here, I will only focus on the UART interface, it can be easily show how a Bluetooth module can be integrated on to a host system through a UART connection and provide the designer an optimal solution for Bluetooth enabled systems.
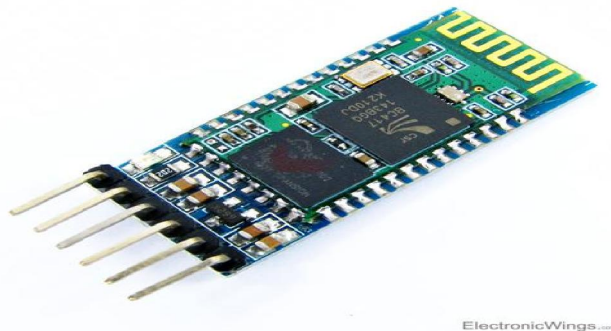

Fig. 4. Bluetooth HC05 Module

ZigbeeModule (CC2500)

It can be used to transmit and receive data at multiple baud rates from any standard CMOS/TTL source. CC2500 Wireless Trans-receiver module is a direct line in replacement for your serial communication it requires no extra hardware and no extra coding to turn your wired communication into wireless one.

It works in Half Duplex mode i.e. it provides communication in both directions, but only one direction at same time (not simultaneously). This switching from receiver to transmitter mode is done automatically.

Features of CC2500 Wireless Module

Supports Multiple Baud rates (4800/9600/19200/38400).Works on ISM band (2.4 GHz) which is reserved internationally so no need to apply for license.

Supports multiple frequencies within the same band rate thus avoiding data collision.

No complex wireless connection software or intimate knowledge of RF is required to connect your serial devices.

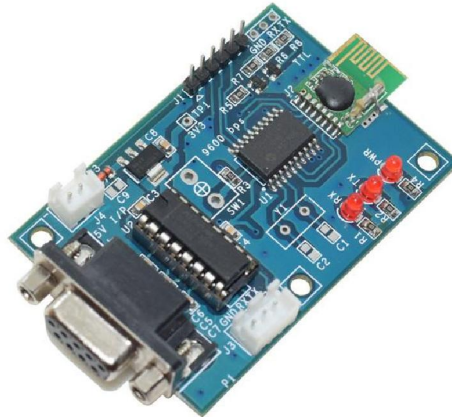Designed to be as easy to use as cables.

No external Antenna required.

Fig. 5. Zigbee CC2500 Module

Temp Sensor LM35

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm\frac{1}{4}$°C at room temperature and $\pm\frac{3}{4}$°C over a full -55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35D is rated to operate over a 0° to +100°C temperature range
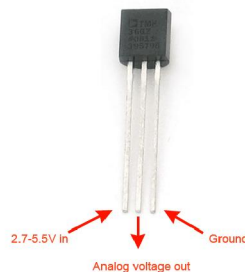

Fig. 6. Temp Sensor

LCD Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

.A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.
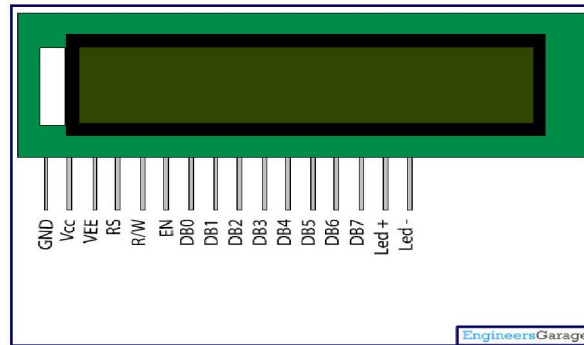
Fig. 7. LCD Display

Ultrasonic Sensor

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit. The basic principle of work:

Using IO trigger for at least 10us high level signal,

The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back.

IF the signal back, through high level , time of high output IO duration is the time from sending ultrasonic to returning.

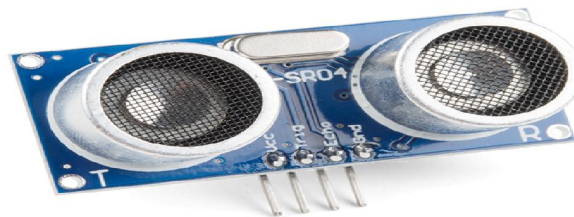Test distance = (high level time×velocity of sound (340M/S) / 2,

Fig. 8. Ultrasonic Sensor

IV. CONCLUSION

This system helps to avoid a physical touch to the device and prevent to spread a virus like corona with the help of giving voice command to the system and accordingly system is worked. This is a Long-term solution which operates independently. The actionable recommendations and solutions make sure that any user can use the elevator. Even the user has any kind of disability. Blind and visually impaired people encounter serious problems in leading an independent life due to their reduced perception of the environment. With the help of our system, the blind people, physically challenged people, low heighted person etc can use the elevator easily and prevent any awkward situation in front of the normal people. The prototype of the elevator is a useful to take input from user and act accordingly.

1. Voice recognition system have been out on the market for some time they have not yet fully developed to their full potential. In this paper we used it potentially and reliably.

2. A voice recognition program and its connection with the controller can supply a sufficient amount of commands necessary for the lift control.

3. The model of a lift is a useful tool for training students in specialization of automation, voice signal recognition and control technologies as well as for specialists' qualification improvement in similar specialization.

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DOI: 10.48175/568

ISSN
2581-9429
IJARSCT

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