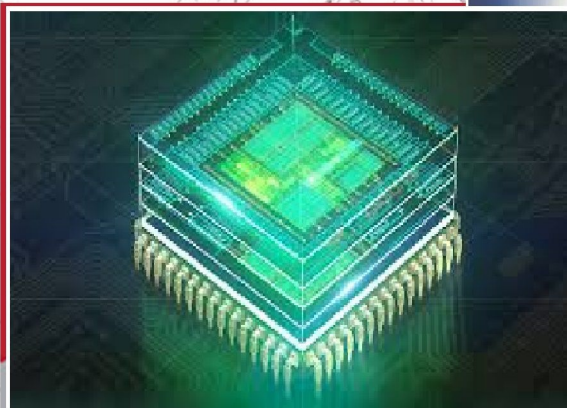


# ELECTRONICS & COMMUNICATION ENGINEERING

## TECH CONNECT

December, 2019



LAKIREDDY BALIREDDY COLLEGE OF ENGINEERING  
MYLAVARAM

***Contents***

| <b><i>S.No</i></b> | <b><i>Title</i></b>                                    | <b><i>Page No.</i></b> |
|--------------------|--|------------------------|
| 1.                 | <b><i>Smoke Detection Alarm</i></b>                    | <b><i>1</i></b>        |
| 2.                 | <b><i>Robotics</i></b>                                 | <b><i>3</i></b>        |
| 3.                 | <b><i>Quantum Computing</i></b>                        | <b><i>7</i></b>        |
| 4.                 | <b><i>Blue Brain Technology</i></b>                    | <b><i>10</i></b>       |
| 5.                 | <b><i>Audio Amplifier</i></b>                          | <b><i>12</i></b>       |
| 6.                 | <b><i>Break Failure Indicator</i></b>                  | <b><i>16</i></b>       |
| 7.                 | <b><i>Gaganyaan-A stride towards Space Mission</i></b> | <b><i>18</i></b>       |

***Editorial Board Members******Mr.G.L.N.Murthy******Editor******Mr.D.Jagadeesh(IV-ECE)******Associate Editor******Ms.V.Divya(III-ECE)******Associate Editor******Mr.P.Sathwik(III-ECE)******Associate Editor******Ms.Oohasri(I-ECE)******Associate Editor***

### ***1. Smoke Detector Alarm***

A smoke detector is a device that senses smoke, typically as an indicator of fire. Commercial security devices issue a signal to a fire alarm control panel as part of a fire alarm system, while household smoke detectors, also known as smoke alarms, generally issue a local audible or visual alarm from the detector itself or several detectors if there are multiple smoke detectors interlinked. A smoke alarm is critical for the early detection of a fire in your home and could mean the difference between life and death. Fires can occur in a variety of ways and in any room of your home. But no matter where or how, having a smoke alarm is the first key step toward your family's safety.

A smoke alarm should be installed and maintained according to the manufacturer's instructions. When installing a smoke alarm, many factors influence where you will place the alarm, including how many are to be installed. Consider placing alarms along your escape path to assist in egress in limited-visibility conditions. In general, you should place alarms in the center of a ceiling or, if you place them on a wall, they should be near the ceiling.

Smoke detectors are housed in plastic enclosures, typically shaped like a disk or square about 150 millimetres (6 in) in diameter and 25 millimetres (1 in) thick, but shape and size vary. Smoke can be detected either optically (photoelectric) or by physical process (ionization); detectors may use either, or both, methods. Sensitive alarms can be used to detect, and thus deter, smoking in areas where it is banned. Smoke detectors in large commercial, industrial, and residential buildings are usually powered by a central fire alarm system, which is powered by the building power with a battery backup. Domestic smoke detectors range from individual battery-powered units, to several interlinked mains-powered units with battery backup; with these interlinked units, if any unit detects smoke, all trigger even if household power has gone out.

The risk of dying in a home fire is cut by 1/4th in homes with working smoke alarms. The US National Fire Protection Association reports 0.53 deaths per 100 fires in homes with working smoke alarms compared to 1.18 deaths without (2009–2013). Some homes do not have any smoke alarms, some alarms do not have working batteries; sometimes the alarm fails to detect the fire.

Although there are several choices to make in selecting the right smoke alarms to buy, the most important thing to remember is that smoke alarms save lives. For that reason, you should install a smoke alarm if your home does not have one. Installing additional smoke alarms throughout the house provides greater protection. Smoke alarms may contain different or multiple sensors. There are two main types of smoke alarms, which are categorized by the type of smoke detection sensor, ionization and photoelectric, used in the alarm. Each type of smoke alarm may perform differently in different types of fires. A smoke alarm may use multiple sensors, sometimes with a heat detector or carbon monoxide detector, to warn of a fire. Ionization detectors contain a chamber with two plates that generate a small, continuous electric current. When smoke particles enter the ionization chamber, the smoke particles disrupt the current flow, which triggers the alarm. Photoelectric detectors use a light beam and light receptor (photocell). When smoke particles are present between the light and receptor, depending on the type of smoke chamber configuration, the reduction or increase of light on the photocell sensor triggers the alarm. Smoke alarms may perform differently. Both ionization and photoelectric detectors are effective smoke sensors, and even though both types of smoke detectors must pass the same tests to be certified to the voluntary standard for smoke alarms, they can perform differently in different types of fires. Ionization detectors respond quickly to flaming fires that give off heat and hot gases with smaller (sub-micron) combustion particles; photoelectric detectors respond more quickly to smoldering fires that give off larger combustion particles. There are combination smoke alarms that combine ionization and photoelectric detectors into one unit, called dual sensor smoke alarms. The amount of time a person may have to escape depends on many factors, such as the type of fire, location of the fire, and the closest smoke alarm.

~B.Snehitha (18761A04C4)

~K.Mounika (18761A04E7)

## ***2.Robotics***

Robotics is the science and technology of robots and their design, manufacture and application. Robotics has connections to electronics, mechanics and software. In general terms the picture of robot gives a common man an idea of a big, heavy machine built of heavily cast metal and wires around that make it run. But due to the advancement in fields like nanotechnology, chip designing, polymers and plastic etc building different types of robots seems like a dream that will soon come true.

Robotics is an interdisciplinary branch of engineering and science that includes mechanical engineering, electronic engineering, information engineering, computer science, and others. Robotics involves design, construction, operation, and use of robots, as well as computer systems for their perception, control, sensory feedback, and information processing. The goal of robotics is to design intelligent machines that can help and assist humans in their day-to-day lives and keep everyone safe.

Robotics develops machines that can substitute for humans and replicate human actions. Robots can be used in many situations and for lots of purposes, but today many are used in dangerous environments (including inspection of radioactive materials, bomb detection and deactivation), manufacturing processes, or where humans cannot survive (e.g. in space, underwater, in high heat, and clean up and containment of hazardous materials and radiation). Robots can take on any form but some are made to resemble humans in appearance. This is said to help in the acceptance of a robot in certain replicative behaviors usually performed by people. Such robots attempt to replicate walking, lifting, speech, cognition, or any other human activity. Many of today's robots are inspired by nature, contributing to the field of bio-inspired robotics.

The concept of creating machines that can operate autonomously dates back to classical times, but research into the functionality and potential uses of robots did not grow substantially until the 20th century. Throughout history, it has been frequently assumed by various scholars, inventors, engineers, and technicians that robots will one day be able to mimic human behavior and manage tasks in a human-like fashion. Today, robotics is a rapidly growing field, as technological advances continue; researching, designing, and building new robots serve various practical purposes, whether domestically, commercially, or militarily. Many robots are built to do jobs that

are hazardous to people, such as defusing bombs, finding survivors in unstable ruins, and exploring mines and shipwrecks. Robotics is also used in STEM (science, technology, engineering, and mathematics) as a teaching aid. The advent of nano robots, microscopic robots that can be injected into the human body, could revolutionize medicine and human health.<sup>[2]</sup>

Robotics is a branch of engineering that involves the conception, design, manufacture, and operation of robots. This field overlaps with electronics, computer science, artificial intelligence, mechatronics, nanotechnology and bioengineering.

A robot has some consistent characteristics:

1. Robots all consist of some sort of mechanical construction. The mechanical aspect of a robot helps it complete tasks in the environment for which it's designed. For example, the Mars 2020 Rover's wheels are individually motorized and made of titanium tubing that help it firmly grip the harsh terrain of the red planet.
2. Robots need electrical components that control and power the machinery. Essentially, an electric current (a battery, for example) is needed to power a large majority of robots.
3. Robots contain at least some level of computer programming. Without a set of code telling it what to do, a robot would just be another piece of simple machinery. Inserting a program into a robot gives it the ability to know when and how to carry out a task.

The robotics industry is still relatively young, but has already made amazing strides. From the deepest depths of our oceans to the highest heights of outer space, robots can be found performing tasks that humans couldn't dream of achieving.

### **Types of Robots**

Mechanical bots come in all shapes and sizes to efficiently carry out the task for which they are designed. From the 0.2 millimeter-long "RoboBee" to the 200 meter-long robotic shipping vessel "Vindskip," robots are emerging to carry out tasks that humans simply can't. Generally, there are five types of robots:

#### **Pre-Programmed Robots**

Pre-programmed robots operate in a controlled environment where they do simple, monotonous tasks. An example of a pre-programmed robot would be a mechanical arm on an automotive assembly line. The arm serves one function — to weld a door on, to insert a certain part into the engine, etc. — and it's job is to perform that task longer, faster and more efficiently than a human.

### **Humanoid Robots**

Humanoid robots are robots that look like and/or mimic human behavior. These robots usually perform human-like activities (like running, jumping and carrying objects), and are sometimes designed to look like us, even having human faces and expressions. Two of the most prominent examples of humanoid robots are Hanson Robotics' Sophia (in the video above) and Boston Dynamics' Atlas.

### **Autonomous Robots**

Autonomous robots operate independently of human operators. These robots are usually designed to carry out tasks in open environments that do not require human supervision. An example of an autonomous robot would be the Roomba vacuum cleaner, which uses sensors to roam throughout a home freely.

### **Tele operated Robots**

Tele operated robots are mechanical bots controlled by humans. These robots usually work in extreme geographical conditions, weather, circumstances, etc. Examples of teleoperated robots are the human-controlled submarines used to fix underwater pipe leaks during the BP oil spill or drones used to detect landmines on a battlefield.

- From Diffusing Bombs to Performing Surgery, VR Robots Have Some Amazing Uses

### **Augmenting Robots**

Augmenting robots either enhance current human capabilities or replace the capabilities a human may have lost. Some examples of augmenting robots are robotic prosthetic limbs or exoskeletons used to lift hefty weights.

## APPLICATIONS OF ROBOTICS

- Helping fight forest fires
- Working alongside humans in manufacturing plants (known as co-bots)
- Robots that offer companionship to elderly individuals
- Surgical assistants
- Last-mile package and food order delivery
- Autonomous household robots that carry out tasks like vacuuming and mowing the grass
- Assisting with finding items and carrying them throughout warehouses
- Used during search-and-rescue missions after natural disasters
- Landmine detectors in war zones

~A.Uma Maheswari( 18761A0402)



### ***3. Quantum Computing***

All computing systems rely on a fundamental ability to store and manipulate information. Current computers manipulate individual bits, which store information as binary 0 and 1 states. Quantum computers leverage mechanical phenomena to manipulate information.

Quantum computing is the use of quantum-mechanical phenomena such as superposition and entanglement to perform computation. A quantum computer is used to perform such computation, which can be implemented theoretically or physically. There are currently two main approaches to physically implementing a quantum computer: analog and digital. Analog approaches are further divided into quantum simulation, quantum annealing, and adiabatic quantum computation. Digital quantum computers use quantum logic gates to do computation. Both approaches use quantum bits or qubits.

Qubits are fundamental to quantum computing and are somewhat analogous to bits in a classical computer. Qubits can be in a 1 or 0 quantum state, or they can also be in a superposition of the 1 and 0 states. However, when qubits are measured the result is always either a 0 or a 1. The probabilities of the two outcomes depend on the quantum state that they were in.

Quantum computing began in the early 1980s, when physicist Paul Benioff proposed a quantum mechanical model of the Turing machine.<sup>[2]</sup> Richard Feynman and Yuri Manin later suggested that a quantum computer had the potential to simulate things that a classical computer could not. In 1994, Peter Shor developed a quantum algorithm for factoring integers that had the potential to decrypt all secured communications. Despite ongoing experimental progress since the late 1990s, most researchers believe that "fault-tolerant quantum computing still a rather distant dream". On 23 October 2019, Google AI, in partnership with the U.S. National Aeronautics and Space Administration (NASA), published a paper in which they claimed to have achieved quantum supremacy. While some have disputed this claim, it is still a significant milestone in the history of quantum computing.

To get to grips with quantum computing, first remember that an ordinary computer works on 0s and 1s. Whatever task you want it to perform, whether it's calculating a sum or booking a holiday, the underlying process is always the same: an instance of the task is translated into a string of 0s and 1s (the input), which is then processed by an algorithm. A

new string of 0s and 1s pops out at the end (the output), which encodes the result. However clever an algorithm might appear, all it ever does is manipulate strings of *bits* — where each bit is either a 0 or a 1. On the machine level, this either/or dichotomy is represented using electrical circuits which can either be closed, in which case a current flows, or open, in which case there isn't a current.

Quantum computing is based on the fact that, in the microscopic world, things don't have to be as clear-cut as we'd expect from our macroscopic experience. Tiny particles, such as electrons or photons, can simultaneously take on *states* that we would normally deem mutually exclusive. They can be in several places at once, for example, and in the case of photons simultaneously exhibit two kinds of polarisation. We never see this *superposition* of different states in ordinary life because it somehow disappears once a system is observed: when you measure the location of an electron or the polarisation of a photon, all but one of the possible alternatives are eliminated and you will see just one. Nobody knows how that happens, but it does. Superposition frees us of from binary constraints. A quantum computer works with particles that can be in superposition. Rather than representing *bits* — such particles would represent *qubits*, which can take on the value 0, or 1, or both simultaneously.

Quantum computers can solve problems that are impossible or would take a traditional computer an impractical amount of time (a billion years) to solve. Quantum computers will change the landscape of data security. Even though quantum computers would be able to crack many of today's encryption techniques, predictions are that they would create hack-proof replacements. Classical computers are better at some tasks than quantum computers (email, spreadsheets and desktop publishing to name a few). The intent of quantum computers is to be a different tool to solve different problems, not to replace classical computers. Quantum computers are great for solving optimisation problems from figuring out the best way to schedule flights at an airport to determining the best delivery routes for the FedEx truck. In order to keep quantum computers stable, they need to be cold.

According to Professor Catherine McGeoch at Amherst University, a quantum computer is “thousands of times” faster than a conventional computer. Superposition is the term used to describe the quantum state where particles can exist in multiple states at the same time, and which allows quantum computers to look at many different variables.

Rather than use more electricity, quantum computers will reduce power consumption anywhere from 100 up to 1000 times because quantum computers use quantum tunnelling. Quantum computers are very fragile. Any kind of vibration impacts the atoms and causes decoherence. There are several algorithms already developed for quantum computers including Grover's for searching an unstructured database and Shor's for factoring large numbers. Once a stable quantum computer gets developed, expect that machine learning will exponentially accelerate even reducing the time to solve a problem from hundreds of thousands of years to seconds.

~ S.Gayatrimeghana(19761A04B2 )

~ B. Jyothika (19761A0472)

### ***5.Blue brain Technology***

Blue brain is the name of the world's first virtual brain. That means a machine that can function as human brain. Today scientists are in research to create an artificial brain that can think, response, take decision, and keep anything in memory. The main aim is to upload human brain into machine. So that man can think, take decision without any effort. After the death of the body, the virtual brain will act as the man .So, even after the death of a person we will not loose the knowledge, intelligence, personalities, feelings and memories of that man that can be used for the development of the human society. No one has ever understood the complexity of human brain. It is complex than any circuitry in the world. So, question may arise "Is it really possible to create a human brain?" The answer is "Yes". Because what ever man has created today always he has followed the nature. When man does not have a device called computer, it was a big question for all .But today it is possible due to the technology. Technology is growing faster than every thing. IBM is now in research to create a virtual brain. It is called "Blue brain ".If possible, this would be the first virtual brain of the world.

The Blue Brain Project is assumed to be the first one to explore about a true “Artificial Intelligence” via the process of reverse engineering and also the effort to reverse engineering a human brain. The vision behind Virtual Brain will help shed some light on some aspects of human recognition. The Blue Brain Project aims to build a full computer model of a functioning brain to simulate drug treatments or any other brain related problems. Blue gene supercomputer constructed by IBM was a machine first used by Blue Brain Project and then a term Blue Brain was introduced. It can be implemented by using supercomputer, the fastest type but quite expensive and are assist for special tasks which require abundant amount of mathematical computations, like weather forecasting employs a supercomputer. The back pane of Blue Brain is Artificial Intelligence, a technology which builds intelligent machines and imparts intelligent agents. Knowledge, learning, reasoning, planning, communication and perception are the main goals of its research. Computational intelligence, statistical methods and traditional symbolic AI are its main effective approaches.

Supercomputer II SCOPE Intelligence is a boon that is created in born. One who have this quality they assume themselves to think to the level where others can't reach. Intelligence is needed everywhere and in every field. Era, in which we are in, also needs intelligent brain for Human Society's sake. Intelligence is limited to human's body and life after death, that intelligent brain stops working. Virtual brain is therefore a key

solution to it. With the help of the virtual brain, brain and intelligence remains alive even after the death of a person. Humans want to live in a computer as a program so that we can save ourselves from remembering a huge amount of data and facts. The introduction to microscope signifies a broader advancement in technology. Electron microscope provides a limited depth level for a brain cells studies and nano tech microscope outputs samples of brain tissue in mere few hours. In depth, simulation of a small area of a brain construct molecule by molecule has been created and has re-constructed various results from real brains.

P.Amulya (17761A0448)

R.Mounika (17761A0450)

### ***5.Audio Amplifier***

An amplifier, electronic amplifier or (informally) amp is an electronic device that can increase the power of a signal (a time-varying voltage or current). It is a two-port electronic circuit that uses electric power from a power supply to increase the amplitude of a signal applied to its input terminals, producing a proportionally greater amplitude signal at its output. The amount of amplification provided by an amplifier is measured by its gain: the ratio of output voltage, current, or power to input. An amplifier is a circuit that has a power gain greater than one.

An amplifier can either be a separate piece of equipment or an electrical circuit contained within another device. Amplification is fundamental to modern electronics, and amplifiers are widely used in almost all electronic equipment. Amplifiers can be categorized in different ways. One is by the frequency of the electronic signal being amplified. For example, audio amplifiers amplify signals in the audio (sound) range of less than 20 kHz, RF amplifiers amplify frequencies in the radio frequency range between 20 kHz and 300 GHz, and servo amplifiers and instrumentation amplifiers may work with very low frequencies down to direct current. Amplifiers can also be categorized by their physical placement in the signal chain; a preamplifier may precede other signal processing stages, for example. The first practical electrical device which could amplify was the triode vacuum tube, invented in 1906 by Lee De Forest, which led to the first amplifiers around 1912. Today most amplifiers use transistors

An audio power amplifier (or power amp) is an electronic amplifier that amplifies low-power electronic audio signals such as the signal from radio receiver or electric guitar pickup to a level that is high enough for driving loudspeakers or headphones. Audio power amplifiers are found in all manner of sound systems including sound reinforcement, public address and home audio systems and musical instrument amplifiers like guitar amplifiers. It is the final electronic stage in a typical audio playback chain before the signal is sent to the loudspeakers.

The preceding stages in such a chain are low power audio amplifiers which perform tasks like pre-amplification of the signal (this is particularly associated with record turntable signals, microphone signals and electric instrument signals from pickups, such as the electric guitar and electric bass), equalization (e.g., adjusting the bass and treble), tone controls, mixing different input signals or adding electronic effects such

as reverb. The inputs can also be any number of audio sources like record players, CD players, digital audio players and cassette players. Most audio power amplifiers require these low-level inputs, which are line level.

While the input signal to an audio power amplifier, such as the signal from an electric guitar, may measure only a few hundred microwatts, its output may be a few watts for small consumer electronics devices, such as clock radios, tens or hundreds of watts for a home stereo system, several thousand watts for a nightclub's sound system or tens of thousands of watts for a large rock concert sound reinforcement system. While power amplifiers are available in standalone units, typically aimed at the hi-fi audiophile market (a niche market) of audio enthusiasts and sound reinforcement system professionals, most consumer electronics sound products, such as clock radios, boom boxes and televisions have relatively small power amplifiers that are integrated inside the chassis of the main product.

Any electronic device that increases the power of an electrical signal whose vibrations are confined to the audio frequency range—the range that can be perceived by the human ear—is an audio amplifier. All devices that transmit, record, or otherwise electronically process voice signals employ audio amplifiers. Voice-recognition or voice-synthesis systems, communications or eavesdropping devices, hearing aids, entertainment systems, talking toys, are examples of devices containing audio amplifiers.

**The need for amplification.** Acoustic or sound waves are longitudinal pressure waves (i.e., waves that cause molecules to oscillate along the wave's line of travel rather than across it) in air, water, or any other medium. A sound is said to be in the *audio* frequency range if it is not too high or low in frequency to be heard by the human ear. Audio sound waves may be converted by microphones into electrical signals for analysis, transmission, or recording. Electrical signals can also be converted by speakers into audible sound waves. Microphones and speakers are both transducers, that is, devices that convert energy from one form (e.g., electrical) into another (e.g., acoustic) or vice versa. Audio amplifiers are required with both microphones and speakers.

**Input amplification.** Amplification of the signal produced by a microphone—often termed preamplification—is necessary because the electrical signal that can be derived directly from sound waves impinging on a microphone is weak (i.e., on the order of .01 V

or less; for eavesdropping applications, much less). Input signals of such low amplitude must be amplified before they can be processed in either analog or digital circuits.

In analog circuits—circuits that process smoothlyvarying electrical quantities—there is always a certain amount of random electrical activity or "noise." This noise is mixed with any information signal processed by the circuit, corrupting it. Amplifying a weak input, such as that from a microphone, before it mingles with circuit noise makes the noise problem manageable. Furthermore, all analog circuits that lack amplification (passive filters, transmission lines, etc.) experience signal loss; that is, they dissipate energy. A weak signal fed into a circuit that does not contain amplification will, therefore, quickly disappear, making amplification necessary in most analog circuits. Finally, amplification provides electronic isolation between the signal being amplified and the result of the amplification process; among other gains, this simplifies the circuit-design process.

If an audio signal is to be processed using digital circuitry (as is often the case today), a digital signal (i.e., on-off, high-low signal that can represent signal magnitudes symbolically) must be derived from the analog input. This conversion is performed by a device termed an analog-to-digital converter. For reasons ultimately deriving from the atomic properties of semiconductors, a typical analog-to-digital converter requires an analog input signal with an amplitude variation on the order of several volts. A low voltage signal must therefore usually be amplified before being digitized.

**Output amplification.** Wherever human ears are the ultimate destination of a signal it is necessary to drive a physical sound-making device at the output. Here audio amplification is needed for a reason complementary to that which applies at the input: the signal power needed to drive an output device (e.g., speaker or headphones) is greater than that conveyed by the signals processed throughout the circuitry of a typical electronic device, whether analog or digital. An audio amplifier is thus found at the output as well as at the input of almost every system handling signals in the audio range.

**Applications.** The number of audio amplifier designs that have been produced over the last century is probably in the hundreds of thousands. Such devices are a ubiquitous feature of modern life, and are found in computers, telephones, radios, high-fidelity audio systems, all military voice-communication systems, many appliances, and even toys.



Audio amplifiers can be miniaturized for placement in headsets, mobile phones. In applications where small size is at a premium, as in hearing aides and espionage applications (bugs and "wires"), they may be ultraminiaturized. At the high-power end, audio amplification drives public-address systems, speaker systems, and (potentially) weapons. Research is being conducted by several countries, including Russia and the U.S. (through its Low Collateral Damage Munitions Program), into the use of highly amplified sound as a weapon; frequencies in the infrasonic, audio, and ultrasonic ranges are all being considered for use against human beings. Though acoustic weapons are sometimes assumed to always be in the nonlethal category, sound can be irritating, painful, or fatal, depending on its intensity and on the efficiency with which its energy is coupled to the body.

Loud music has repeatedly been used as a psychological weapon in siege situations and as an instrument of torture. Specially-designed acoustic weapons can induce, among other effects, vomiting, choking, spasms, incontinence, thermal burns, intolerable sensations in the chest, injury to internal organs, and hearing damage. The latter is considered a serious drawback in antipersonnel applications, as hearing loss caused by intense sound is often partly or wholly permanent. Like laser weapons designed to blind (which have been outlawed by recent international agreement), acoustic weapons designed to deafen would violate international humanitarian law. Further, they would be vulnerable to obvious countermeasures, such as earplugs. Indeed, some scientists are skeptical about the possibility of developing reliable, affordable weapons of any kind from sound. However, research and development are proceeding. It is unlikely that such devices will see widespread application or that, if they do, they will replace ordinary lethal weapons such as firearms. Due to the tendency of sound waves to diffuse with distance, the unpredictability of their effects on individual persons at sub-lethal levels, and the extremely high power requirements (megawatt range) for lethal levels, acoustic weapons are likely to remain a military curiosity. Audio amplification will thus remain ubiquitous in communications devices and rare in weaponry.

~K.Haritha(19761A0430)

~S.Sai tejaswi(19761A0444)

## ***6. Break Failure Indicator***

Today, Machines are widely controlled by automated control system. To meet the need of growing population economic, effective and reliable control of machines as well as their control system is necessary. The main objective of this project is to continuously monitor the braking system at each and every time during the operation of the vehicle. Now a days, accidents are occurring due to lot of reasons, the one of the main reason is brake failure, it caused to due to poor maintenance, improper use and product defect, in order to safe guard the valuable human for accident the accident monitoring of brake is very important issue in automobile. The brake failure indicator circuit is a circuit that monitors constantly of the condition of brakes and provides an audio visual indication. When the brake is applied in order to slow down or to stop the vehicle the green LED blinks and the piezo buzzer beeps for about one second if the brake system is accurate and working properly. If brake system fails the red LED glows and the buzzer do not beep when the brakes are applied.

Automation is the technology by which a process or procedure is performed with minimal human assistance. Automation or automatic control is the use of various control systems for operating equipment such as machinery, processes in factories, boilers and heat treating ovens, switching on telephone networks, steering and stabilization of ships, aircraft and other applications and vehicles with minimal or reduced human intervention.

Automation covers applications ranging from a household thermostat controlling a boiler, to a large industrial control system with tens of thousands of input measurements and output control signals. In control complexity, it can range from simple on-off control to multi-variable high-level algorithms.

Automatic brake failure indicator and braking system, it is genuine project which is fully equipped and designed for automobile vehicles. This forms an integral part of good quality. The one of the main reason is brake failure, it caused to due to very poor maintenance as well as product defect, in order to safe guard the valuable human for accident the accident monitoring of brake is very important thing in automobile Vehicle safety is the avoidance of automobile accidents or the minimization of harmful effects of accidents, in particular as concern to human life and health. Special safety features have been built into vehicles occupants only, and some for the safety of others. Automatic brake failure indicator and braking system is the most effective solution on this problem .it is the

most effective and the simplest methodology used to reduce the rate of accident due to brake failure

Today accidents are occur due to many reasons, the one of the main reason is brake failure, it caused to due to poor maintenance as well as product defect, in order to safe guard the valuable human for accident the accident monitoring of brake is very important thing in automobile Vehicle safety is the avoidance of automobile accidents or the minimization of harmful effects of accidents, in particular as concern to human life and health. Special safety features have been built into vehicles occupants only, and some for the safety of others.

~K.Akhila (18761A04E5)

~N.Sai priya(18761A04F5)

## ***7. Gaganyaan-A stride towards Space Mission***

Gaganyaan (Sanskrit: गगनयान, "Sky Vehicle") is an Indian crewed orbital spacecraft intended to be the formative spacecraft of the Indian Human Spaceflight Programme. The spacecraft is being designed to carry three people, and a planned upgraded version will be equipped with rendezvous and docking capability. In its maiden crewed mission, Indian Space Research Organisation (ISRO)'s largely autonomous 3.7-tonne (8,200 lb) capsule will orbit the Earth at 400 km (250 mi) altitude for up to seven days with a two or three-person crew on board. The crewed vehicle is planned to be launched on ISRO's GSLV Mk III in December 2021. This Hindustan Aeronautics Limited (HAL) manufactured crew module had its first un-crewed experimental flight on 18 December 2014. As of May 2019, design of the crew module has been completed. Defence Research and Development Organisation (DRDO) will provide support for critical human-centric systems and technologies like space grade food, crew healthcare, radiation measurement and protection, parachutes for the safe recovery of the crew module and fire suppression system. On January 22, 2020 ISRO announced Vyommitra, a Female Robot who will accompany other astronauts in the mission. She can detect and give out warnings if environmental changes within the cabin get uncomfortable to astronauts and change the air condition, she can also take up postures suited for launch and tasks and take commands.

Gaganyaan is a project which aims to support the astronauts to the lower orbit of the earth. Gaganyaan mission is similar to that of "Electrodynamic tether" concept. Electrodynamic tether is a long conducting wire extended from the spacecraft which has strong potential and has less propulsion to spacecraft in the lower earth orbit. Electrodynamic tethers play a key role in satellite communication system. The basic principle for electrodynamic tether is Lorentz force [a combination of Electric and Magnetic force on a point charge due to electromagnetic fields]. Electrodynamic tether is made from Aluminium alloy which is strong, lightweight, inexpensive and easily machined. Tether requires no fuel and is completely reusable, environmentally clean and low cost. "Electrodynamic tether drag" system can be used to reduce the orbit of the spacecraft. The major advantage of tethers compared to propulsion system is it does not require any propellant and it also reduces the de-orbit times. The most exotic future scope for electrodynamic tether technology is that it would propel and power spacecraft

exploring to other outer planets and ferry the satellites to the higher orbits. So in this way electrodynamic tethers can provide long term propellant - less propulsion capability for orbital maneuvering and station keeping of small satellites in low earth orbit.

Preliminary studies and technological development of Gaganyaan started in 2006 under the generic name "Orbital Vehicle". The plan was to design a simple capsule with an endurance of about a week in space, a capacity of two astronauts, and a splashdown landing after re-entry. The design was finalized by March 2008 and was submitted to the Government of India for funding. The funding for the Indian Human Spaceflight Programme was sanctioned in February 2009, but it fell short of full political support and it obtained limited developmental funding. Initially, the first uncrewed flight of the orbital vehicle was proposed to be in 2013, then it was revised to 2016. However, in April 2012 it was reported that funding problems placed the future of the project in serious doubt; and in August 2013 it was announced that all crewed spaceflight efforts by India had been designated as being 'off ISRO's priority list'. By early 2014 the project was reconsidered and was one of the main beneficiaries of a substantial budget increase announced in February 2014. ISRO is developing the Gaganyaan orbital vehicle on the tests performed with their scaled 550 kg Space Capsule Recovery Experiment (SRE), which was launched and recovered in January 2007.

The Indian Space Research Organisation has unveiled a human robot that will be sent to space as part of the Gaganyaan mission, India's ambitious plan to send humans to space.

### **HIGHLIGHTS**

- Vyommitra is a half-humanoid who can mimic human actions
- ISRO will send Vyommitra to space on unmanned missions
- ISRO aims to send three Indians to space by 2022

She can talk. She can recognise other humans. She can mimic what they would do in space. She can even hold conversations and answer queries. She is Vyommitra, a spacefaring human robot developed by the Indian Space Research Organisation. Vyommitra is a 'half-humanoid' that Isro plans to send to space as part of test flights that will be undertaken ahead of the ambitious launch of India's maiden human spaceflight mission.

Vyommitra, in her own words, can "mimic" the activity of a crew of astronauts and even "recognise them and respond to their queries". Vyommitra was unveiled by Isro at an

event in Bengaluru on Wednesday where she greeted reporters with "Hi, I'm Vyommitra the first prototype of half humanoid."According to an ISRO scientist, Vyommitra is a half humanoid since she does not have legs. "It's called a half humanoid because it doesn't have legs. It can only bend sideways and forward. It will carry out certain experiments and will always remain in touch with the Isro command centre," Isro scientist Sam Dayal said.

The space agency plans to send Vyommitra to space later this year when it will launch unmanned flights to space as part of the Gaganyaan project. The Gaganyaan project, announced by PM Narendra Modi in his 2019 Independence Day address, is an ambitious plan of sending Indians to space.

#### Reference(s)

[1] <https://en.wikipedia.org/wiki/Gaganyaan>

~V.SATHVIKA (19761A04C2)

