

VOICE CONTROLLED HUMAN ASSISTANCE ROBOT

Submitted in partial fulfilment of the requirements for the award of
Bachelor of Engineering degree in Electronics and Communication
Engineering

By

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Accredited with Grade “A” by NAAC

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of T SUNNY ASHLESH(37130415), T DURGA SAI TEJA(37130411) who carried out the project entitled "VOICE CONTROLLED HUMAN ASSISTANCE ROBOT" under the supervision of Dr.M.R .Ebenezar Jebarani M.E., Ph.D., from Dec 2020 to March 2021.

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ABSTRACT

A chatbot could be a bug that reproduces human discourse through voice orders or text talks or each. Chatbot, short for chatterbot, is an engineered insight (AI) include that might be implanted and utilized through any major electronic informing applications. There territory unit assortment of equivalents for chatbot, just as "bot," "IM bot" "intelligent specialist" or "fake discourse element". Chatbots likewise are known as chatterbots could be such an electronic correspondence Ai used in informing applications.

A chatbot could be a PC Chat-bot is ascending as a genuine innovation in forming the long haul by interfacing actual gadgets or things with robot. It set up presents differed openings for convergence of other innovative patterns which could change it to turn out to be even stacks of smart and conservative. all through this task the inclination to concentrate on the blend of Intelligent casual bundle Agents or Chat-bots with machine. Writing overviews have investigated shifted applications, highlights, basic advancements and noted difficulties of robot.

Then again, Chatbots unit being received in bigger numbers owing to significant steps being developed of stages and systems. The oddity of this venture lies at stretches the specific coordination of Chat-bots at spans the robot situation. Recognizable proof of the fresher difficulties and attainable future bearings with this new reconciliation, have assembled been created. Regularly, a discussion hatchling can speak with a genuine individual, anyway applications territory unit being created during which 2 talk bots will speak with each other.

Visit bots territory unit used in applications like web based business customer administration, choice focuses and web betting. Chatbots region unit increasingly more blessing in organizations and here and there territory unit acclimated automatize undertakings that needn't bother with expertise based abilities.

With customer administration happening through electronic informing applications in like manner as calls, there region unit developing quantities of utilization cases any place chatbot preparing offers associations a straightforward return on venture. focus staff could likewise be altogether in peril from AI-driven chatbots

CHAPTER 1

1 INTRODUCTION

Chatbots region unit utilized as electronic correspondence administration provider that gives texting system. It will probably deliver informal support of the individuals who act with bots usually known as client in partner degree prudent way.

The fastest way and insignificant befuddling net application and portable application that is clear for establishment with none might want of establishment bundles.

These bundles region unit clear to oversee and circulate. Chatbots differ from elective visiting application as they are doing not contain any on-line standing and additionally last seen and choice with elective client. Fig.1explains concerning the sorts of chatbot out there to be utilized in net applications.

Open area chatbot is utilized to recover the all broad data like comprehension, conjecture and so on For ex ALEXA hatchling, CORTANA hatchling kind windows SIRI hatchling kind apple or google colleague.

The most commitment of our work is that the improvement of chatbot abuse numerical rationale, common cycle equation like example parsing ,sentiment investigation and so on, some of the advances like AI and its recipe region unit utilized in chatbot for parsing the sentence.

The calculations of AI like hypothesis organization ,neural organization ,repetitive neural organization territory unit utilized in this chatbot. With the help of sack of words (BOW),the location of digital tormenting will be done essentially.

The benefit behind this chatbot is easy to understand and may get associated information reliable with the client queries still as avoiding of menace words.

1.1 EXISTING SYSTEM:

Recorder spigot and Device is utilized for the Voice Module and Speaker to remember the failed to remember things. it's not Automatic one and in this manner the Work should be done physically.

1.2 DISADVANTAGES:

- * Time Consumption high

- * Manual Work

1.3 PROPOSED SYSTEM: This arranged framework is to actuate dynamic answers misuse mp3 modules with a visit bot. Its uses visit bot with partner degree speaker partner degree partner degree mouth activity with Arduino microcontroller that associated with a servo module that keeps perception the associated activities.

The associated water engine will be turned on or off abuse partner degree visit application hatching that they need to create on an individual premise .The last yield is that after by initiate or off the heap misuse chatbot application once chatbot can pass on the different solutions for our questions misuse mouth activity and speaker the mouth activity associated with microcontroller abuse servo engine and speaker associated through mp3 American state card based for the most part modulator .

Everyone can conjointly screen the standing abuse fluid precious stone showcase.

1.4 ADVANTAGES:

- * Accuracy
- * Optimized Voice Recognition
- * Less postponement
- * Low expense

1.5 APPLICATIONS:

- * Medical
- * unsuitable Chatbot
- * Industrial information

CHAPTER 2

LITERATURE REVIEW

Hyeopwoo Lee et.al.,[2019] proposed voice action identification assumes a vital part for A practical voice interface among human and cell phones, since it will be utilized as a trigger to initiate A programmed discourse acknowledgment module of a cell phone. In the event that the info discourse sign will be perceived as a predefined wizardry word getting back from an authentic client, it will be utilized as a trigger. during this paper, we will in general propose a voice trigger framework utilizing a catchphrase subordinate speaker acknowledgment procedure. The voice trigger ought to be prepared to perform watchword acknowledgment, in like manner as speaker acknowledgment, while not exploitation processly demanding discourse recognizers to appropriately trigger a cell phone with low computational force utilization. we will in general propose a model fundamentally {based} system and a secret Andrei Markov model (HMM) based technique for the voice trigger to unwind this issue. The trials utilizing a Korean word corpus show that the model basically based system performed four.1 occasions speedier than the HMM principally based approach. Notwithstanding, the HMM basically based strategy diminished the ubiquity blunder by twenty seven.8% similarly contrasted with the model fundamentally based technique. The arranged methodologies are corresponding and might be utilized by choice retribution on the gadget of interest.

Nasrin Aktar et.al., [2019] proposed advancement of a voice acknowledgment basically based canny seat framework for genuinely debilitated people that ar incapable to drive the seat by hand is portrayed during this paper any place the patient will work the seat exploitation voice orders and furthermore the area of patient will be determined exploitation GPS module inside the seat that tracks and sends the information to cell phone (application) by means of headquarters. Voice module V3 is utilized to record patient's voice and recognize that voice to follow the headings of the patient. This unit changes over the voice orders to positional documentation numbers so the data is taken care of to the Wi-Fi module to manage the seat. Wi-Fi module guides the engine driver IC to move the wheels wanted way. Engine speed likewise can be controlled in 3 phases low, medium, high. this strategy also offers impediment identification consequently exploitation IR detecting component and a cell phone application has been created for the individuals from the group of patient to comprehend concerning the situation of the patient. Utilization of headquarters makes the framework fast and robot application offers low cost and easy to use air than the customary GSM fundamentally based route frameworks. As this technique simultaneously offers voice worked seat, engine speed the board, snag discovery and GPS following of patient exploitation android application, ideally it'll be a productive framework for the crippled people around the world.

Snezhana pleshkova et.al.,[2019] proposed voice orders acknowledgment errands utilized limited arrangements of words as analyzed of widespread discourse acknowledgment frameworks committed to figure with the full arrangement of expressions of 1 or extra that one characteristic dialects. nowadays these general discourse acknowledgment frameworks are commonly upheld

cloud advancements ,computerized reasoning and conceivably on neural organizations with profound learning. the most hindrance of exploitation these all inclusive discourse acknowledgment frameworks in errands like voice orders acknowledgment is that the need of extra inquiry the limited arrangement of words (a couple of expressions of voice orders) inside the information bases ,containing frightfully enormous arrangement of expressions of a chose phonetic correspondence. Hence, the recommendation in light of the fact that the objective of this content is to blend the advantages of general discourse acknowledgment frameworks exploitation cloud innovations, AI and neural organizations with profound learning in voice orders acknowledgment errands, anyway making and exploitation the diminished information as an adequate arrangement of the enormous discourse acknowledgment data existing as cloud data sets..

Kenshi Ota et.al.,[2017] proposed Home Automation business is developing quickly; this is frequently fuelled by the prerequisite to supply supporting frameworks for the matured and furthermore the crippled, especially individuals who live alone. not to mention this, the globe populace is affirmed to get more seasoned. Home mechanization frameworks ought to befits the menage norms and accommodation of use. This paper subtleties the overall style of a remote home computerization framework (WHAS) that has been planned and upheld. The robotization focuses on acknowledgment of voice orders and uses low-power RF ZigBee remote correspondence modules that ar similarly minimal effort. the house computerization framework is intended to control all lights and electrical apparatuses in an extremely home or working environment exploitation voice orders. The framework has been tried and confirmed. The confirmation checks encased voice acknowledgment reaction test, indoor ZigBee correspondence check, and furthermore the pressure and decompression trial of DPCM (Differential Pulse Code Modulation) discourse signals. The tests concerned a combination of 35 male and female subjects with entirely unexpected English pronunciations. 35 very surprising voice orders were sent by everybody. so the check concerned causation a total of 1225 orders and seventy nine.8% of those.

Ms. anushka kanawade et.al., [2019] proposed Stories square measure one among the numerous things that everyone tunes in to all through youth. Not exclusively do they give exercises concerning morals and ethics anyway conjointly work with up perception, style and learning among the children. Along these lines stories assume a significant part in reinforcing the preparation of a child at an outrageously early age. The Story Telling application created is one such strategy that empowers to make and describe stories with the help of motion and voice acknowledgment strategies. Will this can this could work a device for the scholastics to shape the preparation ability a ton of wonderful and conjointly the children can make their own accounts that progressively will work with them enlarge their creative mind. This paper talks about anyway the voice and signal modules are wont to help the strategy for narrating. Motion acknowledgment is utilized to notice the hand signals that square measure will not to move the characters while the story is being described exploitation the mass discovery. while voice acknowledgment is utilized for dynamic the foundation progressively all through story's portrayal per the words utilized in the

story by coordinating with the data that stores a planning of the words and comparing pictures. Hence this paper offers a rundown of the blending of motion and voice acknowledgment went to carry out the narrating application.

Falguni Patel et.al.,[2019] proposed chatbots square measure specialists that react with the client in tongue even as a character's would answer. In particular, social chatbots square measure those that set up an amazing enthusiastic relationship with the client. the most idea behind this chatbot was to deliver mental alleviation to understudies World Health Organization suffer totally various degrees of stress related which may be the beginning of an antagonistic sorrow. during this paper, we tend to projected partner insightful social helpful chatbot that conveys the content into feeling marks especially, Happy, Joy, Shame, Anger, Disgust, Sadness, Guilt, and Fear. Further, upheld the inclination name, it set up the clients' mental state like focused or discouraged exploitation clients' talk data. For feeling identification, we tend to conveyed 3 standard profound learning classifiers especially, Convolutional Neural Network (CNN), lasting Neural Network (CNN), and defined Attention Network (HAN). especially, the extended philosophy of the chatbot is area explicit any place through the clients' cooperation, the chatbot can attempt to stop the bearish activities and assemble a ton of valuable considerations.

V Akshatha Prasad et.al., [2020] proposed man-made brainpower principally based open curios square measure known as chatbots. the point of a chatterbot or chatbot is to deliver partner association between a character's and a machine inside the assortment of discourse or text. they offer the least difficult types of assistance in an incredibly style of zones, similar to instruction, medical services, transportation, and so on According to the investigation, almost eighty fifth of item contributions will be machine-driven by 2020. The extended framework could be a voice-based chatbot that assists with upgrading the security and computerization of a work. The framework utilizes Automatic Speaker Recognition (ASR) rule in order to recognize an individual and license him/her inside the work. this grants exclusively affirmed individual to get to the work offices. an identical standard is utilized for creating the rundown of available segments inside the working environment upheld the individual's catchphrase input hence computerizing the lab components dispatch.

Crystal Jing Nilotic et.al.,[2019] proposed headway in innovation and development in showing like chatbot and broadened reality might be scary for scholastics anyway as a mentor, we'd prefer to use on these progressions to answer to the progressions and difficulties inside the instructing and learning scene. There square measure assortment of instruments offered for scholastics to use to beat the difficulties, and one among them is that the use of figuring (AI) anyway making a chatbot needs progressed programming abilities, and it's occasionally planned without any preparation to suit the alleged scholarly reason. This notice makes it inconvenient for scholastics to adjust existing frameworks or to point in making a similar rendition. during this workshop, we will be sharing our encounters acquired from creating changed chatbots for educating utilizing a mechanical stage which will kick off your chatbot.

Sayed Ehsanullah Ahmady et.al.,[2020] proposed at the point when a debacle occurs, early clearing of occupants is one among the compelling ways that for the decrease of human damage. At that point, the fast grouping and conveyance of right fiasco related data square measure fundamental. during this investigation, we tend to build up a chatbot application as partner add-on to the message stage interface. This chatbot gives crisis information to unfamiliar people in Japan at the hour of debacles. the information given by the projected application is, for example, the close to clearing focuses like the departure habitats and train stations, and furthermore the time-frame calamity data upheld the client's present area. people likewise can share fiasco related photographs by means of the projected application. Such photographs may could conjointly be additionally useful not only for catastrophe influenced people anyway likewise for administrative organizations to accomplish a more vigorous comprehension of current conditions and in this manner work with them fabricate refined determinations.

Naz Albayrak et.al.,[2018] proposed chatbot might be outline as programming bundle which will talk with people exploitation registering. These product bundle square measure will not to perform errands like rapidly reacting to clients, illuminating them, serving to purchase stock and offering higher assistance to clients. during this paper, we tend to blessing the last principle and furthermore the fundamental thoughts of registering principally based chatbots and associated thoughts likewise as their applications in differed areas like media transmission, banking, wellbeing, customer choice focuses and online business. for sure, the consequences of partner model chatbot

for gift administration created for media transmission specialist organization are introduced utilizing the proposed design.

Saurabh Srivastava et.al.,[2020] proposed there is an evident perception inside the local area to incorporate chatbots with their sites and versatile applications. they supply an adapted interface to information and may work advanced aides that may perform errands for a private. There territory unit a few mechanical stages which offer interfaces to make these chatbots. they're used by each talented programming framework designers also as people from non-IT foundations. upheld our encounters with 3 popular chatbot-building stages - Google Dialog flow, IBM Watson Assistant and Amazon Lex, we will in general blessing a stock of captivating choices that these stages should show to take into account their blended client base. we will in general conjointly rate the arrangement and straightforward utilization of those choices on this variants of those stages.

Prakhar Srivastava et.al.,[2020] proposed automatized clinical chatbots region unit conversationally designed considering innovation with having the capacity to downsize endeavors to medical services costs and improve admittance to clinical benefits and data. we tend to designed an identification bot that draws in patients inside the oral correspondence for their clinical inquiry related issues to gives an individualized finding upheld their analyzed indication and profile. Our chatbot framework is able to spot manifestations from client contributions with a normal exactness of sixty fifth. exploitation these removed analyzed side effects right manifestations were known with a review of sixty fifth and an accuracy of 71. At last, the chatbot came the normal ID for more a great deal of tasks. This discovers that a clinical chatbot will offer a fairly right ID to patients with direct indication examination and a casual methodology, this implies that a decent language clinical hatchling may be reasonable. In addition, the overall viability of this hatchling shows that a great deal of yield machine-controlled clinical item may thrive to serve a much greater part in medical care.

Reval Levannoza et.al.,[2020] proposed with the genuine use of profound learning, chic chatbot frameworks need huge instructing dataset to understand their pinnacle execution. while not special case, the occasion of chatbot for the building secretary errands conjointly requests a tremendous instructing dataset. tragically, challenging exertion and weighty time region unit needed to

physically gather a dataset immediately size. Thusly, partner framework is needed to help the dataset grouping. as to determine the matter, this examination contributes in building up the data framework that allows an enormous information variety for training a structure secretary chatbot in an incredibly reasonable time. In detail, the commitment of this investigation territory unit twofold: (1) building up a realiable publicly supporting framework style to assemble and store the dataset for training structure secretary chatbot; and (2) building up a client experience that may animate the group laborers to create a great deal of information.

Neelkumar P. Patel et.al.,[2020] proposed more often than not, Students must be constrained to visit colleges or schools to assemble differed information like Tution charges, Term Schedule, and so on all through their confirmation technique or according to their every day wants. This strategy is unfathomably drawn-out and time overpowering, conjointly it needs labor force in giving required information to visitors. Consequently, to beat the issues a chatbot might be created. The venture is in regards to collaboration among clients and chatbot which may be gotten to from wherever whenever. The chatbot might be just snared with any college or school site with not many direct language changes. Chatbot furnishes changed information related with college or school and conjointly understudies related information. The chatbot might be used by any individual WHO will get to the college's site. The task utilizes the possibility of AI and Machine Learning. PHP Language is utilized for the occasion of Chatbot. Client will raise college related inquiries, at that point the inquiry is applied as partner contribution to recipe, that measures the message and shows the comparing reaction to the client. The Project interface is similar to an electronic informing Application.

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M Tafaquh Fiddin Al Islami et.al.,[2020] proposed organizations and small medium organizations (UMKM) had the opportunity to act with customers to broaden their client consistency standard. one among the manners in which that is to utilize chatbot. aside from being cost-productive, this procedure is furthermore appallingly powerful and very straightforward for firms to utilize. to make a basic and powerful chatbot needs a combination of 2 logical fields, AI and programming framework designing. This investigation has the ensuing choices. 1) emotive slant examination, this element is dazzled by Russel's Circumplex Model. Modifier words will be planned in an incredibly grid with values upheld the Russell Circumplex Model. This model can focus on the modifier words, extremity, and friendship level of a sentence. 2) Conjunction conclusion examination, consider of free strategy for association these days, a slant investigation framework must be constrained to confirm the estimation cost in development sentences. This development sentence has one or a great deal of conjunctions. This combination assumption framework can break sentences upheld combination. The fragmental sentence will be handled by emotive assumption investigation. The framework at that point thinks about the personality of the combination to see the assumption of the total sentence. 3) Graph Chatbot, this component is utilized to frame it basic for companies to change and create their bots. This hatchling can move with clients like people, upheld a diagram talk map that has been made. Chatbot charts were created abuse javascript library Vue is to frame it simpler to control the visual diagram. The framework produces fulfilling precision. Chart chatbot will deal with procedural discussions fine. The progression of voice correspondence as per the diagram that has been laid out. Chart chatbot has 100% exactness and with progress reacts to all or any client discussions.

CHAPTER-3

EXISTING SYSTEM

- *A few chat bots with useful applications in this system are presented.
- *Let's begin by discussing the ELIZA Chabot system architecture and the working.
- *And also the other working systems like ALICE and Siri.
- *It was one of the first chat bots, designed in 1966.
- *It acts like a therapist by rephrasing statements of the user and posing them back as questions.
- *ELIZA works by simple parsing and substitution of key words into reframed phrases.
- *People get emotionally caught up by ELIZA's confident replies forgetting that it's a machine.
- *ALICE (Artificial Linguistic Internet Computer Entity) is inspired by ELIZA. Siri was developed by Apple. Siri is a computer program that works as a virtual personal assistant and knowledge navigator.

3.1 HARDWARE REQUIREMENTS

- Arduino Microcontroller.
- Voice modulator.
- Servo motor.
- LCD
- Bluetooth module.
- Light.
- RELAY.

3.1.1 SOFTWARE REQUIREMENTS:

- Embedded C
- Arduino IDE

3.2 HARDWARE REQUIREMENTS

3.2.1 POWER SUPPLY UNIT:

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

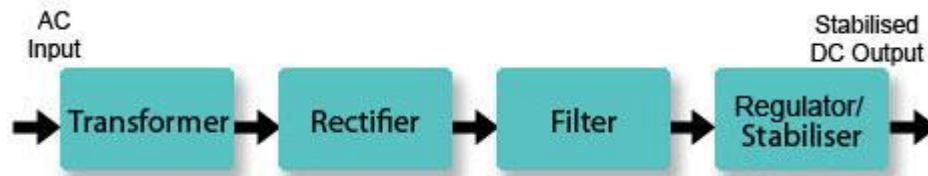


Fig 3.2 Power Supply unit

3.2.2 STEP DOWN TRANSFORMER

Essential force supply the information power transformer has its essential twisting associated with the mains (line) supply. An optional winding, electro-attractively coupled however electrically detached from the essential is utilized to get an AC voltage of appropriate abundance, and after additional handling by the PSU, to drive the gadgets circuit it is to supply.

The transformer stage should have the option to supply the current required. In the event that too little a transformer is utilized, almost certainly, the force supply's capacity to keep up full yield voltage at full yield current will be hindered. With too little a transformer, the misfortunes will increment significantly as full burden is put on the transformer.

As the transformer is probably going to be the most expensive thing in the force supply unit, cautious thought should be given to offsetting cost with likely current necessity. There may likewise be a requirement for security gadgets, for example, warm wires to separate the transformer if overheating happens, and electrical disconnection among essential and auxiliary windings, for electrical wellbeing.



Fig 3.3 Step down Transformer

3.2.3 THE RECTIFIER STAGE

Rectifier circuit is utilized; to change over the AC input is changed over to DC. The full wave connect rectifier utilizes four diodes organized in a scaffold circuit to give full wave correction without the requirement for a middle tapped transformer.

An extra benefit is that, as two diodes are leading at any one time, the diodes need just a large portion of the converse breakdown voltage ability of diodes utilized for half and customary full wave correction. The scaffold rectifier can be worked from independent diodes or a joined extension rectifier can be utilized.

It tends to be seen that on every half cycle, inverse sets of diodes direct, yet the current through the heap stays in similar extremity for both half cycles.

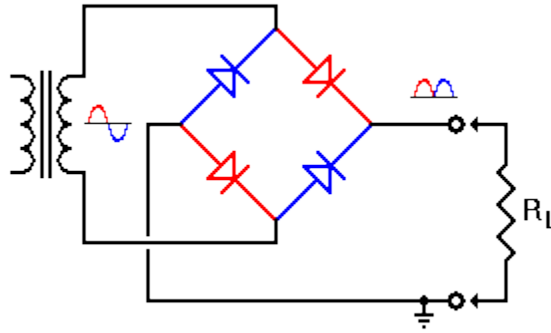


Fig 3.4 Bridge Rectifier

3.2.4 FILTER:

A commonplace force supply channel circuit can be best perceived by isolating the circuit into two sections, the repository capacitor and the low pass channel. Every one of these parts adds to eliminating the excess AC beats, however in an unexpected way.

Electrolytic capacitor utilized as a repository capacitor, alleged in light of the fact that it goes about as a transitory stockpiling for the force supply yield current. The rectifier diode supplies current to charge a repository capacitor on each pattern of the info wave. The supply capacitor is huge electrolytic, typically of a few hundred or even at least 1,000 microfarads, particularly in mains recurrence PSUs.

This enormous estimation of capacitance is required on the grounds that the supply capacitor, when charged, should give sufficient DC to keep a consistent PSU yield without an information current; for example during the holes between the positive half cycles when the rectifier isn't leading.

When the information wave passes V_{pk} the rectifier anode falls underneath the capacitor voltage, the rectifier becomes switch one-sided and conduction stops. The heap circuit is currently provided by the supply capacitor alone.

Obviously, despite the fact that the repository capacitor has enormous worth, it releases as it supplies the heap, and its voltage falls, however not by definitely. Eventually during the following pattern of the mains input, the rectifier input voltage transcends the voltage on the

mostly released capacitor and the repository is re-charged to the pinnacle esteem V_{pk} once more.

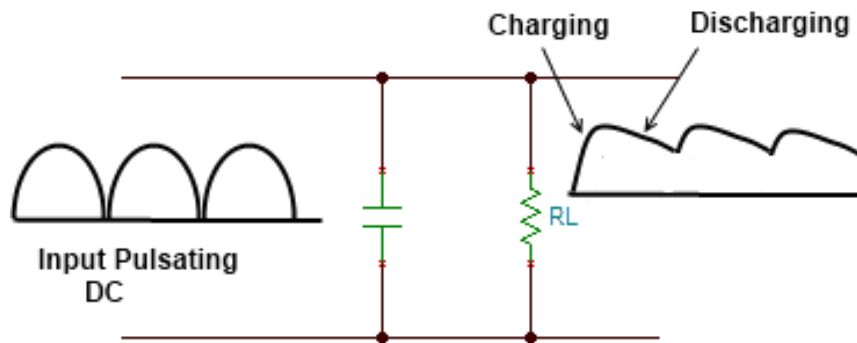


Fig 3.5 Filter Circuit

3.2.5 VOLTAGE REGULATOR

Voltage controller ICs are accessible with fixed or variable yield voltages. They are likewise appraised by the most extreme current they can pass. Negative voltage controllers are accessible, predominantly for use in double supplies. Most controllers incorporate some programmed security from exorbitant current and overheating.

The LM78XX arrangement of three terminal controllers is accessible with a few fixed yield voltages making them valuable in a wide scope of uses. One of these is neighbourhood on card guideline, killing the dispersion issues related with single point guideline.

The voltages accessible permit these controllers to be utilized in rationale frameworks, instrumentation, Hi-Fi, and other strong state electronic hardware. Albeit planned basically as fixed voltage controllers, these gadgets can be utilized with outside parts to get movable voltages and current.

1. Positive controller

1.1 Input pin

1.2 Ground pin

1.3 Output pin

2. It directs the positive voltage

3. Negative controller

4. Ground pin

5. Information pin

6. Yield pin

It directs the negative voltage. The controlled DC yield is smooth with no wave. It is reasonable

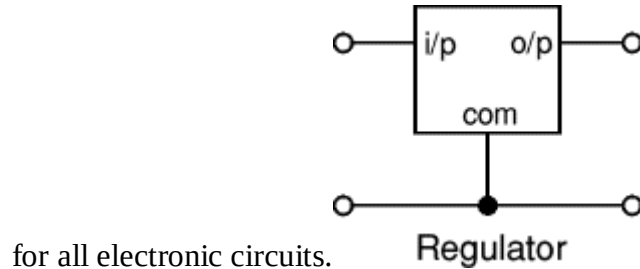


Fig 3.6 Regulator Circuit

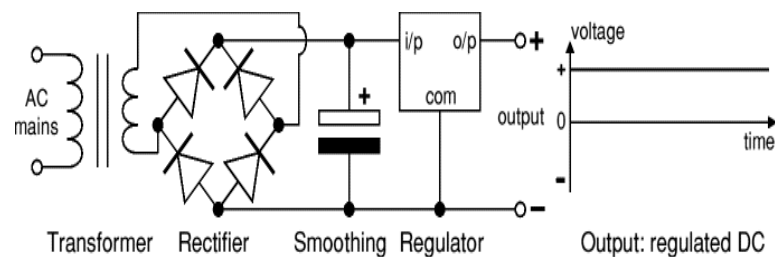


Fig 3.7 Power Supply Circuit

3.2.6 ARDUINO

An Arduino is actually a microcontroller based kit which can be either used directly by purchasing from the vendor or can be made at home using the components, owing to its open source hardware feature. It is basically used in communications and in controlling or operating many devices. It was founded by Massimo Banzi and David Cuartielles in 2005.

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward.

The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions.

3.2.7 ARDUINO ARCHITECTURE:

Arduino's processor basically uses the Harvard architecture where the program code and program data have separate memory. It consists of two memories- Program memory and the data memory. The code is stored in the flash program memory, whereas the data is stored in the data memory. The Atmega328 has 32 KB of flash memory for storing code (of which 0.5 KB is used for the bootloader), 2 KB of SRAM and 1 KB of EEPROM and operates with a clock speed of 16MHz.

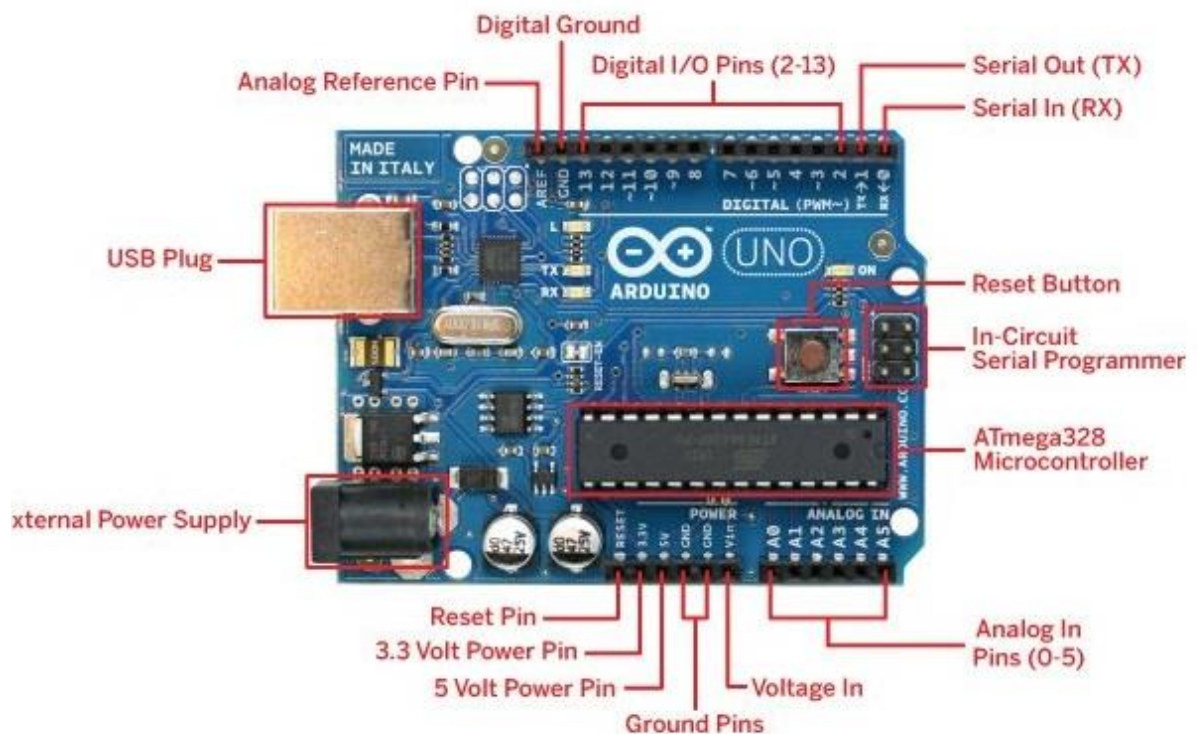


Fig 3.8 Arduino Board

The most important advantage with Arduino is the programs can be directly loaded to the device without requiring any hardware programmer to burn the program. This is done because of the

presence of the 0.5KB of Bootloader which allows the program to be burned into the circuit. All we have to do is to download the Arduino software and writing the code.

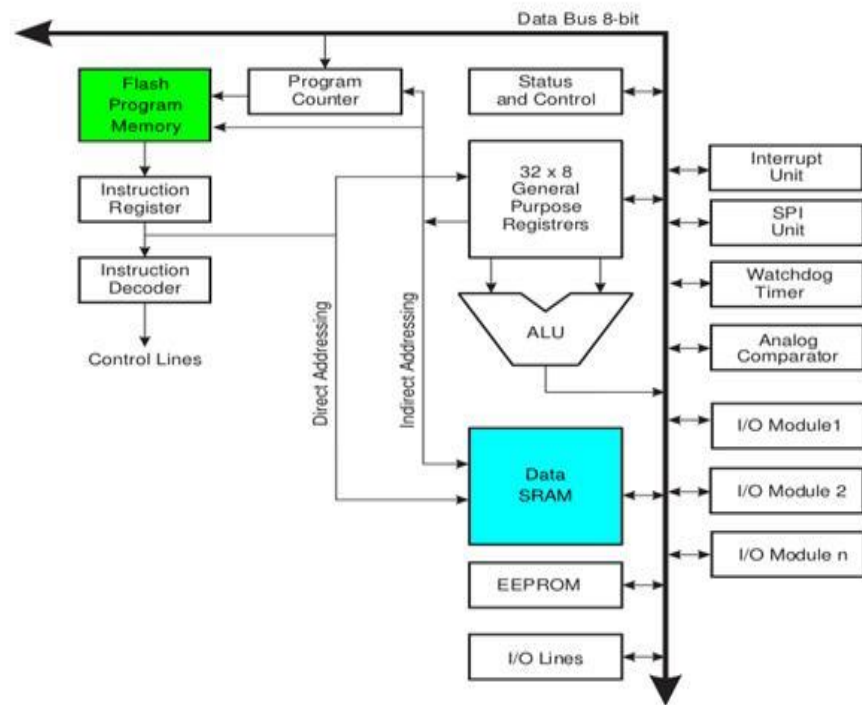


Fig 3.9 Arduino architecture

3.2.8 ARDUINO PIN DIAGRAM

Arduino Uno consists of 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

Arduino Uno R3 Pinout

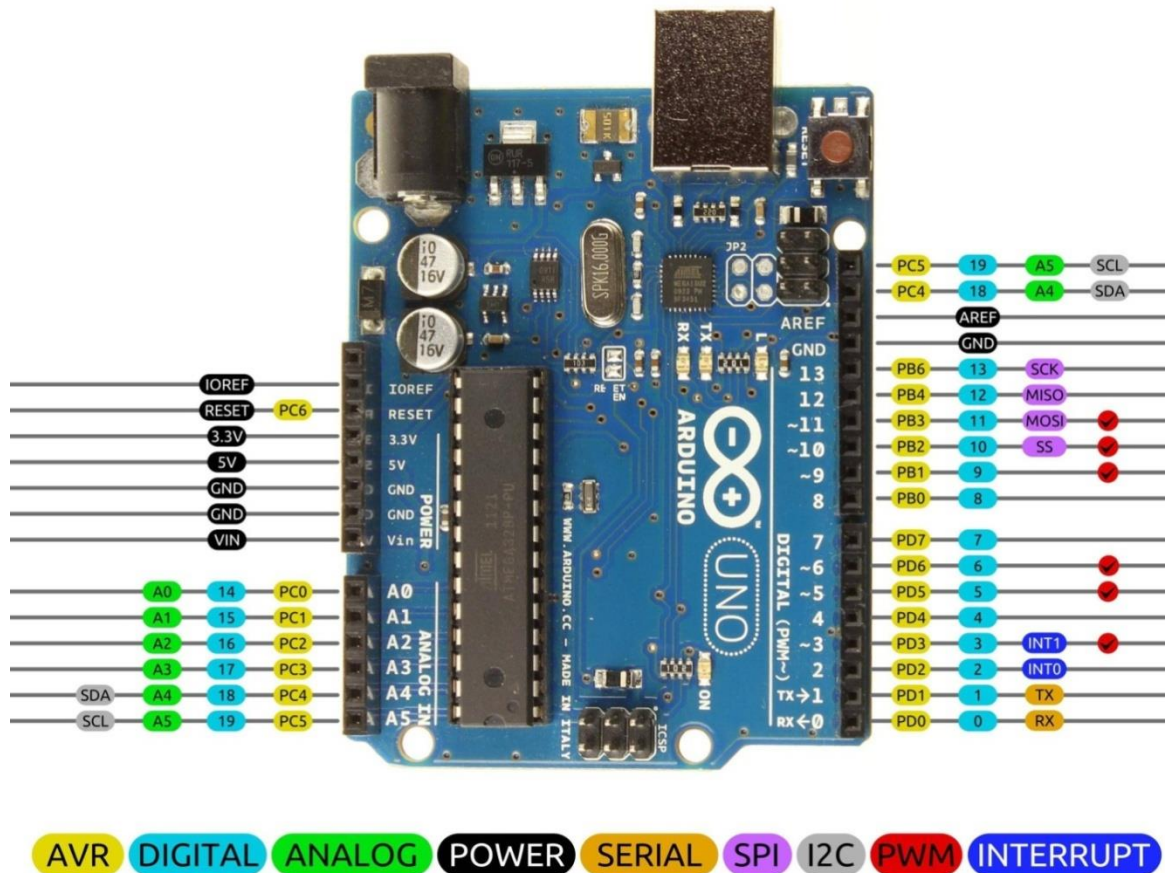


Fig 3.10 Arduino pin diagram

3.2.9 POWER JACK

Arduino can be power either from the pc through a USB or through outer source like connector or a battery. It can work on an outside supply of 7 to 12V. Force can be applied remotely through the pin Vin or by giving voltage reference through the IOREf pin.

The Arduino Uno can be fueled by means of the USB association or with an outside power supply. The force source is chosen automatically. External (non-USB) force can come either from an AC-to-DC connector (divider mole) or battery. The connector can be associated by stopping.

3.3 DIGITAL INPUTS

It comprises of 14 computerized inputs/output sticks, every one of which give or take up 40mA current. Some of them have exceptional capacities like pins 0 and 1, which go about as Rx and Tx individually, for sequential correspondence, pins 2 and 3-which are output interferes with, pins 3,5,6,9,11 which gives pwm output and pin 13 where LED is associated. It has 6 simple information/output sticks, each giving a goal of 10 pieces. It gives reference to the simple inputs. It resets the microcontroller when low.

3.3.1 STEPS TO PROGRAM:

Programs written in Arduino are known as sketches. A basic sketch consists of 3 parts

1. Declaration of Variables

2. Initialization: It is written in the setup () function.

3. Control code: It is written in the loop () function.

- The sketch is saved with .ino extension. Any operations like verifying, opening a sketch, saving a sketch can be done using the buttons on the toolbar or using the tool menu.
- The sketch should be stored in the sketchbook directory.
- Chose the proper board from the tools menu and the serial port numbers.
- Click on the upload button or chose upload from the tools menu. Thus the code is uploaded by the bootloader onto the microcontroller.
- It comes with an easy provision of connecting with the CPU of the computer using serial communication over USB as it contains built in power and reset circuitry.

3.4 LCD:

3.4.1 INTRODUCTION

Liquid crystal cell displays (LCDs) used to display of display of numeric and alphanumeric characters in dot matrix and segmental displays. They are all around us in laptop computers, digital clocks and watches, microwave, CD players and many other electronic devices.

LCDs are common because they offer some real advantages over other display technologies. LCDs consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it.

Fig 3.11 Lcd display



A LCD is made with either an alooof network or a functioning lattice show matrix. A functioning grid has a semiconductor situated at every pixel crossing point, requiring less current to control the luminance of a pixel.

Therefore, the current in a functioning network show can be turned here and there more oftentimes, improving the screen revive time. Passive framework LCD's have double filtering, implying that they check the lattice twice with current in the equivalent

3.4.2 WORKING

At the point when adequate voltage is applied to the anodes the fluid precious stone atoms would be adjusted a particular way. The light beams going through the LCD would be pivoted by the polarizer, which would bring about initiating/featuring the ideal characters.

The force supply ought to be of +5v, with most extreme admissible drifters of 10mv. To accomplish a superior/reasonable difference for the showcase the voltage at pin 3 ought to be changed appropriately.

The ground terminal of the force supply should be separated appropriately so voltage is actuated in it. The module ought to be separated appropriately so that stray voltages are not initiated, which could cause a flicking show.

LCD is lightweight with a couple, millimeters thickness since the LCD devours less force, they are viable with low force electronic circuits, and can be fueled for long terms. LCD doesn't create light thus light is expected to peruse the showcase. By utilizing backdrop illumination, perusing is conceivable in obscurity.

LCDs have long life and a wide working temperature range. Before LCD is utilized for showing appropriate introduction ought to be finished. LCDs with few sections, for example, those utilized in computerized watches and pocket adding machines, have individual electrical contacts for each portion. An outside committed circuit supplies an electric charge to control each fragment.

This showcase structure is cumbersome for in excess of a couple of show components. Little monochrome shows like those found in close to home coordinators, or more seasoned PC screens. The pixels are tended to each in turn by line and section addresses.

This sort of show is called uninvolved network tended to on the grounds that the pixel should hold its state between invigorates without the advantage of a consistent electrical charge. As the quantity of pixels builds, this sort of show turns out to be less doable.

Extremely lethargic reaction times and helpless difference are run of the mill of inactive lattice tended to LCDs. High-goal shading presentations, for example, current LCD PC screens and TVs utilize a functioning network structure. A grid of slim film semiconductors (TFTs) is added to the polarizing and shading channels.

Every pixel has its own devoted semiconductor, permitting every section line to get to one pixel. At the point when a line is initiated, the entirety of the section lines are associated with a line of pixels and the right voltage is driven onto the entirety of the segment lines.

The line is then deactivated and the following column line is enacted. The entirety of the line lines are initiated in grouping during an invigorate activity. Dynamic grid tended to shows look "more brilliant" and "more honed" than uninvolved framework tended to showcases of a similar size, and for the most part have speedier reaction times, delivering much better pictures.

A broadly useful alphanumeric LCD, with two lines of 16 characters. So the kind of LCD utilized in this venture is 16 characters * 2 lines with 5*7 dabs with cursor, inherent regulator, +5v power supply, 1/16 obligation cycle.

3.4.3 PIN DESCRIPTION FOR LCD

PIN NO	SYMBOL	FUNCTION
1	Vss	Ground terminal of Module
2	Vdd	Supply terminal of Module, +5v
3	Vo	Power supply for liquid crystal drive
4	RS	Register select RS=0...Instruction register RS=1...Data register
5	R/W	Read/Write R/W=1...Read R/W=0...Write
6	EN	Enable
7-14	DB0-DB7	Bi-directional Data Bus.

		Data Transfer is performed once ,thru DB0-DB7,incase of interface data length is 8-bits;and twice, thru DB4-DB7 in the case of interface data length is 4-bits.Upper four bits first then lower four bits.
15	LAMP-(L-)	LED or EL lamp power supply terminals
16	LAMP+(L+) (E2)	Enable

TABLE-1

3.4.4 LCD INTERFACING WITH MICROCONTROLLER

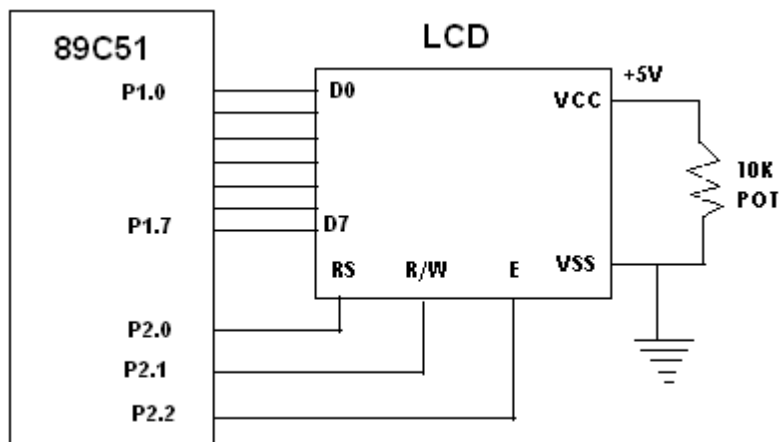


FIG 3.12

3.4.5 ADVANTAGES

- Consume much lesser energy when compared to LEDs.
- Utilizes the light available outside and no generation of light.

- Since very thin layer of liquid crystal is used, more suitable to act as display elements.
- Since reflectivity is highly sensitive to temperature, used as temperature measuring sensor.

3.4.6 DISADVANTAGES

- Angle of viewing is very limited.
- External light is a must for display.
- Since not generating its own light and makes use of external light for display, contrast is poor.
- Cannot be used under wide range of temperature.

3.4.7 APPLICATIONS

- Watches
- Fax & Copy machines & Calculators.

3.5 BLUETOOTH

Bluetooth is a media communications industry determination that depicts how cell phones, PCs, and individual advanced colleagues (PDAs) can be effortlessly interconnected utilizing a short-range remote association.

Utilizing this innovation, clients of telephones, pagers, and individual advanced collaborators can purchase a three-in-one telephone that can serve as a versatile telephone at home or in the workplace, get immediately synchronized with data in a work area or note pad PC, start the sending or getting of a fax, start a print-out, and, when all is said in done, have all portable and fixed PC gadgets be completely organized.

Bluetooth necessitates that a minimal effort handset chip be remembered for every gadget. The handset communicates and gets in a formerly unused recurrence band of 2.45 GHz that is accessible worldwide (with some variety of data transmission in various nations).

Notwithstanding information, up to three voice channels are accessible. Every gadget has a one of a kind 48-piece address from the IEEE 802 norm. Associations can be highlight point or multipoint..

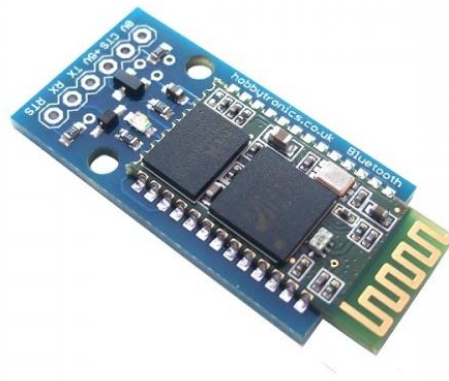


Fig 3.13 Bluetooth

The maximum range is 10 meters. Data can be exchanged at a rate of 1 megabit per second (up to 2 Mbps in the second generation of the technology). A frequency hop scheme allows devices to communicate even in areas with a great deal of electromagnetic interference. Built-in encryption and verification is provided.

3.5.1 WORKING PRINCIPLES OF BLUETOOTH

The Bluetooth standard, similar to WiFi, utilizes the FHSS strategy (Frequency-Hopping Spread Spectrum), which includes parting the recurrence band of 2.402-2.480 GHz into 79 channels (called bounces) each 1MHz wide, at that point communicating the sign utilizing a grouping of channels known to both the sending and accepting stations.

Hence, by exchanging channels as frequently as 1600 times each second, the Bluetooth standard can keep away from obstruction with other radio signs. Bluetooth works by the basic guideline of sending and getting information as radio waves. Each Bluetooth empowered gadget has a card-like connection known as the Bluetooth connector. It is this Bluetooth connector that sends and gets information.

A Bluetooth connector has a specific scope of association. One electronic connector can see another Bluetooth gadget just if the subsequent gadget is available inside the scope of the main gadget. At the point when they are inside the reach, they can strike up an association between themselves. Striking up of association between two Bluetooth gadgets are known as paring of gadgets.



Fig 3.14 Working

A piconet is a network of devices connected using Bluetooth technology. The network ranges from two to eight connected devices. When a network is established, one device takes the role of the master while all the other devices act as slaves. Piconets are established dynamically and automatically as Bluetooth devices enter and leave radio proximity

3.5.2 COMMUNICATION PRINCIPLE

The Bluetooth standard depends on an expert/slave operational mode. The expression "piconet" is utilized to allude to the organization shaped by one gadget and all gadgets found inside its reach. Up to 10 piconets can exist together inside a solitary inclusion region.

An expert can be all the while associated with upwards of 7 dynamic slave gadgets. Devices in a piconet have an intelligent location of 3 pieces, for a limit of 8 gadgets. Gadgets in stopped mode are synchronized, however don't have their own actual location in the piconet.

As a general rule, at a given second, the expert gadget must be associated with a solitary slave without a moment's delay. Consequently, it rapidly switches between slaves to cause it to appear as though it is at the same time associated with all the slave gadgets.

Bluetooth empowers two piconets to be connected to each other to frame a more extensive organization, called a "disperse net", utilizing certain gadgets which go about as a scaffold between the two piconets.

3.5.3 BLUETOOTH SECURITY

- Switch on the Bluetooth when you need to send or receive data. Do not keep it turned on always. This can prevent chances of hacking.
- When a Bluetooth device tries to send data to your device, usually a message will show up, asking you to confirm the reception. Do it only if you know who is sending the data.
- Install a good antivirus program in your mobile device.
- Install a good program in your system as well. Harmful software can enter your device from system as well when you transfer data.
- Do not use Wireless technology like Bluetooth to send confidential data.

These are some of the specific ways through which you can keep your Bluetooth device safe and keep your data secure.

3.5.4 ESTABLISHING CONNECTIONS

Establishing a connection between two Bluetooth devices follows a relatively complicated procedure meant to ensure a certain amount of security, as follows:

- Passive mode
- Inquiry: Finding access points
- Paging: Synchronizing with access points
- Access point service discovery
- Creating a channel with access point
- Pairing using PIN (security)
- Using the network

3.5.5 THE KEY FEATURES OF BLUETOOTH TECHNOLOGY:

- Less complication
- Less power consumption
- Available at cheaper rates
- Robustness

3.5.6 APPLICATION

- 1. Wireless networking between **laptops** and desktop computers, or desktops that are in a confined space and little bandwidth is needed.
- 2. Peripherals such as mice, keyboards, and printers.
- 3. Cell phones with Bluetooth technology have been **sold** in large numbers, as they are able to connect to computers, PDAs (Personal Data Assistant), and various other devices. The standard also includes the support for more powerful and longer range devices.
- 4. The transfer of files, images and MP3, between mobile phones.
- 5. Certain MP3 players and digital cameras to transfer files to and from computers.
- 6. Bluetooth technology headsets for smart phones and cell phones.
- 7. Data logging equipment **that** transmits data to a computer via Bluetooth technology.
- 8. Sony Play station 3 and Nintendo Revolution will both use Bluetooth technology for their wireless controllers.

3.6 VOICE MODULE

APR9600 is a minimal effort elite sound record/replay IC joining streak simple stockpiling procedure. Recorded sound is held even after power supply is taken out from the module. The replayed sound displays superior grade with a low commotion level.

Inspecting rate briefly recording period is 4.2 kHz that gives a sound record/replay transmission capacity of 20Hz to 2.1 kHz. Nonetheless, by changing a wavering resistor, an examining rate really high accomplished. This abbreviates the all out length of sound account to 32 seconds.

Complete sound account time can be shifted from 32 seconds to 60 seconds by changing the estimation of a solitary resistor. The IC can work in one of two modes: sequential mode and equal mode.

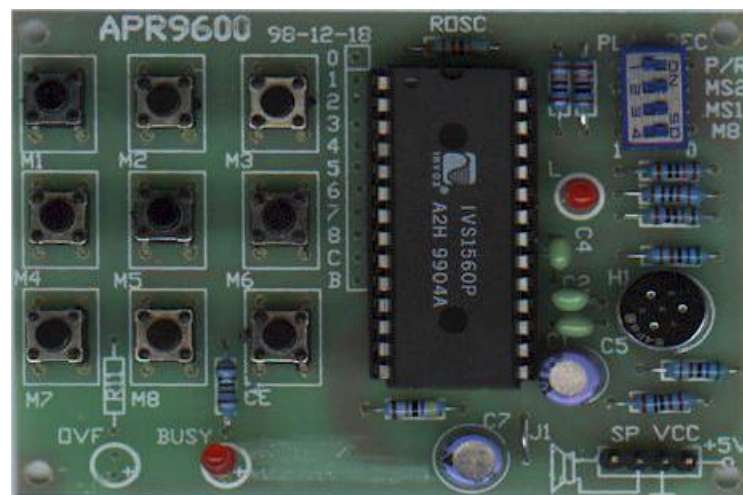
In sequential access mode, sound can be recorded in 256 segments. In equal access mode, sound can be recorded in 2, 4 or 8 areas. The IC can be controlled just utilizing press button keys. It is additionally conceivable to control the IC utilizing outer computerized hardware like miniature regulators and PCs.

The APR9600 has a 28 pin DIP bundle. Supply voltage is between 4.5V to 6.5V. During recording and replaying, current utilization is 25 mA. Out of gear mode, the current drops to 1A.

The APR9600 exploratory board is a collected PCB board comprising of an APR9600 IC, an electret mouthpiece, support segments and vital changes to permit clients to investigate all elements of the APR9600 chip.

The swaying resistor is picked so the all out recording period is 60 seconds with an inspecting pace of 4.2 kHz. The board estimates 80mm by 55mm.

**Fig 3.15 -APR9600
Experimentalboard**



During sound chronicle, sound is gotten by the amplifier. A mouthpiece pre-speaker enhances the voltage signal from the amplifier. An AGC circuit is remembered for the pre-intensifier, the degree of which is constrained by an outer capacitor and resistor.

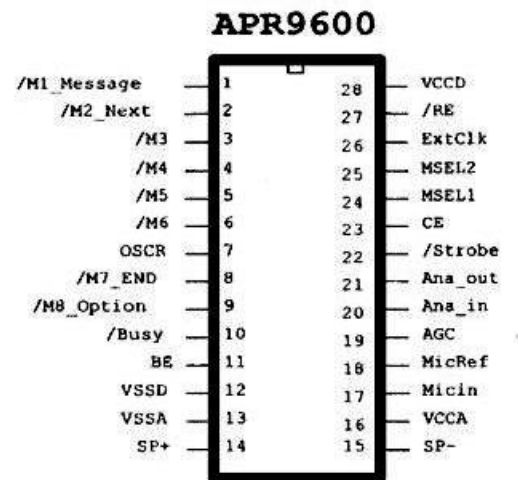
In the event that the voltage level of a sound sign is around 100 mV top to-top, the sign can be

taken care of straightforwardly into the IC through ANA IN (pin 20). The sound sign goes through a channel and an inspecting and hold circuit. The simple voltage is then composed into non-unpredictable blaze simple RAMs.

During sound replaying, the IC's control circuit peruses simple information from streak RAMs. The sign at that point goes through a low-pass channel, a force intensifier and yield to a 8 to 16 Ohm speaker.

3.6.1 PIN-OUT OF APR9600

It has a 28 pin DIP package. Supply voltage is between 4.5V to 6.5V. During recording and replaying, current consumption is 25 mA. In idle mode, the current drops to 1A.



3.6.2 PIN-FUNCTIONS OF THE APR9600

Fig 3.16 Pin diagram

Pin	Name	Functions	Pin	Mane	Functions
-----	------	-----------	-----	------	-----------

1	-M1	Select 1 st section of sound or serial mode recording and replaying control (low active)	15	SP-	Speaker, negative end
2	-M2	Select 2 nd section or fast forward	16	VCCA	Analogue circuit power supply
3	-M3	Select 3 rd section of sound	17	MICIN	Microphone input (electret type microphone)
4	-M4	Select 4 th section of sound	18	MICREF	Microphone reference input
5	-M5	Select 5 th section of sound	19	AGC	AGC control
6	-M6	Select 6 th section of sound	20	ANA-IN	Audio input (accept a signal of
7	OSCR	Resistor to set clock frequency.	21	ANA-OUT	Audio output from the microphone amplifier
8	-M7	Select 7 th section of sound or IC overflow indication	22	STROBE	During recording and replaying, it produces a strobe signal
9	-M8	Select 8 th section of sound or select mode	23	CE	Reset sound track counter to
10	-BUSY	Busy (low active)	24	MSEL1	Mode selection 1
11	BE	=1, beep when a key is pressed =0, do not beep	25	MSEL2	Mode selection 2
12	VSSD	Digital circuit ground	26	EXTCLK	External clock input
13	VSSA	Analogue circuit ground	27	-RE	=0 to record, =1 to replay
14	SP+	Speaker, positive end	28	VCCD	Digital circuit power supply

Table -2

3.6.3 MODES AND SELECTION OF MODES

MSEL1	MSEL2	-M8	Function Keys	Functions
-------	-------	-----	---------------	-----------

0	1	0 or 1	-M1, -M2 to select 1 st & 2 nd sound tracks. CE to stop	Parallel mode, 2 sections, 30 seconds for each
1	0	0 or 1	-M1 to -M4 to select a sound track, CE to stop	Parallel mode, 4 sections, 15 seconds for each
1	1	1	-M1 to -M8 to select a sound	Parallel mode, 8 sections, 7.5 seconds for each
1	1	1	-M1 to -M8 to select a sound	Pressing and hold down a key from -M1 to M8 to
0	0	1	-M1 and CE	Serial mode, allow up to 256 sound tracks to be recorded and played. Sound tracks are played from
0	0	0	-M1,-M2 and CE	Serial mode, Press -M1 to replay one sound track. Toggle -M2 once to move to the next sound track. Press CE to play sound from

TABLE -3

Notes:

RE=0 to record sound. RE=1 to replay sound

Press -M1 to -M8 once to replay a sound track. Press the key again to stop replaying the track Press and hold -M1 to -M8 continuously, the corresponding track will be replayed repeatedly during recording; -M1 to M8 should be pressed while the sound is being recorded. Releasing the key terminates recording.

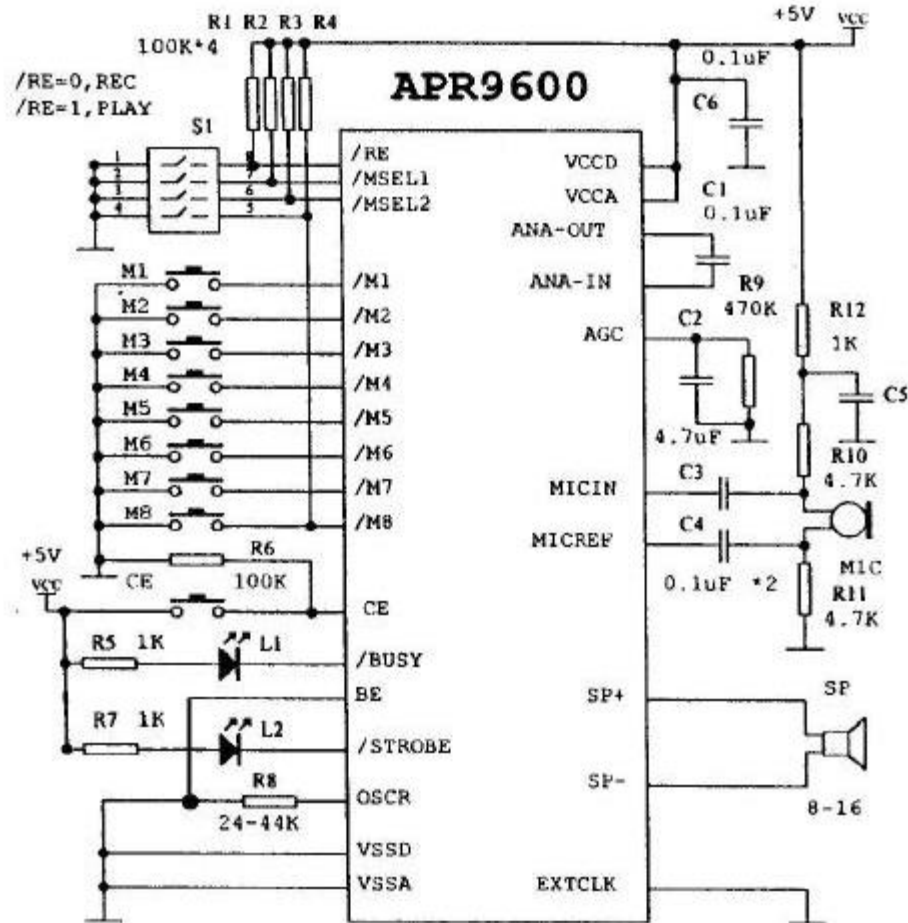


Fig 3.17 PIN DIAGRAM

3.7 RELAY

We realize that the vast majority of the top of the line mechanical application gadgets have transfers for their powerful working. Transfers are basic switches which are worked both electrically and precisely. Transfers comprise of a n electromagnet and furthermore a bunch of contacts.

The exchanging component is done with the assistance of the electromagnet. There are additionally other working standards for its working. Yet, they contrast as per their applications. The vast majority of the gadgets have the utilization of transfers.

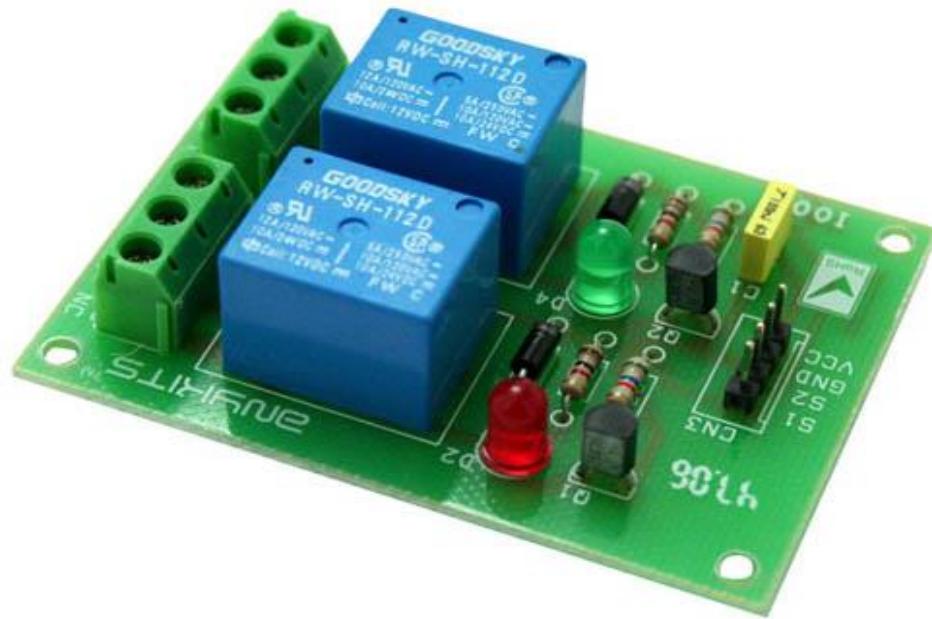


FIG 3.18 RELAY

The primary activity of a hand-off comes in where just a low-power sign can be utilized to control a circuit. It is likewise utilized in where just one sign can be utilized to control a great deal of circuits. The use of transfers began during the innovation of phones.

They assumed a significant part in exchanging brings in phone trades. They were likewise utilized in significant distance telecommunication. They were utilized to change the sign coming starting with one source then onto the next objective.

After the innovation of PCs they were likewise used to perform Boolean and other intelligent activities. The top of the line utilizations of transfers require high ability to be driven by electric engines, etc. Such transfers are called contactors.

3.7.1 RELAY BASICS

The nuts and bolts for every one of the transfers are something very similar. Investigate a 4 – pin hand-off appeared beneath. There are two tones appeared. The green tone addresses the control circuit and the red tone addresses the heap circuit. A little control loop is associated onto the control circuit. A switch is associated with the heap. This switch is constrained by the loop in the control

circuit. Presently let us make the various strides that **occur in a hand-off.**

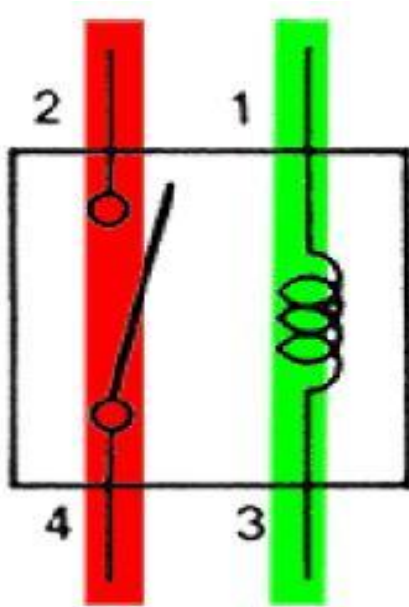


Fig 3.19 relay operation

3.7.2 ENERGIZED RELAY (ON)

As shown in the circuit, the current flowing through the coils represented by pins 1 and 3 causes a magnetic field to be aroused. This magnetic field causes the closing of the pins 2 and 4. Thus the switch plays an important role in the relay working. As it is a part of the load circuit, it is used to control an electrical circuit that is connected to it. Thus, when the relay is energized the current flow will be through the pins 2 and 4.

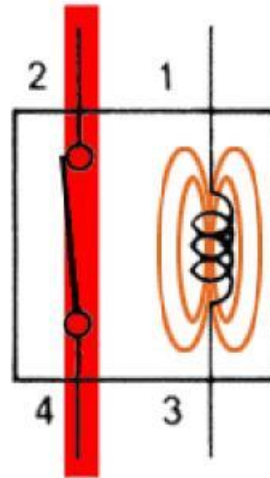


Fig 3.20 Energized Relay

(ON)

3.7.3 DE – ENERGIZED RELAY (OFF)

As soon as the current flow stops through pins 1 and 3, the switch opens and thus the open circuit prevents the current flow through pins 2 and 4. Thus the relay becomes de-energized and thus in off position.

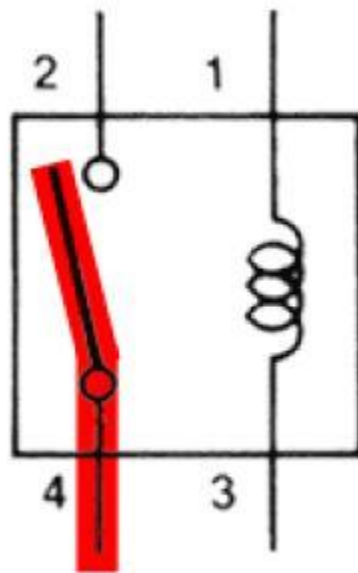


Fig 3.21 De-Energized Relay (OFF)

In simple, when a voltage is applied to pin 1, the electromagnet activates, causing a magnetic field to be developed, which goes on to close the pins 2 and 4 causing a closed circuit.

When there is no voltage on pin 1, there will be no electromagnetic force and thus no magnetic field. Thus the switches remain open.

3.7.4 WORKING PRINCIPLE

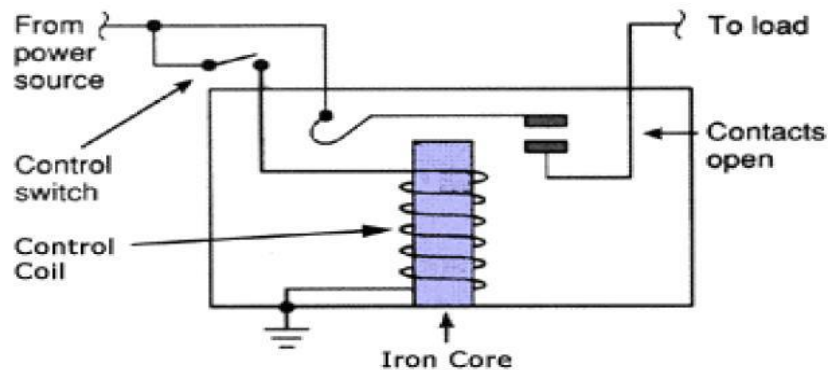


fig 3.22 Relay

The graph shows an internal segment outline of a hand-off. An iron center is encircled by a control loop. As appeared, the force source is given to the electromagnet through a control switch and through contacts to the heap. At the point when current beginnings moving through the control loop, the electromagnet begins empowering and in this way escalates the attractive field.

Accordingly the upper contact arm begins to be pulled in to the lower fixed arm and in this manner shuts the contacts making a short out for the force the heap. Then again, assuming the transfer was at that point de-stimulated when the contacts were shut, the contact move oppositely and make an open circuit.

When the curl current is off, the mobile armature will be returned by a power back to its underlying position. This power will be practically equivalent to a large portion of the strength of the attractive power. This power is basically given by two variables. They are the spring and furthermore gravity.

Transfers are predominantly made for two essential activities. One is low voltage application and the other is high voltage. For low voltage applications, more inclination will be given to lessen the clamor of the entire circuit. For high voltage applications, they are fundamentally intended to.

3.7.5 FEATURES:

- They are quick acting and can be reset fast.
- They are simple in construction.
- They are reliable.
- The values can be easily set. No special programming device is required.
- People can be trained on these relays easily

3.7.6 RELAY APPLICATIONS

- ☐ Relays are used to realize logic functions. They play a very important role in providing safety critical logic.
- ☐ Relays are used to provide time delay functions. They are used to time the delay open and delay close of contacts.
- ☐ Relays are used to control high voltage circuits with the help of low voltage signals. Similarly they are used to control high current circuits with the help of low current signals.
- ☐ They are also used as protective relays. By this function all the faults during transmission and reception can be detected and isolated.
- ☐ Relay Drive by Means of a Transistor
- ☐ Relay Drive by Means of SCR
- ☐ Relay Drive from External Contacts
- ☐ LED Series and Parallel Connections
- ☐ Electronic Circuit Drive by Means of a Relay
- ☐ Power Source Circuit
- ☐ PC Board Design Considerations

3.8 SERVO MOTOR

Servo Motors are DC Motors (check out how DC motor works) with a servo mechanism to provide a precise angular motion. Pulse width modulation (PWM) technique is used to set the angle of rotation. Generally RC servo motors have a rotation limit of 90^0 to 180^0 but servos with high rotation angles are also available.

A servo motor is one of the widely used variable speed drives in industrial production and process automation and building technology worldwide. Although servo motors are not a specific class of motor, they are intended and designed to use in motion control applications which require high accuracy positioning, quick reversing and exceptional performance.

A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate an object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which runs through servo mechanism.

If a motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor. We can get a very high torque servo motor in a small and light weight packages

A servo motor is a linear or rotary actuator that provides fast precision position control for closed-loop position control applications. Unlike large industrial motors, a servo motor is not used for continuous energy conversion.

Servo motors have a high speed response due to low inertia and are designed with small diameter and long rotor length. Servo motors work on servo mechanism that uses position feedback to control the speed and final position of the motor

3.8.1 PRINCIPLE OF SERVO MOTORS

A servo comprises of a Motor (DC or AC), a potentiometer, gear get together and a controlling circuit. Most importantly we use gear gathering to decrease RPM and to build force of engine.

Say at beginning situation of servo engine shaft, the situation of the potentiometer handle is with the end goal that there is no electrical sign produced at the yield port of the potentiometer.

Presently an electrical sign is given to another information terminal of the blunder identifierspeaker. Presently contrast between these two signs, one comes from potentiometer and another comes from other source, will be prepared in input instrument and yield will be given in term of mistake signal.

This mistake signal goes about as the contribution for engine and engine turns over pivoting. Presently engine shaft is associated with potentiometer and as engine turns so the potentiometer and it will create a sign.

After at some point the situation of potentiometer comes to at a place that the yield of potentiometer is same as outer sign gave. At this condition, there will be no yield signal from the enhancer to the engine contribution as there is no contrast between outer applied sign and the sign produced at potentiometer, and in the present circumstance engine quits turning.



Fig 3.23 SERVO MOTOR

3.8.2 TYPES OF SERVO MOTORS

Basically, servo motors are classified into AC and DC servo motors depending upon the nature of supply used for its operation. Brushed permanent magnet DC servo motors are used for simple applications owing to their cost, efficiency and simplicity.

3.8.3 DC SERVO MOTORS

A DC servo motor consists of a small DC motor, feedback potentiometer, gearbox, motor drive electronic circuit and electronic feedback control loop. It is more or less similar to the normal DC motor. The stator of the motor consists of a cylindrical frame and the magnet is attached to the inside of the frame.



FIG 3.24 DC MOTOR

The rotor comprises of brush and shaft. A commutator and a rotor metal supporting casing are connected to the outside of the shaft and the armature winding is wound in the rotor metal supporting casing. A brush is worked with an armature loop that provisions the current to the commutator. At the rear of the shaft, an indicator is incorporated into the rotor to identify the revolution speed.

With this development, it is easy to plan a regulator utilizing straightforward hardware on the grounds that the force is corresponding to the measure of current move through the armature. And likewise the immediate extremity of the control voltage

3.8.4 WORKING PRINCIPLE OF DC SERVO MOTOR

DC servo engine is a gathering of four significant segments, in particular a DC engine, a position detecting gadget, a stuff get together, and a control circuit. The beneath figure shows the parts that comprising in RC servo engines wherein little DC engine is utilized for driving the heaps at exact speed and position.

DC reference voltage is set to the worth relating to the ideal yield. This voltage can be applied by utilizing another potentiometer, control beat width to voltage converter, or through clocks relying

upon the control hardware. The dial on the potentiometer delivers a comparing voltage which is then applied as one of the contributions to mistake speaker.

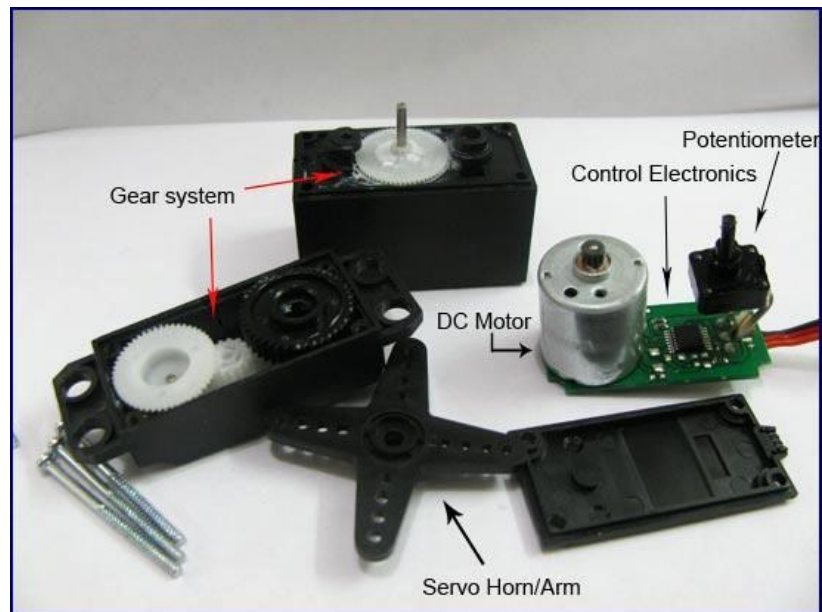


FIG 3.25 MOTOR

The feedback signal corresponding to the present position of the load is obtained by using a position sensor. This sensor is normally a potentiometer that produces the voltage corresponding to the absolute angle of the motor shaft through gear mechanism. Then the feedback voltage value is applied at the input of error amplifier (comparator).

The error amplifier is a negative feedback amplifier and it reduces the difference between its inputs. It compares the voltage related to current position of the motor with desired voltage related to desired position of the motor and produces the either a positive or negative voltage.

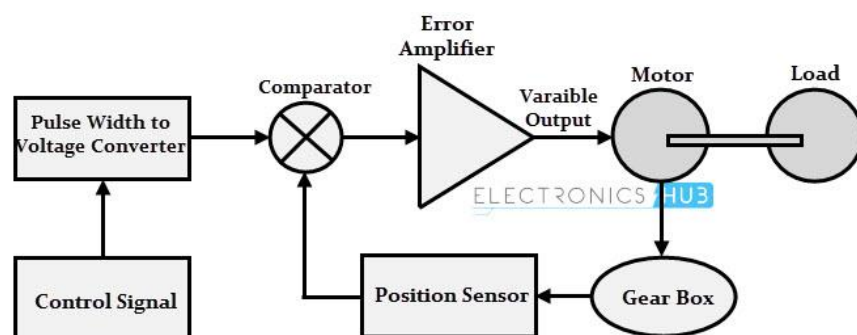
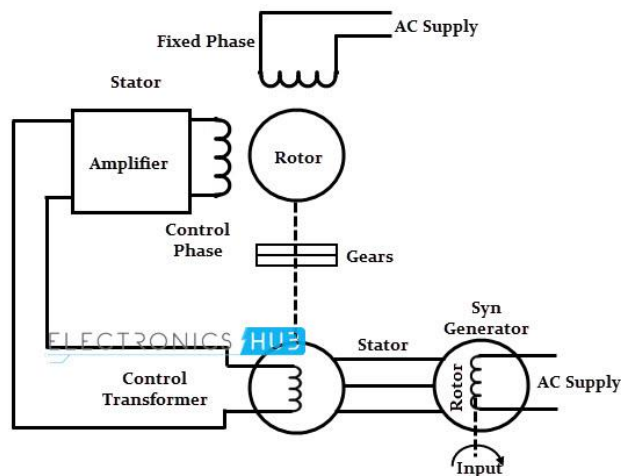


FIG 3.26 BLOCK DIAGRAM

3.8.5 WORKING PRINCIPLE OF AC SERVO MOTOR

The schematic chart of servo framework for AC two-stage enlistment engine is appeared in the figure beneath. In this, the reference contribution at which the engine shaft needs to keep up at a specific position is given to the rotor of synchro generator as mechanical information θ . This rotor is associated with the electrical contribution at evaluated voltage at a fixed recurrence.

The three stator terminals of a synchro generator are associated correspondingly to the terminals of control transformer. The precise situation of the two-stage engine is communicated to the rotor of control transformer through gear train course of action and it addresses the control



condition alpha.

FIG 3.27 DIAGRAM

3.8.6 SERVOMOTOR FEATURES:

- Linear relationship between the speed and electric control signal.
- Steady state stability.
- Wide range of speed control.
- Linearity of mechanical characteristics throughout the entire speed range.
- Low mechanical and electrical inertia.
- Fast response.

3.8.7 ADVANTAGES OF DC SERVOMOTORS ARE:

- Higher output than from a 50Hz motor of same size.
- Linearity of characteristics is achieved easily.
- Easier speed control from zero speed to full speed in both directions.
- Higher torque to inertia ratio that gives them quick response to control signals.
- DC servomotors have light weight, low inertia and low inductance armature that can respond quickly to commands for a change in position or speed.
- Low electrical time constants (0.1 to 6ms) and low mechanical time constants (2.3 to 40ms).
- DC motors are capable of delivering over 3 times their rated torque for a short time but AC motors will start at 2 to 2.5 times their rated torque.

The DC servomotors are generally used for large power applications such as in machine tools and robotics.

3.8.8 ADVANTAGES OF AC SERVOMOTORS ARE:

- Low cost.
- Higher efficiency and less maintenance (because no commutator and brushes).

3.8.9 DISADVANTAGES OF AC SERVOMOTORS ARE:

- Non-linear Characteristics.
- More difficult to control in positioning applications.
- The AC servo motors are best suited for low power applications.

3.9 SOFTWARE UNIT

3.9.1 EMBEDDED C

Installed C is a bunch of language expansions for the C Programming language by the C Standards council to address shared trait gives that exist between C augmentations for various implanted frameworks.

Verifiably, installed C programming requires nonstandard expansions to the C language to help fascinating highlights, for example, fixed-point number juggling, numerous particular memory banks, and essential I/O tasks.

3.9.2 NECESSITY

During outset long periods of chip based frameworks, programs were created utilizing constructing agents and intertwined into the EPROMs. There used to be no system to discover what the program was doing. LEDs, switches, and so on were utilized to check for right execution of the program.

Some 'blessed' designers had In-circuit Simulators (ICEs), yet they were excessively expensive and were not exactly solid also. As time advanced, utilization of chip explicit get together just as the programming language decreased and installed frameworks moved onto C as the implanted programming language of decision.

C is the most generally utilized programming language for implanted processors/regulators. Get together is likewise utilized however mostly to execute those parts of the code where exceptionally high planning precision, code size proficiency, and so forth are prime necessities.

3.9.3 ADVANTAGES

- It is little and less difficult to learn, get, program and troubleshoot.
- Compared to low level computing construct, C code composed is more solid and adaptable, more compact between various stages.

- C compilers are accessible for practically totally inserted gadgets being used today, and there is an enormous pool of experienced C developers.
- Unlike get together, C has benefit of processor-autonomy and isn't explicit to a specific microchip/microcontroller or any framework. This makes it advantageous for a client to create programs that can run on the greater part of the frameworks.
- As C consolidates usefulness of low level computing construct and highlights of significant level dialects, C is treated as a 'center level code' or 'undeniable level low level computing construct'.
- It is genuinely effective.
- It upholds admittance to I/O and gives simplicity of the executives of huge implanted tasks.

3.9.4 EMBEDDED SYSTEMS PROGRAMMING

Installed frameworks writing computer programs is not the same as creating applications on a PCs. Key qualities of an installed framework, when contrasted with PCs, are as per the following:

- Embedded gadgets have asset constraints (limited ROM, restricted RAM, restricted stack space, less preparing power)
- Components utilized in inserted framework and PCs are unique; implanted frameworks commonly utilizes more modest, less force devouring parts. Installed frameworks are more attached to the equipment.

Two remarkable highlights of Embedded Programming are code speed and code size. Code speed is represented by the handling power, timing requirements, while code size is administered by accessible program memory and utilization of programming language.

Objective of installed framework writing computer programs is to get greatest highlights in least space and least time.

Installed frameworks are customized utilizing diverse kind of dialects:

- Machine Code
- Low level language, i.e., gathering
- High level language like C, C++, Java, Ada, and so on

- Application level language like Visual Basic, content.

3.9.5 ADVANTAGES:

- It is little and sensibly more straightforward to learn, get, program and troubleshoot.
- C Compilers are accessible for practically completely installed gadgets being used today, and there is an enormous pool of experienced C developers.
- Unlike gathering, C has benefit of processor-autonomy and isn't explicit to a specific microchip/microcontroller or any framework. This makes it advantageous for a client to create programs that can run on the majority of the frameworks.
- As C consolidates usefulness of low level computing construct and highlights of significant level dialects, C is treated as a 'center level code' or 'undeniable level low level computing construct'
- It is genuinely proficient and upholds admittance to I/O and gives simplicity of the executives of enormous implanted activities.

3.9.6 DIFFERENCE BETWEEN C AND EMBEDDED C

In spite of the fact that C and installed C seem unique and are utilized in various settings, they have a bigger number of likenesses than the distinctions. The greater part of the develops are same; the distinction lies in their applications.

C is utilized for PCs, while installed C is for microcontroller based applications. As needs be, C has the privilege to utilize assets of a work area PC like memory, OS, and so forth While programming on work area frameworks, we need not worry about memory.

Be that as it may, inserted C needs to use with the restricted assets (RAM, ROM, I/Os) on an implanted processor. Along these lines, program code should find a way into the accessible program memory. In the event that code surpasses the breaking point, the framework is probably going to crash.

Compilers for C (ANSI C) normally produce OS dependant executables. Installed C expects compilers to make records to be downloaded to the microcontrollers/chip where it needs to run.

Installed compilers offer admittance to all assets which isn't given in compilers to work station applications.

Inserted frameworks frequently have the ongoing imperatives, which is typically not there with personal computer applications. Installed frameworks regularly don't have a support, which is accessible in the event of work area applications.

In this way, what essentially is unique while programming with inserted C is the mentality; for installed applications, we need to ideally utilize the assets, make the program code productive, and fulfill ongoing limitations, assuming any. This is finished utilizing the essential builds, grammar, and capacity libraries of 'C'.

3.10 ARDUINO SOFTWARE (IDE)

The Arduino Integrated Development Environment or Arduino Software (IDE) contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

3.10.1 SERIAL MONITOR

The Arduino Integrated Development Environment or Arduino Software (IDE) contains a content manager for composing code, a message region, a book comfort, a toolbar with catches for basic capacities and a progression of menus. It interfaces with the Arduino and Genuino equipment to transfer programs and speak with them.

3.10.2 BOARDS

The board determination has two impacts: it sets the boundaries (for example Computer chip speed and baud rate) utilized when aggregating and transferring representations; and sets and the document and wire settings utilized by the consume boot loader order.

A portion of the board definitions vary just in the last mentioned, so regardless of whether you've been transferring effectively with a specific choice you'll need to check it prior to consuming the boot loader. You can discover a correlation table between the different sheets [here](#).

Arduino Software (IDE) remembers the worked for help for the sheets in the accompanying rundown, all dependent on the AVR Core. The Boards remembered for the standard establishment permits to add support for the developing number of new sheets dependent on various centers like Arduino Due, Arduino Zero, Edison, Galileo, etc.

CHAPTER -4

PROPOSED SYSTEM

* This proposed system is to activate dynamic answers using mp3 modules with a chat-bot. This System consists of power supply unit, Microcontroller ,Voice modulator, speaker, Bluetooth module, LCD display, Servo motors, Relay, Bulb, Fan.

* Its uses chat bot with an speaker and an mouth action with PIC microcontroller that is connected to an servo module which keeps monitoring the connected actions.

* The final output is that when turning on or off the load using chat bot app then chat bot will convey the respective answers for our questions using mouth action and speaker. The mouth action is connected to microcontroller using servo motor and speaker connected through mp3 SD card based modulator.

* IoT is poised to become intrinsic to the day to day.

*Activities in the future, however the dynamic nature of IoT has its share of difficulties, and this paper has put forward the concept of using Chatbots to address some of the challenges in IoT. Through this initial endeavor we can identify possible areas that can be worked on for the future which show great potential:

1) Stronger AI based Agents As more advances are made in the field of AI, Software Agents will also grow to become more intelligent in the future. The goal of AI is by using Natural Language Generation models to create more natural flows of conversation between humans and bots. Chatbots will play an important role in the research areas of Intelligent Agents as well as Machine-to-Machine (M2M) research in IoT.

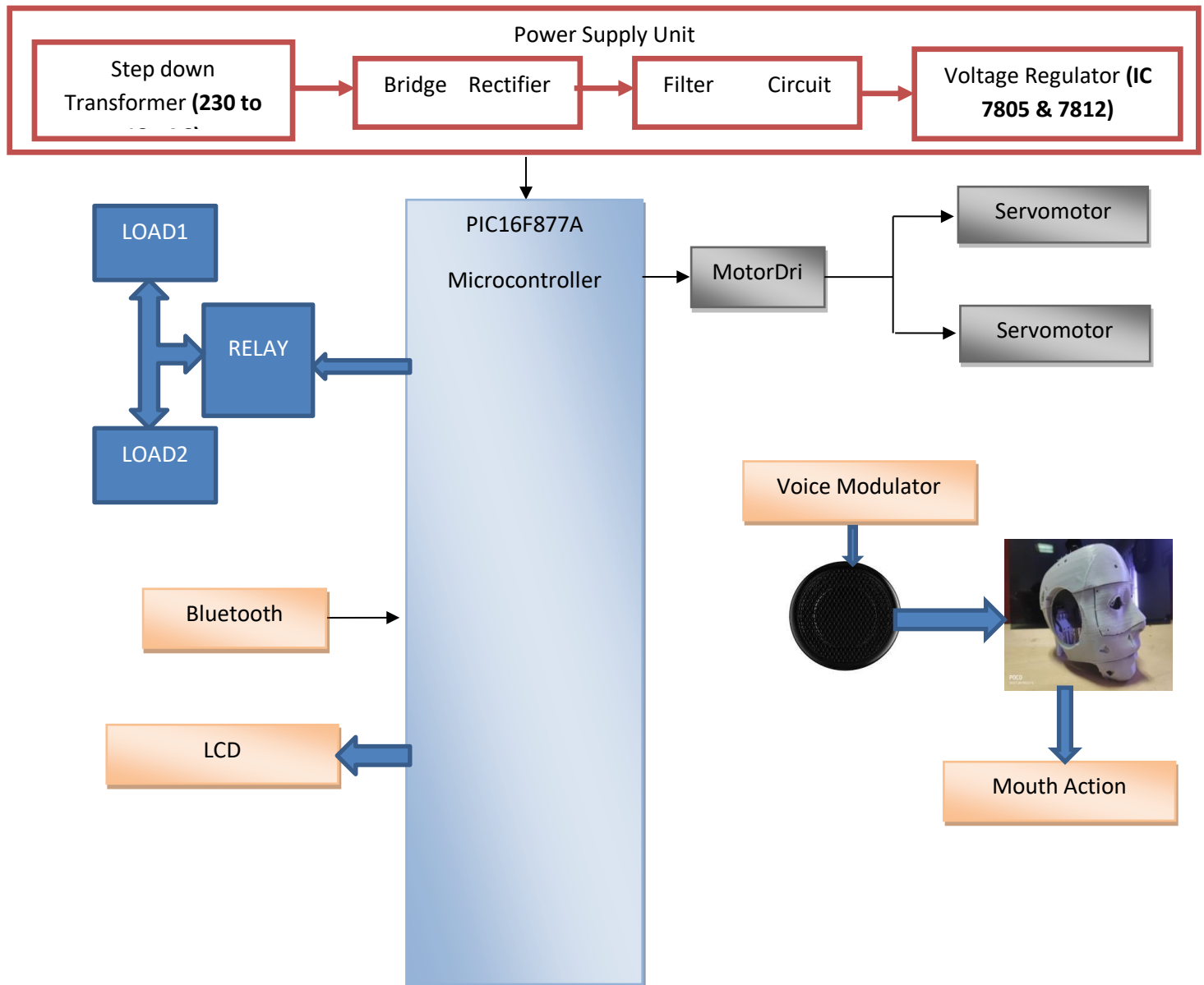


Fig 4.1 Block Diagram

□ The power supply unit comprises Transformer, rectifier, Filter and controller. The transformer used to venture down the voltage from 230v to 12v AC signal. Rectifier is utilized to change over the AC voltage into DC voltage. The channel unit used to eliminate the Ac swells given by the rectifier unit. The controller is utilized to give the steady force supply to the parts utilized in the task.

□ The Bluetooth module is utilized to get the voice contribution from the human and it will provide for the microcontroller as text. In light of the content given by the Bluetooth module the microcontroller will check the pre-characterized order. On the off chance that the order given by the human is perceived, the apparatus will be controlled and in the event that we pose inquiries to the robot, it will reply by utilizing the speaker.

□ The Servo engine used to give the mouth activity. The lcd show is utilized to show the human order as text.

2) Cyber Physical Systems and IoT Cyber Physical Systems allude to further developed, cutting edge implanted Information and Communications Technology (ICT) frameworks. They share numerous likenesses with IoT however with higher blend and coordination among physical and computational components .

The US National Science Foundation (NSF) recognized digital actual frameworks among the key examination zones soon .IoT will assume significant part in the progress to CPS as one of the key empowering innovations .Further headways in AI parts of Chatbots in IoT will be firmly identified with the Transformation, Cyber, Cognition and Configuration levels of the 5C CPS Architecture .

Force supply is a reference to a wellspring of electrical force. A gadget or framework that provisions electrical or different kinds of energy to a yield burden or gathering of burdens is known as a force supply unit or PSU. The term is most regularly applied to electrical energy supplies, less frequently to mechanical ones, and once in a while to other people.

Fundamental force supply the info power transformer has its essential twisting associated with the mains (line) supply. An optional winding, electro-attractively coupled however electrically secluded from the essential is utilized to acquire an AC voltage of appropriate plentifulness, and after additional handling by the PSU, to drive the hardware circuit it is to supply.

Voltage controller ICs are accessible with fixed or variable yield voltages. They are likewise appraised by the greatest current they can pass. Negative voltage controllers are accessible, predominantly for use in double supplies. Most controllers incorporate some programmed insurance from unreasonable current and overheating.

An Arduino is really a microcontroller based pack which can be either utilized straightforwardly by buying from the seller or can be made at home utilizing the parts, attributable to its open source equipment include. It is essentially utilized in interchanges and in controlling or working numerous gadgets. It was established by Massimo Banzi and David Cuartielles in 2005.

The Arduino Uno is a microcontroller board dependent on the ATmega328. It has 14 computerized input/output pins (of which 6 can be utilized as PWM yields), 6 simple data sources, a 16 MHz gem oscillator, a USB association, a force jack, an ICSP header, and a reset button.

Arduino can be power either from the pc through a USB or through outside source like connector or a battery. It can work on an outer inventory of 7 to 12V. Force can be applied remotely through the pin Vin or by giving voltage reference through the IOREf pin.

The Arduino Uno can be controlled by means of the USB association or with an outside power supply. The force source is chosen automatically. External (non-USB) force can come either from an AC-to-DC connector (divider mole) or battery. The connector can be associated by stopping.

Bluetooth is a broadcast communications industry particular that depicts how cell phones, PCs, and individual advanced colleagues (PDAs) can be handily interconnected utilizing a short-range remote association.

APR9600 is a minimal effort elite sound record/replay IC consolidating streak simple stockpiling method. Recorded sound is held even after power supply is eliminated from the module. The replayed sound displays top caliber with a low clamor level. Inspecting rate briefly recording period is 4.2 kHz that gives a sound record/replay transmission capacity of 20Hz to 2.1 kHz. Notwithstanding, by changing a wavering resistor, an examining rate really high accomplished. This abbreviates the all out length of sound account to 32 seconds.

We realize that the vast majority of the top of the line mechanical application gadgets have transfers for their successful working. Transfers are basic switches which are worked both electrically and precisely. Transfers comprise of a n electromagnet and furthermore a bunch of contacts. The exchanging system is done with the assistance of the electromagnet. There are additionally other working standards for its working. In any case, they contrast as indicated by their applications. The vast majority of the gadgets have the use of transfers.

Servo Motors are DC Motors (look at how DC engine works) with a servo instrument to give an exact precise movement. Heartbeat width balance (PWM) procedure is utilized to set the point of revolution. By and large RC servo engines have a revolution cutoff of 900 to 1800 however servos with high pivot points are additionally accessible.

A servo engine is one of the broadly utilized variable speed drives in mechanical creation and interaction computerization and building innovation around the world. Albeit servo engines are not a particular class of engine, they are expected and intended to use moving control applications which require high precision situating, speedy switching and extraordinary execution.

CHAPTER 5

RESULTS AND DISCUSSIONS



FIG 5.1 Project image

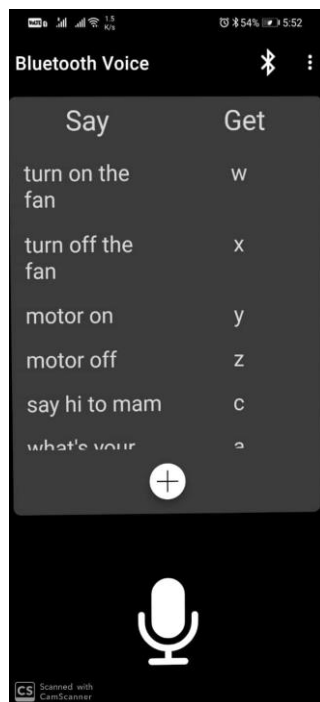


FIG 5.2-Bluetooth application

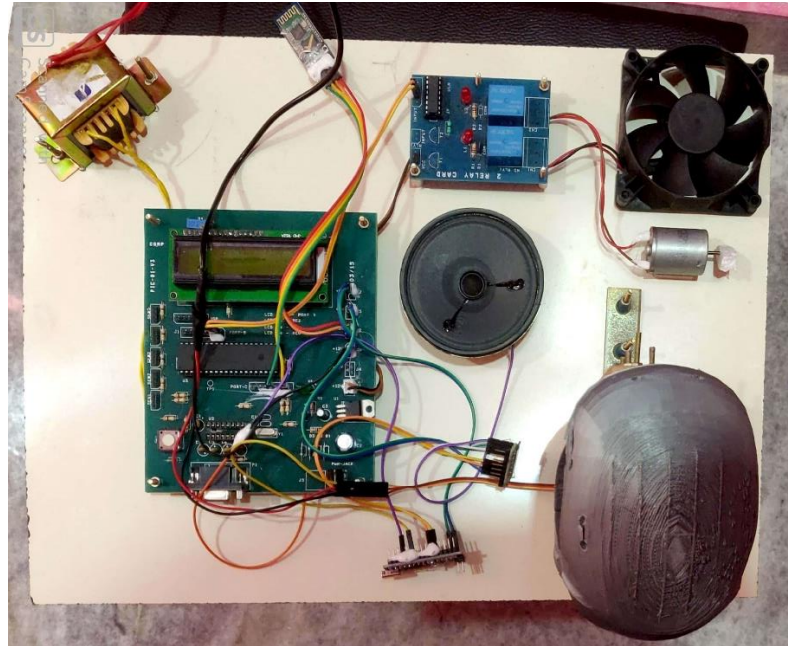


FIG 5.3 Device (front view)



FIG 5.4- Lcd display

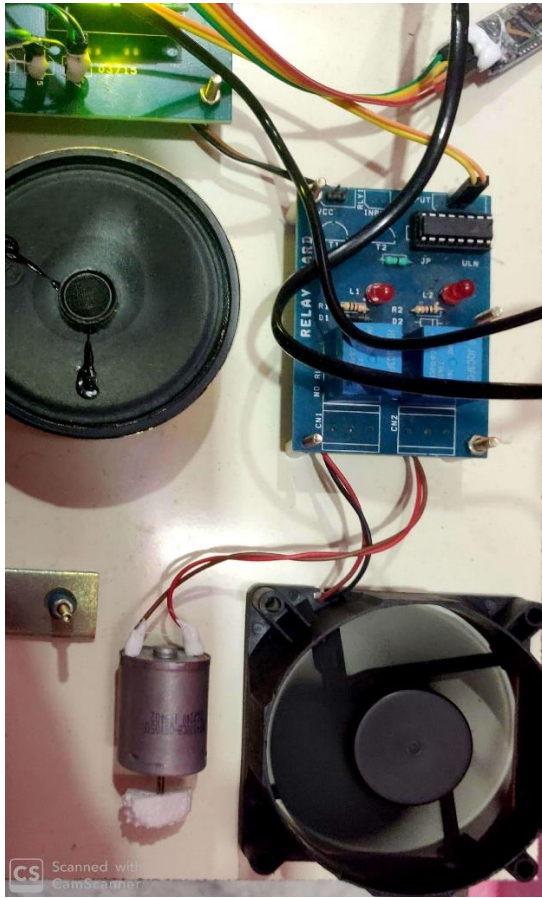


FIG 5.5 working of fan and motor.

Fig 5.1: This is the complete assemble of our project by connecting the requirements using power supply.

Fig 5.2 : This is the Bluetooth application which is used as connection between mobile and the Bluetooth module.

Fig 5.3: This is the connection view of the project.

Fig 5.4: This is the lcd screen which is used for the monitoring of the message.

Fig 5.5: Working of the fan and motor when the command is given.

Fig 5.6:Monitoring the latitude and longitude of the location.

GEO TAGGING

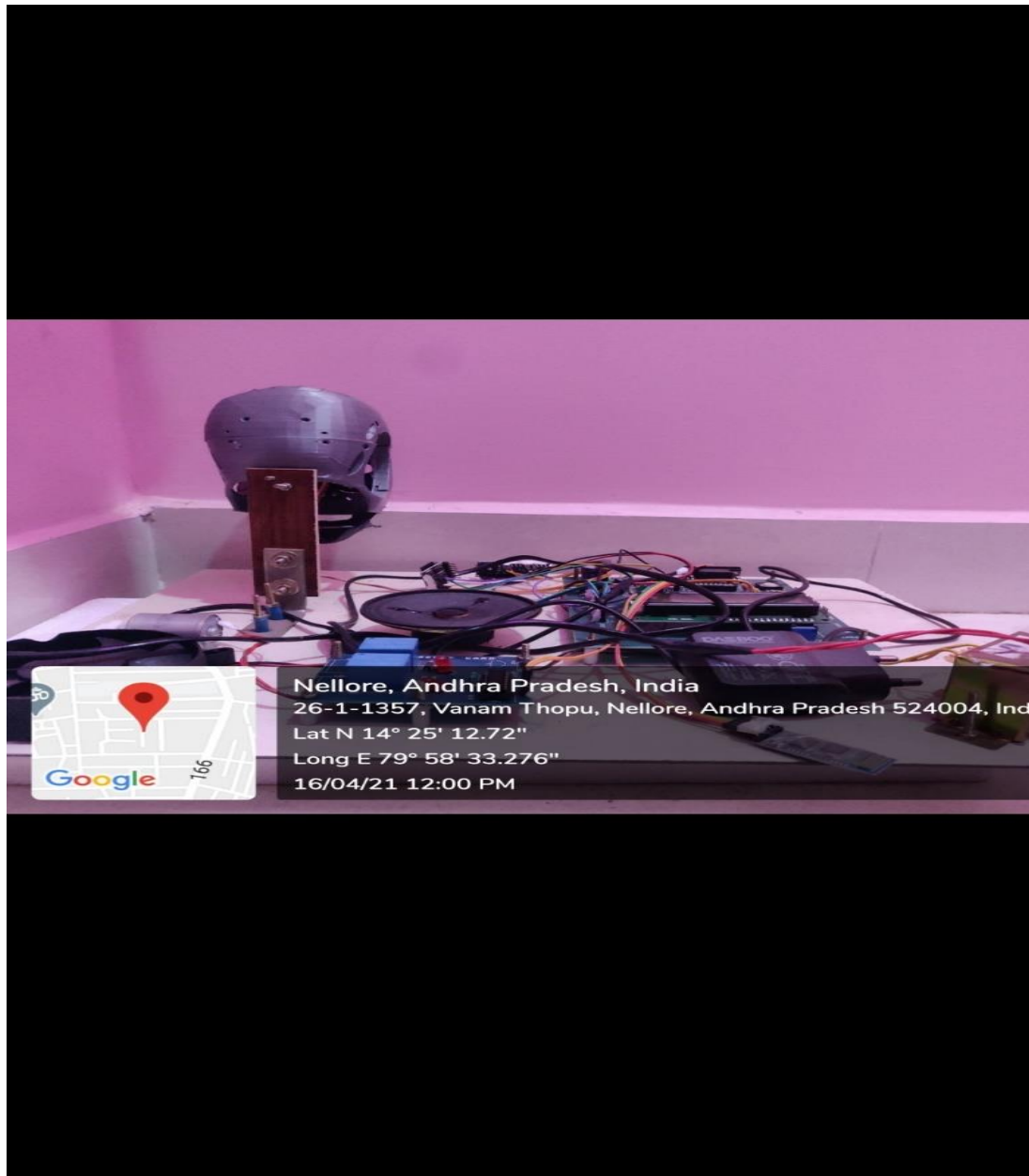


FIG 5.6

geo tagging of project

CHAPTER 6

CONCLUSION

In this REPORT, we present a strategy to plan fast technique for Chatbot to assist the Blind and Deaf People with recollecting the failed to remember things. It is Useful Chatbot to Recognize the Voice and Playback it.

Advancement in the field of IoT has been wonderful lately. Likewise, Chatbot frameworks are additionally getting more keen and refined as the days progress. As far as we could possibly know, no work has been distributed itemizing the particular incorporation of Chatbots to IoT.

This paper has endeavored to incorporate these two fields together by enrolling the key structural parts required and imagine potential approaches to address a portion of the current difficulties in IoT. We trust that this undertaking will prompt more wise and successful incorporated IoT frameworks.

The advancement of Chatbots in IoT presents the worldview of human-insider savvy frameworks which has energizing examination challenges in the space of Wisdom of Crowds. The idea of insight of group recommends that collection of data can bring about choices that are superior to what might have been accomplished by any person in the gathering .

With regards to IoT, the sharing of large information from billions of sensors and gadgets makes more worth in the biological system when contrasted with not sharing. Anyways it requires information interoperability instead of basically

collecting various different information sources which are incongruent or have no similitudes.

Subsequently Chatbots in IoT frameworks can utilize methods like Human Swarming, a methodology that utilizes continuous input circles from gatherings of clients to make precise bits of knowledge. There are a lot of fascinating exploration openings in securing precise qualities from the group

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