



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
UNIVERSITY COLLEGE OF ENGINEERING, VIZIANAGARAM.



DEPARTMENT OF
ELECTRICAL AND ELECTRONICS ENGINEERING
PRESENTS



THE MEMOIR

CHRONICLE OF EEE

VOL-8

JAN-2021

EDITORIAL COLUMN

We take immense pleasure to thank all the readers of our magazine for your support to our effort. We, the Department of Electrical and Electronics Engineering, JNTUK University College of Engineering Vizianagaram, proudly present the seventh edition of our magazine “THE MEMOIR- Chronicles of EEE”.

We would like to take this opportunity to thank our principal, **Dr.G.Swami Naidu**, for his constant support at all times, head of the department, **Smt.A.Padmaja**, who has continuously been bringing in all her prudence and extent to be the perfect motivation to each and everyone around, all the faculty, the department of Electrical and Electronics Engineering, and our fellow students, for their support in developing our magazine.

We would like to thank, **Dr.G.Saraswathi**, who motivated, supported and guided 1st year students to complete projects under Engineering Exploration-Design thinking successfully and gaining knowledge in various aspects of Electrical Engineering.

We would like to extend a special thanks to **Dr.V.S.Vakula**, for their approachability and constant support. We would also like to thank Smt. S.Rajitha, and all the teaching faculty of the department of Electrical and Electronics Engineering for their constant support in sharing knowledge and enlightening us. This edition is gathering of recent advancements in power generation and technologies, about an electrical scientist Georg simon Ohm, a clear view on Hybrid vehicles, the future transporter : hyperloop, parametric speaker, the new technology named digital twin technology and dyson sphere. A brief overview of hardware projects done by 1 Btech EEE students as a part of Engineering Exploration - Design thinking is also included in the Edition.

Once again, we would like to express our considerable appreciation to all authors of articles and their knowledge in carving “THE MEMOIR- Chronicles of EEE”.

We welcome your valuable suggestion to improve the standard of our magazine.

**THANK YOU
MAGAZINE TEAM**

PRINCIPAL'S MESSAGE :

I am extremely happy to note that the Department of Electrical and Electronics Engineering student community is bringing out the seventh edition of its newsletter, **"THE MEMOIR"**.



In this connection, I invite the attention of the students towards the articles read in the magazine which paves the way to the world of innovation and invention. It also leads the students to get exposure about new technologies and improve their personality by knowing the life of the inspiring personalities read in the magazine. I whole heartedly congratulate the the members of editorial board for their act in keeping their spirit at high. I wish them all success.

HOD'S MESSAGE :

I am extremely delighted to note that the student community of Department of Electrical and Electronics Engineering, JNTUK UCEV in bringing out seventh edition of its yearly newsletter **"THE MEMOIR"**. I wish them all success.



In this connection, I invite the attention of students towards the successful and inspiring personalities read in the newspaper. I would like to congratulate the effort put by them who contributed the technical and literary articles to the magazine.

I whole-heartedly congratulate the members of editorial board for keeping and continuing the spirit at high for bringing the magazine to reality.

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DESIGNED BY,

S.VJVEK
O.ANJAN KUMAR

EDITED BY,

K.DURGA MANOHAR
J.SONU

MOTTO OF MAGAZINE



Engineering is a profession in which scientific knowledge and mathematics is used and experimented with to develop ways that benefit mankind, making it extremely important to society for several reasons.

Engineering encompasses a whole range of industries that could include on-site, practical construction work as well as evaluating safety systems from an office. They use the knowledge they have within a specific industry in order to make things work and solve problems, whether this be with transport, medicine, entertainment, space or the environment. In fact, engineering is behind everything. Mobile phones? They're down to engineers. Make-up? Also, down to engineers. Cars, computers, shoes and even cutlery? It's all down to engineers.

The environment that engineers work in ranges from offices to studios and laboratories to the outdoors and even underground. Engineering is very closely linked to technology, and the rise of it, which is why it has played a huge part in technological advances including computers, hospital machines, the internet and more.

“There Is No Life Without Engineering.”

“Engineering Sees All, Knows All.”

ABOUT AN ELECTRICAL SCIENTIST

GEORG SIMON OHM

Georg Simon Ohm (16 March 1789 – 6 July 1854) was a German physicist and mathematician. As a school teacher, Ohm began his research with the new electrochemical cell, invented by Italian scientist Alessandro Volta. Using equipment of his own creation, Ohm found that there is a direct proportionality between the potential difference (voltage) applied across a conductor and the resultant electric current. This relationship is known as Ohm's law.



Early life

Georg Simon Ohm was born into a Protestant family in Erlangen, Brandenburg-Bayreuth (then a part of the Holy Roman Empire), son to Johann Wolfgang Ohm, a locksmith and Maria Elizabeth Beck, the daughter of a tailor in Erlangen. Although his parents had not been formally educated, Ohm's father was a respected man who had educated himself to a high level and was able to give his sons an excellent education through his own teachings. Of the seven children of the family only three survived to adulthood: Georg Simon, his younger brother Martin, who later became a well-known mathematician, and his sister Elizabeth Barbara. His mother died when he was ten.

From early childhood, Georg and Martin were taught by their father who brought them to a high standard in mathematics, physics, chemistry and philosophy. Georg Simon attended Erlangen Gymnasium from age eleven to fifteen where he received little in the area of scientific training, which sharply contrasted with the inspired instruction that both Georg and Martin received from their father. This characteristic made the Ohms bear a resemblance to the Bernoulli family, as noted by Karl Christian von Langsdorf, a professor at the University of Erlangen.

Life in university

Georg Ohm's father, concerned that his son was wasting his educational opportunity, sent Ohm to Switzerland. There in September 1806 Ohm accepted a position as a mathematics teacher in a school in Gottstadt bei Nidau.

Karl Christian von Langsdorf left the University of Erlangen in early 1809 to take up a post in the University of Heidelberg. Ohm wanted to restart his mathematical studies with Langsdorf in Heidelberg. Langsdorf, however, advised Ohm to pursue mathemati-

cal studies on his own, and suggested that Ohm read works of Euler, Laplace and Lacroix. Rather reluctantly Ohm took his advice but he left his teaching post in Gottstatt Monastery in March 1809 to become a private tutor in Neuchâtel. For two years he carried out his duties as a tutor while he followed Langsdorf's advice and continued his private study of mathematics. Then in April 1811 he returned to the University of Erlangen.

Teaching career

Ohm's own studies prepared him for his doctorate which he received from the University of Erlangen on October 25, 1811. He immediately joined the faculty there as a lecturer in mathematics but left after three semesters because of unpromising prospects. He could not survive on his salary as a lecturer. The Bavarian government offered him a post as a teacher of mathematics and physics at a poor quality school in Bamberg which Ohm accepted in January 1813. Unhappy with his job, Georg began writing an elementary textbook on geometry as a way to prove his abilities. That school was closed in February 1816. The Bavarian government then sent Ohm to an overcrowded school in Bamberg to help out with the teaching of mathematics.

After his assignment in Bamberg, Ohm sent his completed manuscript to King Wilhelm III of Prussia. The King was satisfied with Ohm's book, and offered Ohm a position at the Jesuit Gymnasium of Cologne on 11 September 1817. This school had a reputation for good science education and Ohm was required to teach physics in addition to mathematics. The physics laboratory was well equipped, allowing Ohm to begin experiments in physics. As the son of a locksmith, Ohm had some practical experience with mechanical devices.

Ohm published *Die galvanische Kette, mathematisch bearbeitet* (The Galvanic Circuit Investigated Mathematically) in 1827. Ohm's college did not appreciate his work and Ohm resigned from his position. He then made an application to, and was employed by, the Polytechnic School of Nuremberg. Ohm arrived at the Polytechnic School of Nuremberg in 1833, and in 1852 he became a professor of experimental physics at the University of Munich. [

In 1849, Ohm published *Beiträge zur Molecular-Physik*, (in English: Molecular



Memorial for Ohm (by Wilhelm von Rümmer) at the Technical University of Munich, Campus Theresienstrasse

Physics). In the preface of this work he stated he hoped to write a second and third volume “and if God gives me length of days for it, a fourth”. However, on finding that an original discovery recorded in it was being anticipated by a Swedish scientist he did not publish it, stating: “The episode has given a fresh and deep sense for my mind to the saying ‘Man proposes, and God disposes.’ The project that gave the first impetus to my inquiry has been dissipated into mist, and a new one, undesigned by me, has been accomplished in its place.” Ohm died in Munich in 1854, and is buried in the Alter Südfriedhof. A collection of his family letters would be compiled in a German book, which shows that he used to sign some of his letters with the expression “Gott befohlen, G S Ohm,” meaning “Commended to God”.

Discovery of Ohm’s law:

Ohm’s law first appeared[a] in the famous book *Die galvanische Kette, mathematisch bearbeitet* (tr., *The Galvanic Circuit Investigated Mathematically*) (1827) in which he gave his complete theory of electricity. In this work, he stated his law for electromotive force acting between the extremities of any part of a circuit is the product of the strength of the current, and the resistance of that part of the circuit. The book begins with the mathematical background necessary for an understanding of the rest of the work. While his work greatly influenced the theory and applications of current electricity, it was coldly received at that time. Ohm presents his theory as one of contiguous action, a theory which opposed the concept of action at a distance. Ohm believed that the communication of electricity occurred between “contiguous particles” which is the term he himself used. The paper is concerned with this idea, and in particular with illustrating the differences in this scientific approach of Ohm’s and the approaches of Joseph Fourier and Claude-Louis Navier. A study of the conceptual framework used by Ohm in producing Ohm’s law has been presented by Archibald. The work of Ohm marked the early beginning of the subject of circuit theory, although this did not become an important field until the end of the century.

courtesy:

<https://www.famousscientists.org/georg-ohm/>

by,

P.Sekhar (19VV5A0275)

P.Sai Ram(19VV5A0276)

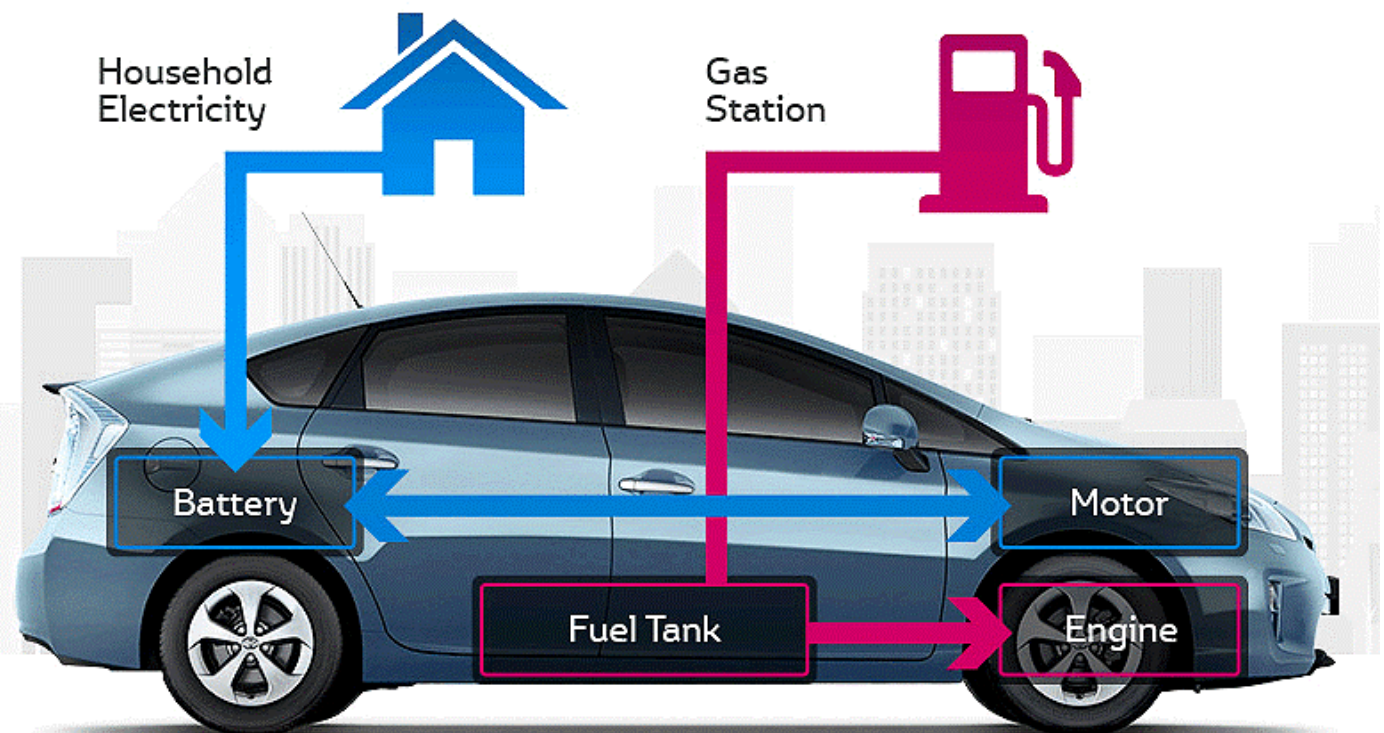
S.Vivek (19VV5A0277)

HYBRID VEHICLES

What is a hybrid?

Quite simply, a hybrid combines at least one electric motor with a gasoline engine to move the car, and its system recaptures energy via regenerative braking. Sometimes the electric motor does all the work, sometimes it's the gas engine, and sometimes they work together. The result is less gasoline burned and, therefore, better fuel economy. Adding electric power can even boost performance in certain instances.

With all of them, electricity comes from a high-voltage battery pack (separate from the car's conventional 12-volt battery) that's replenished by capturing energy from deceleration that's typically lost to heat generated by the brakes in conventional cars. (This happens through the regenerative braking system.) Hybrids also use the gas engine to charge and maintain the battery. Car companies use different hybrid designs to accomplish different missions, ranging from maximum fuel savings to keeping the vehicle's cost as low as possible.



Type of Hybrid Vehicles

Parallel Hybrid

In this most common design, the electric motor(s) and gasoline engine are connected in a common transmission that blends the two power sources. That transmission can be an automatic, a manual, or a continuously variable transmission (CVT). One very popular hybrid transmission is a power-split CVT, which is used by the Toyota Prius and Chevrolet Volt. Transmission type and the size of the gasoline engine are the main factors that determine how a parallel hybrid will accelerate, sound, and feel. Brands that use the parallel

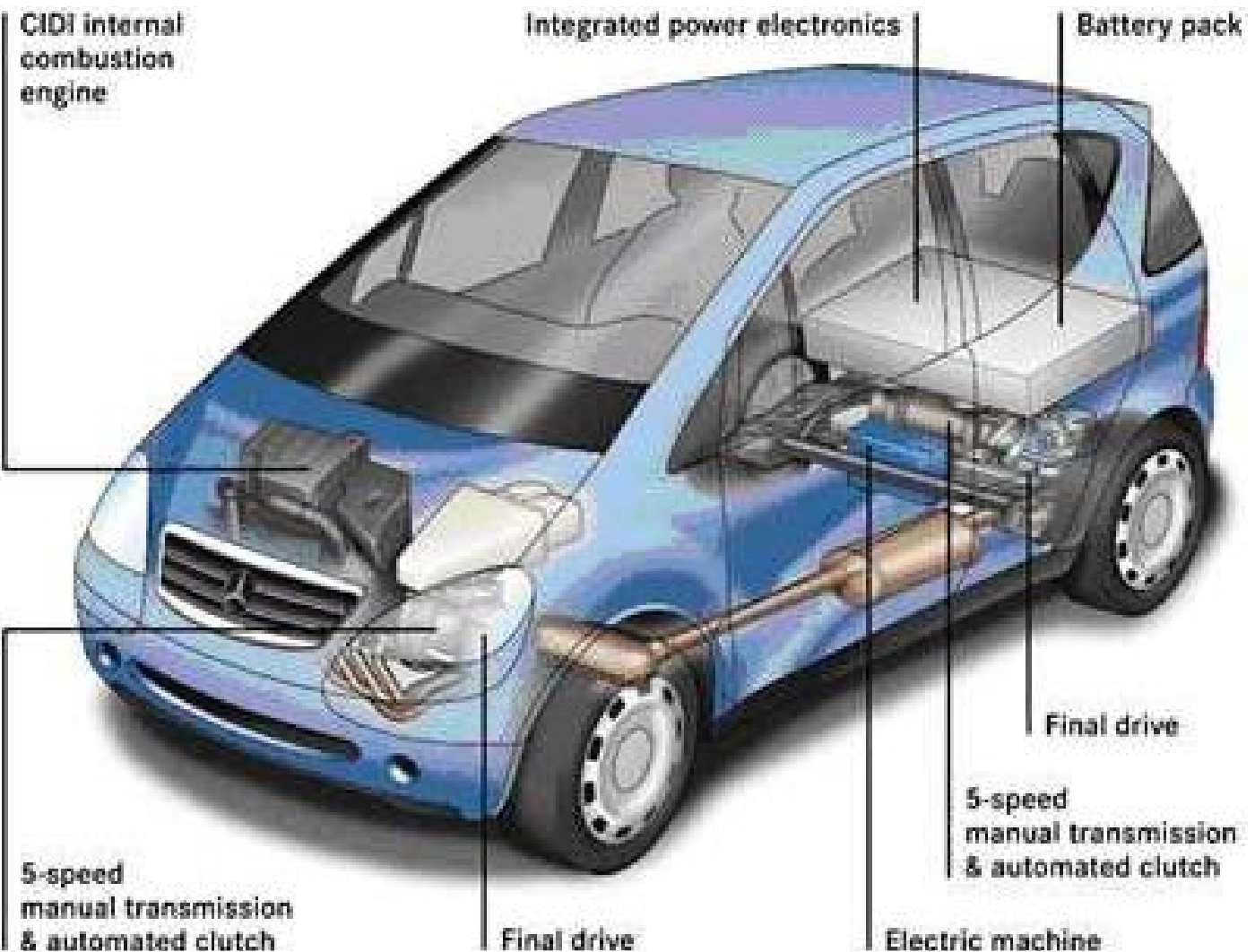
design include Toyota, Lexus, Hyundai, Kia, Ford, Honda, Lincoln, Nissan, and Infiniti.

Series Hybrid

In this design, the electric motor(s) provides all the thrust, and there is never a physical mechanical connection between the engine and the wheels. The gasoline engine is just there to recharge the battery. This results in a driving experience that's more indicative of an electric car, with smoother, powerful acceleration. There's typically less vibration when the gasoline engine engages. However, that engagement doesn't always happen in concert with what your right foot is doing (remember, the battery is making the demands), so the engine might be revving up while the car is cruising at a steady speed. Some find this behaviour disconcerting.

Plug-In Hybrid

A plug-in hybrid enhances the conventional hybrid concept with a much larger battery pack that, like an electric car's, must be fully recharged using an external electricity source—from your home, office, or public charging station. This greater amount of energy storage is like a larger gas tank: It allows for extended all-electric driving (between 15 and 55 miles depending on the model) and can significantly reduce fuel consumption. In fact, if you have a short commute and recharge nightly, you'll be running on electricity most of the time. Should you deplete



the all-electric range, the car basically reverts to being a conventional parallel hybrid.

How hybrid-electric vehicles work?

Hybrids-Electric vehicles (HEVs) combine the advantage of gasoline engines and electric motors. The key areas for efficiency or performance gains are regenerative braking, dual power sources, and less idling.

- Regenerate braking. The drive train can be used to convert kinetic energy (from the moving car) into stored electrical energy (batteries). The same electric motor that powers the drivetrain is used to resist the motion of the drivetrain. This applied resistance from the electric motor causes the wheel to slow down and simultaneously recharge the batteries.
- Dual power. Power can come from either the engine, motor or both depending on driving circumstances. Additional power to assist the engine in accelerating or climbing might be provided by the electric motor. Or more commonly, a smaller electric motor provides all of the power for low-speed driving conditions and is augmented by the engine at higher speeds.
- Automatic start/shutoff. It automatically shuts off the engine when the vehicle comes to a stop and restarts it when the accelerator is pressed down. This automation is much simpler with an electric motor. Also see dual power above.

[https://www.caranddriver.com/features/a26390899/
what-is-hybrid-car/](https://www.caranddriver.com/features/a26390899/what-is-hybrid-car/)

by,
B.B.S.S.KRISHNA
18VV5A0265

HYPERLOOP, FUTURE TRANSPORTER

Human civilization and transportation system both are intensively involved like the back of a coin. We are still looking for the methods of new transportation technology which should be cheaper and faster in the 21st century. Many scientists and engineers have tried to develop a new sustainable transportation system, but they failed to bring the system commercially. But in 2013, An open-source paper was proposed by ELON MUSK who is the founder, CEO, and lead designer of SpaceX co-founder, CEO, and product architect of Tesla, Inc. known as “An Alpha Vision”, which describe the fifth mode of transportation system named Hyper loop after Rail, Water, Road, Air. Though this transportation system is in the conceptual stage, this performance would be a lot of times superior to high-speed rail and air transportation system and also reduce the travel time, transport costs, energy consumption with better safety. So far, hyper loop Vactrain (vacuum train) based on three-part which is

1. Magnetic or air levitation
2. Linear motor proportion

3. Vacuum based transport system

I. HOW DOES THE SYSTEMWORK?

Basic elements of transportation technology are:

- The tube
- The capsule

The Tube

Hyper loop is a tube-based transportation system. It uses two tubes, one for moving forward direction and another one for moving the opposite direction. The diameter and length of the tube are 2.23 m and 30 m. The tube is supported by pylons consecutive-ly 100 ft along the tube. The thickness of the tube (For passengers' tube) is 20 to 23 mm.



The capsule

The capsule is the vehicle for transferring passengers' which dimensions are 25-30 m in length, 1.1 m in height, and 1.35 m in width. It could carry 28 passengers at a time by providing two rows of seats with 14 seats in each row. It has a compartment for hand luggage of its passengers. As so far, the whole system could carry 840 people/hour, which means 7.4 million people/year. The movement of the capsule is carried out using linear electric motors. The moving motor element (rotor) is located on the bottom of the capsule while the tube incorporates the stationary motor element (stator), which powers the capsule.

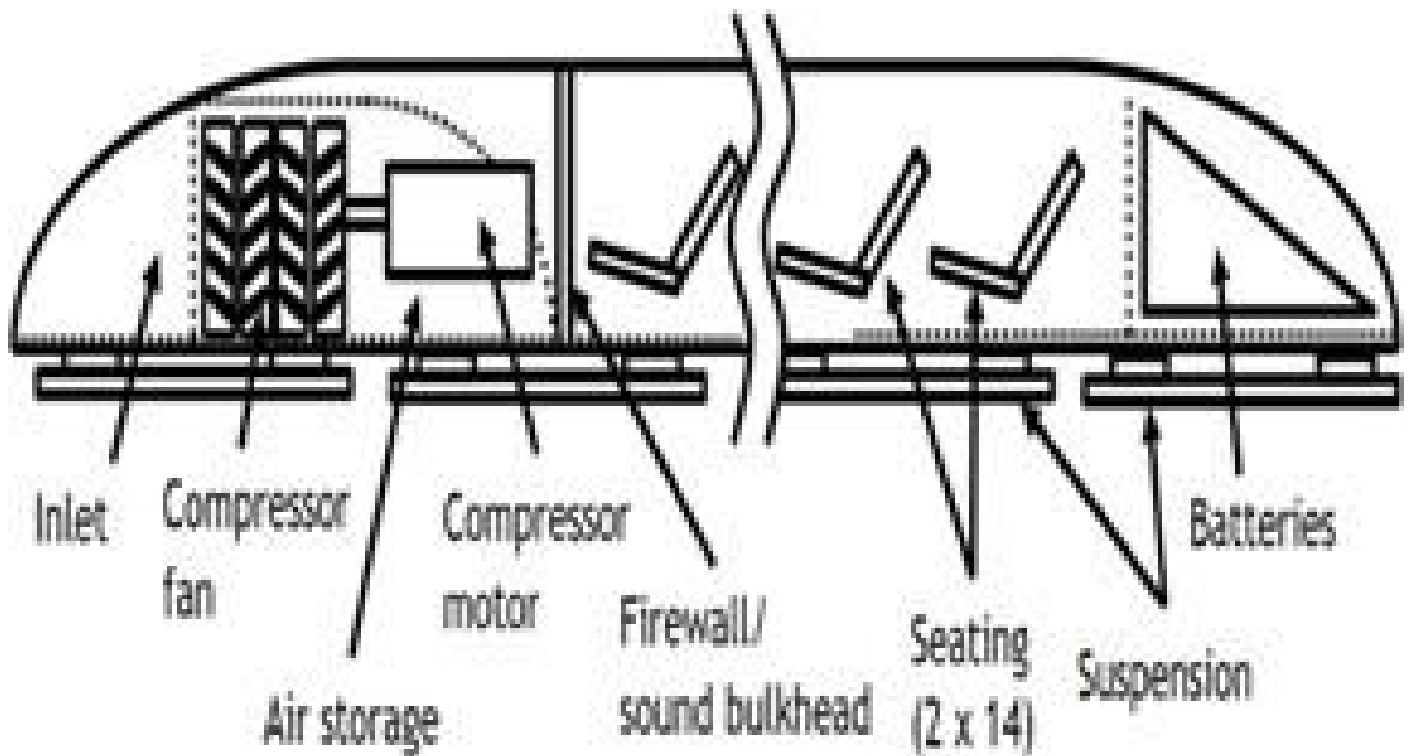


II. WORKING PRINCIPLE &FEATURES OF THIS NEW TECHNOLOGY

An Aluminum sheet works as a rotor for the engine located on the bottom. The stator bend produces linearly moving magnetic field acting on the bottom surface of the capsule. In the transportation system, the main driver is the

Aluminum sheets, which located in the area has vortex currents induced in it, in this way creating an opposite magnetic field. The two different magnetic fields force back each other and produce the motion of the capsule. It would not be challenging to accelerate the capsule to reach the velocity of 760 mph and decelerate it for the better and safer braking system. The acceleration will reboot in a periodically every 110 km (roughly). There should have been a minimum interval time of 30 seconds between two side by side capsules. To get the maximum velocity, the friction should be very lower between capsule and tube. That is why Air cushion mode around the capsule is the right method to prevent the friction between capsule and tube. In the front part of the capsule, An Air compressor receives a counter flow of air to increases the incoming air pressure by 20 times. It feeds in specific proportions through a system of different parts of the capsule surface. As so far, the capsule Must move through the tube by air currents without touching the tube wall.

When a solid body moves in the air, air cushion pushes back from the front. The strength of resistance to movement increases with increasing speed of the body. For reducing air resistance, it is proposed to maintain a pressure of 100 Pa (1/1000 atmospheric pressure) in the tube. The vacuum pump system maintains the required reduced pressure.



Hyper loop passenger pod subsystem notional locations

Energy exhausted by using the air cushion is 21 MW. Solar panels are located on the outer surface of the tube to produce the power for the whole system.

The cells could a massive amount of energy, almost 57MW.

To get maximum speed from any high-speed transportation system, the path should be straight line. Therefore, hyper loop tube should be a straight line as possible as we can. Due to the curvilinear nature of the route in urban areas of Los Angeles and San Francisco, the capsule reduces the speed on these sections of the road. In 2016, the work already had begun; it is planned to finish the project in 2020. Elon Musk estimates the costs of this project at \$ 6 billion for only passenger capsule. Two

companies, Hyper loop One and Hyper loop Transportation Technologies (HTT), began to work for this project. They have involved in solving technical problems associated with the new technology. They have built experimental testing grounds and have started for reality of specific projects in the US and other countries. The NTT is working to the realization this project in California. It also has initial agreements with other countries like Central Europe, United Arab Emirates (UAE), and From Asia (China & India) for the development of Hyper loop passenger's project. In 2016, Hyper loop One organized a worldwide competition to select places where the first hyper loop project will begin. The proposals should outline the need to use new ultra-high-speed transport technology to move goods and people in this particular place. As a result, the company received 2600 offers from individuals and organizations for five months. The company is establishing contact with Russia to construct of a Speed rail it takes 2 hours 38 minutes, by aircraft, it is covered in 1 hour 15 minutes.

A. From table: 2, it is so apparent that the implementation cost is cheap than oath Err modes of high-speed transport systems.

B. This transport system could be three modes of transportation like surface, underwater, underground as well. However, Association a unique underwater transport based on lying off the underwater tubes. As a result, the cargo can be transport with speed of sound. It would be a vast and revolutionary turning point in the whole shipping industry.

C. The system overcomes the limit on the

speed of the land implemented transport in the most advanced modern transportation systems, such as magnetic levitation (maglev) train. A similar train in 2015 at the experimental site in Japan reached a record of a maximum ground transportation speed of 603 km/h; this is half the acknowledged maximum speed of hyper loop.

D. The twin-tube Hyper loop route Los Angeles to San Francisco delivers passengers traffic in a volume of 840 people per hour, which consents to reach the route output capacity of 7.4 million people per year.

E. The new transport system can guarantee low costs in the design and the realization of the transport system. A small weight of transport capsules of several tons compared to multi-tonnage railroad train allows the use of significantly simpler bridges and transitions in the construction of hyper loop roads. The total cost for passenger version hyper loop project from Los Angeles to San Francisco is \$ 6 billion, while for the alternative high-speed rail project; the US governments are ready to spend \$ 70 billion. Moreover, an interesting part of the project is a cheap ticket to travel long distances such as Los Angeles to San Francisco ticket will cost \$20, a ticket for travel on the high-speed rail will cost \$105.

F. Lower operating outlays, consuming 21 MW of energy, the passenger pod moves with an air cushion. The energy produces by solar cells which can produce 57 MW of energy.

G. The best part of the hyper loop is independence from weather conditions, no problem caused at high-speed by small sol-

id counter particles. For Subsonic transport, this is a big problem. This system is much quieter than the traditional high-speed transport system. Another part of this technology is ecological cleanliness due to using air, electricity generated by solar batteries.

H. Reliability and safety, The system safe from all the natural obstacles like floods, earthquakes, bad weather, against birds, animals and also different vehicles, pedestrians. As no physical interaction with cars and railways, pipelines, high voltage electric lines due to tube, this makes it safer and sounder traveling system.

III. FUTURE WORKS OF THIS NEW TECHNOLOGY

As this new technology is in under construction and visualization so here has a huge opportunity to develop as new mode to transportation which could dominate the all available transportation system (High Speed transportation system, Maglev transportation system). Worlds' most technologically develop nation (The USA, China, and Germany) always have been trying to develop the new technology. So, this technology will come at Guizhou province in China which will be the next step to bring it in reality. After developing this technology it could reduce the travel time between long distance with affordable cost for travel.



IV. CONCLUSION:

Being a transportation system fast is not enough; it should be durable, sustainable and safer than others. It was outlined with safety in mind by Elon Musk, known as hyper loop. Developing this project estimate costs \$6 billion from Los Angeles to San Francisco for only passenger travel. Except US many come forward to develop this new technology like Dubai, China, And India, etc. It is a great privilege to the traveller which can save time and money at the sometime.

<https://www.intelligenttransport.com/transport-articles/74281/hyperloop-systems-society-transport/>

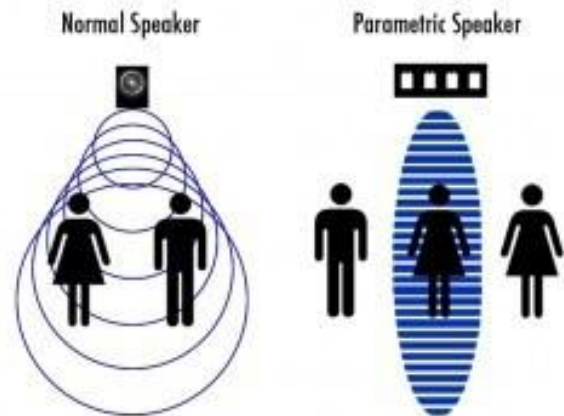
-By
J.Sonu
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PARAMETRIC SPEAKER

What is a parametric speaker?

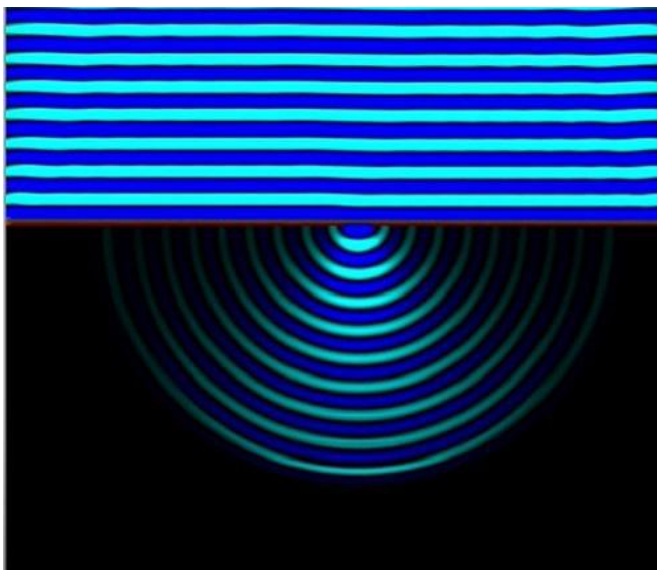
Experiments with parametric and directional speaker systems have been going on since the early 1960s. Ultrasonic sound has much smaller wavelengths than regular audible sound making it much more directional than a traditional loudspeaker system.

Most speakers are designed to throw sound as far and loud as possible. Parametric speakers are more like a laser beam with the sound focused at high intensity into a relatively small area. The result is that two people can be standing only a few feet apart from each other yet only one of them will hear the directional audio waves emanating from the parametric audio source.

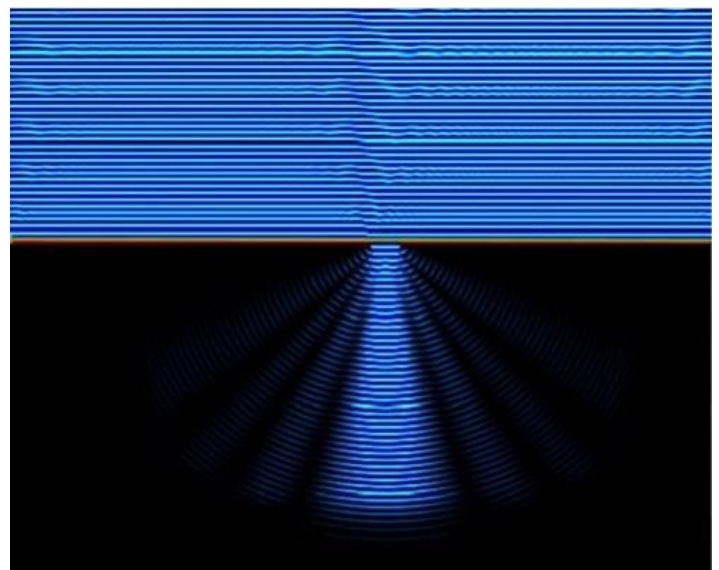


Working

When sound travels it disperses and spreads out as in first shown pictures (a), (b). But higher the frequency more focused it is as shown in below pictures



(a) Low frequency sound waves



(b) high frequency sound waves

Biggest difference is that they don't produce ordinary, audible sound waves with a single, moving electromagnetic coil and cone. Instead, they generate ultrasound (high-frequency sound) waves that are too high pitched for our ears to hear using an array of electrical devices called piezoelectric transducers. These are simply crystals, such as quartz, that vibrate back and forth tens of thousands of times a second when you feed electric currents through them, producing very high frequencies of sound. Ultrasound is used because its higher-frequency waves have a correspondingly shorter wavelength and diffract (spread out) less as they travel, which means they

stay together in a beam for longer than ordinary sound would. Also, having an array of many, small transducer makes sound diffract less than it would do from a single, large transducer (for reasons briefly explained in this article on directional sound).

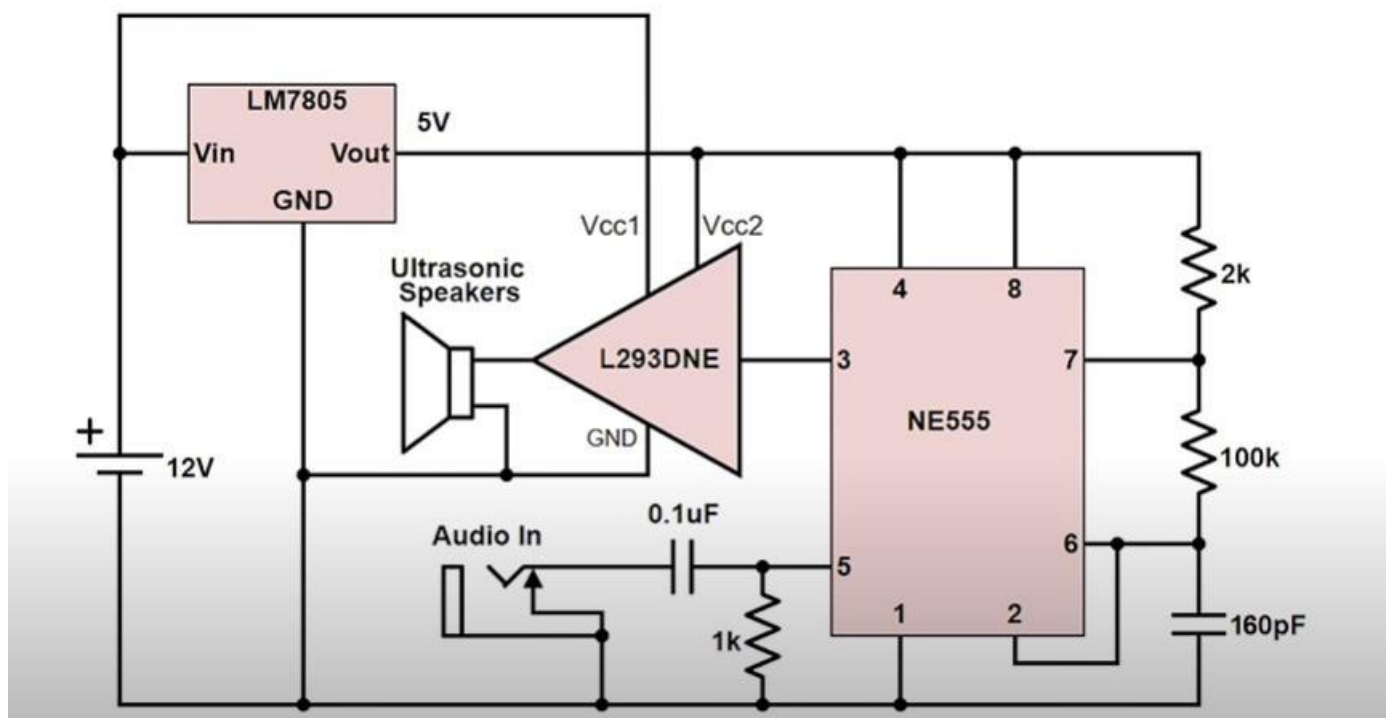


Photo: A conventional (electromagnetic) speaker Has a single, large, sound-producing cone.



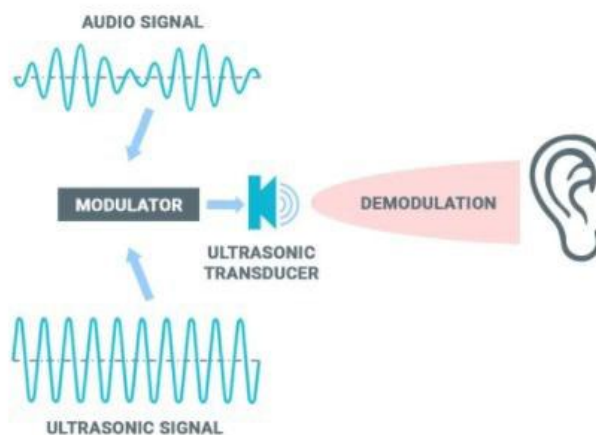
Photo: A parametric, directional speaker has an Array of many ultrasonic transducers

Circuit



Effectively, then, the ultrasound travels out from a directional speaker in a narrowly focused column, like a flashlight beam. But when it hits something, it turns back into ordinary sound you can hear, in other words the speaker array actually produces a modulated wave made of two separate ultrasound waves.

One of them is a steady, reference tone of a constant 200,000 hertz (Hz) frequency (the carrier wave) and the other is the signal that fluctuates between 200,200 Hz and 220,000 Hz (the modulating wave). Although they're combined, it's easiest to think of them as two separate waves traveling out in parallel straight lines through a column of air without overlapping.



If they meet an obstruction (such as your curious head), they suddenly slow down and mix together so they interfere constructively (by adding together) and destructively (by subtracting from one another). By the principle of wave superposition, two ultrasound waves of those frequencies can subtract from one another to produce a third wave with a much lower frequency in the range 200–20,000 Hz—and that's in the frequency range that your ears hear. An electronic circuit attached to the piezoelectric transducers constantly alters the frequency of the two waves so they produce the correct lower, audible frequency when they collide and “demodulate.” (It also encodes the signal in a unique way that ensures there's less noise and distortion when it separates out in the listener's ear.) The process by which the two ultrasound waves mix together is technically called parametric interaction, which is why speakers that work this way are sometimes called parametric loudspeakers.

One of the biggest advantages of directional loudspeakers is how far they can make sound travel. In theory, sound pumping out from a conventional speaker follows what's called the inverse-square law, so doubling the distance from the speaker reduces the intensity by much more than half. But a directional speaker sends its sound in a much more tightly focused column, with far less energy dissipation. In practice, that means it can travel something 20 times further than sound from a conventional speaker.

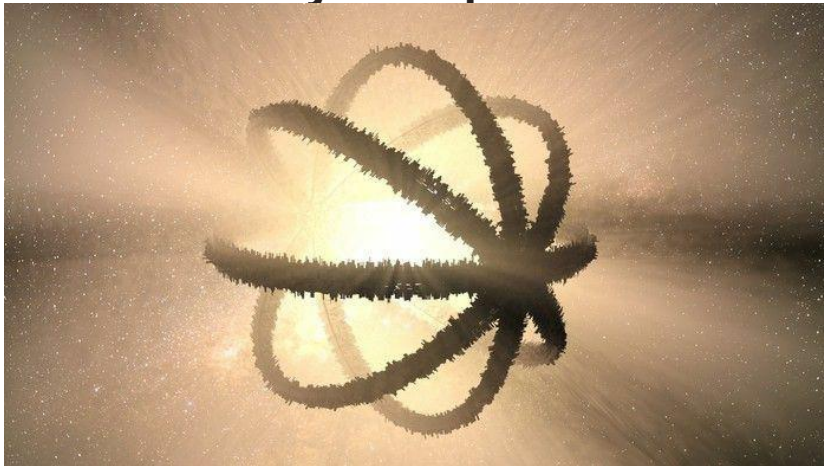
<https://www.soundlazer.com/what-is-a-parametric-speaker/>

by
D.Anudeep
17VV1A0215

DYSON SPHERE: THE FUTURE OF HARNESSING UNLIMITED ENERGY

The Dyson Sphere is a megastructure that can completely harness the energy of a star, and we may have found of way to construct it. Ever since the development of the first civilization, there was always one key problem that prevented the civilization from taking over the entire world: energy. Energy was one of the biggest factors preventing humans from taking over because it fuels everything. Now, things are different. Back then, no energy-powered technology existed. Today, however, almost everything we use is powered by energy, from our pocket-sized phones to massive TVs. Energy is finite, meaning we don't have an unlimited supply, and that's the biggest thing preventing us from conducting interplanetary missions. Hence, a project was introduced that could revolutionize how humans perceive energy. It was a way that would let us harness nearly 50% or more of the sun's energy, and with that type of power, humans would be capable of becoming a type 2 civilization. However, what was this project exactly and how would it work? Let's find out.

• What is a Dyson Sphere?



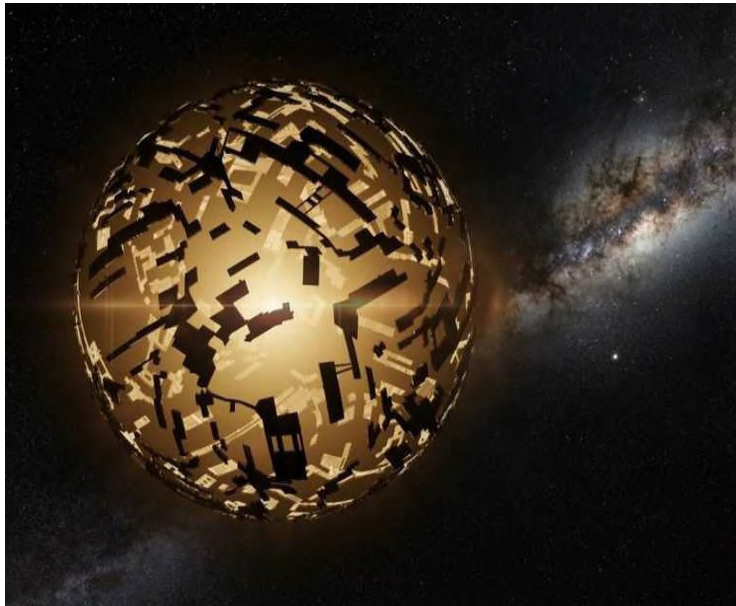
The project mentioned earlier is known as a Dyson Sphere, and it is a theoretical mega-engineering project that encircles a star with platforms orbiting in tight formation. It consists of tiny solar panels, each absorbing the light from the sun and sending it back to Earth for use. This

project was originally introduced by a British-American theoretical physicist Freeman Dyson, who first speculated about these intricate structures in 1960. He stated that as a population continued to increase, more energy would be required, as the rate of energy consumed would eventually be greater than the energy the population could produce. However, with a star that is powered by gasses and fuels producing nearly infinite energy, absorbing a mere 50% of the star's energy would provide roughly 192.5 yotta watts of energy since the Sun produces 384.6 yotta watts (3.846×10^{26} watts) of energy. This amount of energy is unimaginable, and being able to control this type of energy would help humans colonize several planets rapidly.

• Types of Dyson Spheres.

To successfully gain energy from a star, there must be a proper, well-organized infrastructure. There are various designs for different needs, hence, there are several infrastructure designs. Some could gain only 25% of

the energy of the sun, while others could gain 100% of the Sun's energy.

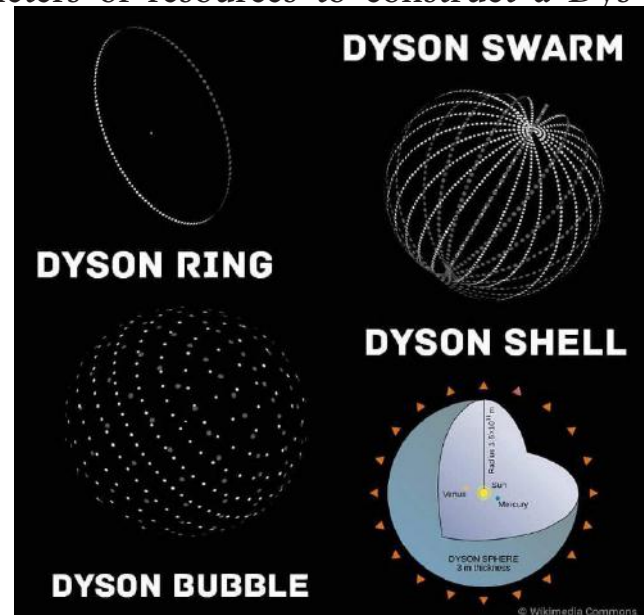
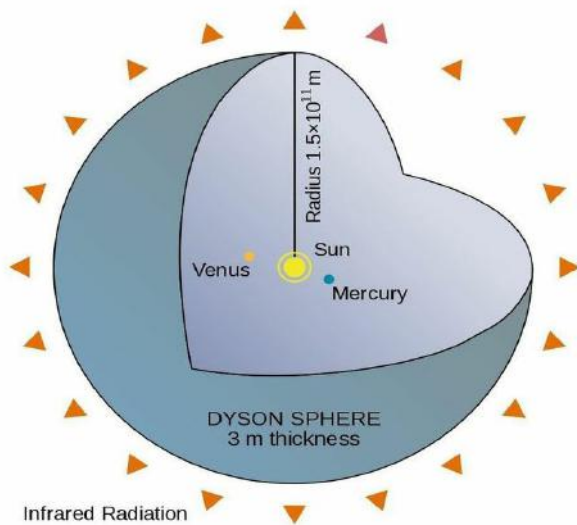


One of the designs for a Dyson Sphere is the Dyson Ring, which would lie on the axis of the sun and absorb >25% of the energy. Another design, the Dyson Shell, would cover up to a 3 million mile radius and would completely engulf the Sun, Mercury, Venus, and Earth, providing us 100% of the Sun's energy. Thinking about this unimaginable amount of power is difficult, but imagine this: in a single hour, the amount of power from a Dyson Sphere could absorb from the Sun and give to the Earth is more than the entire world consumes in a year. To put that into perspective, according to the U.S. Department of Energy, every hour, 430 quintillion Joules of energy from the Sun would hit the Earth. That's 430 with 18 zeroes after it, which is absurd to think about. Now, you may be thinking: why don't we just construct the Dyson Shell right away so we can harness all 100% of the energy from the Sun? Well, some major roadblocks are preventing us from doing so, including the fact that we don't have enough space to build it and we don't have technology advanced enough to do so. Additionally, the funding we would need to construct this project would be astronomically high. To achieve such gargantuan tasks, an advanced civilization must be categorized as one of three types: Type I, Type II, or Type III. Each type of civilization distinguishes itself by conquering and accomplishing specific tasks.

A Type I civilization has colonized its planet and neighboring moon completely. A Type II civilization, also called a stellar civilization, can use and control energy at the scale of its planetary system. A Type III civilization, a.k.a galactic civilization, can control energy at the scale of its entire host galaxy. This is known as the Kardashev scale, and it's a method of measuring a civilization's level of technological advancement based on the amount of energy they can harness. Currently, we aren't even at Type I yet, as we're currently categorized as 0.7. This means that our civilization is not even close to building an entire Dyson Ring, much less a Dyson Sphere.

• How Will They Be Constructed?

To build a Dyson Sphere, we would need more metal and steel than Earth's supply. From a mathematical perspective, we would need roughly 280 quintillion cubic meters of resources to construct a Dyson



on Sphere. For the Dyson sphere to be just 1mm in thickness with a radius of 1AU (Astronomical Unit = 93 million miles), it would require material equaling about 82 percent of the Earth's volume. That's 2.22 septillion (2.22 trillion squared) kilograms of iron! However, to make this possible, mankind would need to be at least a Type II civilization to even come close to constructing a monstrosity like this. We would have to mine out dozens of asteroids and planets just to gain enough metal, iron, and steel to construct a Dyson Sphere of 1mm in thickness (that's as thin as a credit card)!

• Is The Dyson Sphere Possible To Construct?

Although such megastructures are theoretically possible to construct, building a stable Dyson Sphere structure is currently beyond humanity's engineering capacity. The number of materials and resources required to obtain, transmit, and maintain a functional Dyson Sphere exceeds present-day industrial capabilities. Additionally, we currently don't have access to spaceships or rockets that can carry the needed tiles and resources to the desired star. With where mankind is now, we're nowhere near constructing something that could surround our planet, let alone a Dyson Sphere for a star.

Even if we could build one, it would take decades to set up the Dyson Sphere around the Sun, as the workers would need protective gear to protect themselves from the Sun's solar rays, radiation, and immense heat. Additionally, the diameter of the Sun is 864,938 miles, so constructing that distance worth of intricate tiles would take decades to do. The entire world would have to come together and work out a deal to construct an infrastructure this big. However, it's predicted that if everything goes according to plan and humanity becomes a Type II civilization, a Dyson Sphere could successfully be constructed and used within 1 million years.

<https://earthsky.org/space/what-is-a-dyson-sphere>

-By
Kumar Durga Manohar.K
18VV1A0219

DIGITAL TWIN TECHNOLOGY

Introduction to digital twin:

Ever made a machine? If yes, then how many attempts it took to make it function flawlessly, to make it the ideal one? We guess a bonanza of these unsuccessful attempts. It's not only you but every manufactory faces this troublesome situation. At times, a defect in a certain fragment might result in the nonfunctioning of the device. This will



require dismantling the fragments, figuring out the corrupted part, fixing it and there you go back to day one. Ever wanted if you could find out how the machine is going to function before assembling all components? What if we say that you can simulate your device on your desktop as the same as it is going to perform in the real world? No, we are not talking about video games but the exact replica of the device with all of its components from the micro atomic level to the macro geometric level. Yes, this lies within the realm of possibility and can be realized with the help of a “Digital Twin“. The next significant thing in industrial services will be about accurately foretelling the future of physical assets through their digital twins. You might not be acquainted with this term “Digital Twin” right now, but believe me, once you get a glimpse of it, you will be craving to know everything about a “Digital Twin”. Let's start by outlining it. There are plenty of definitions of a “Digital Twin” flooding all over the Internet but the simplest is: A Digital Twin is a real-time digital clone of a physical device.

Brief History of Digital Twin:

The concept and model of the Digital Twin was officially put forward in 2002 by Dr. Michael Grieves as the conceptual model underlying Product Lifecycle Management (PLM). The concept was being practiced since the 1960s by NASA. They used basic twinning ideas for space programming at that time. An example is when NASA developed a digital twin to assess and simulate conditions on board Apollo 13.

A Digital Twin consists of three distinct parts: The physical part, the Digital Part and the connection between the two. The ‘connection here refers to the data that flows from physical products to the digital/virtual product and information that is being available from the digital environment to the physical environment.

How Digital Twin Work?

With the above piece of information, you might have sketched an idea in your mind about the working of a “Digital Twin”. By now, after getting an approximate idea of a digital twin, you might have realized that to create a digital twin, we need physical data, virtual data and the interaction data between the two to map them together to make a digi-

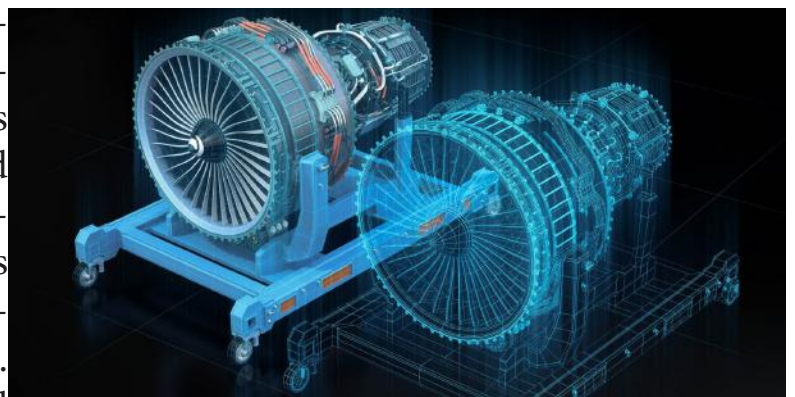
tal replica of the system. For the creation of a digital twin of any system, the engineers collect and synthesize data from various sources including physical data, manufacturing data, operational data and insights from analytics software. The sensors are connected to the



physical product that helps to collect data and send it back to the digital twin, and their interaction helps to optimize the product's performance using a maintenance team. The Engineers integrate Internet of Things, Artificial Intelligence, Machine Learning, and Software Analytics with Spatial Network Graphs to gather all the relevant information and map it into a physics-based virtual simulating model and then by applying Analytics into these models, we get the performance characteristics of the physical asset. For most of the devices, the seamless exchange of data helps in getting the best possible analysis; the same is the case for digital twin. Therefore, a digital twin continuously updates itself from multiple sources to represent its near real-time status, working condition or position. Its learning system learns from itself, using a sensor that conveys data of various aspects of its operating condition; from human experts, such as engineers with deep and relevant industry domain knowledge; from other similar machines; and from the larger systems and environment which it may be a part of. A digital twin also uses the data from past machine usage to factor into its digital model. The digital model created is then applied with analytics such as environmental conditions or interaction analytics with other devices to detect anomalies and the lifecycle of the physical counterpart. The twin then determines an optimal process that boosts some key performance metrics and provides forecasts for long-term planning which helps in optimizing the business outcome.

Need of Digital Twins:

Without any doubt, constructing a digital twin would be purposeless if there were no practical reasons for pursuing it. It is already noted that one cannot make a perfect machine in just one try and it costs bags of money and a whole lot of time experimenting on physical products. On another note, Digital twins and



IOT (InternetOfThings) together with artificial intelligence help us analyze data and monitor systems to scrutinize and solve these problems. Where making a change in

a physical product could be backbreaking, a digital replica can be swiftly revised to demonstrate amendments and to run simulations.

If the outcome of the revised system does not comply with our needs after testing it on Digital Twin prior to physical machine, this would help us with no wastage of physical resources along with the time savings. By monitoring the status of a system or process and using multiple tides of data in real-time to study its digital twin, engineers gain deep knowledge on how to enhance product lifecycles, streamline maintenance and sharp optimization. Using a digital replica of the physical system not only accelerates development in various aspects but also helps to analyze, observe and navigate to every minute detail with so much precision that there is no space for errors and inaccuracies ensuring the optimal production output. Yet another benefit is that digital twins allow experts to work on projects even when they are not in direct contact with the physical twin. It ensures the safety of a well being with no risk of tragedy. Digital twin also helps engineers to work on equipment that's already in space and completely inaccessible to them, without the hassle that comes with the physical accessibility of such types of equipment. Any update or alteration can be first tested for its outcomes and repercussions to avoid any calamity by directly implementing it in the physical world. In a nutshell, digital twins have the power to reshape the universe.

Applications of Digital Twins

We are in the early development stages of the Digital Industrial Era. We are witnessing the major applications of Digital Twins in the following sectors:

1. **Manufacturing:** Not only the emergence of Digital Twins helps us manufacture high-grade products. But also we can salvage money and time both, which would otherwise be wasted on the production. It facilitates these firms to test new designs expeditiously.
2. **Automotive:** As automobiles, especially cars, become progressively integrated with IOT and digital technology, the ability to replicate every detail becomes increasingly indispensable. With the help of digital twins, it has become a piece of cake for engineers to predict the performance of the machines. We can construct a digital twin of all sorts of autonomous vehicles and track the vehicle from the day of its creation to the day it goes to the junkyard.
3. **Healthcare:** A digital twin can help virtualizes a hospital system to create a safe environment and test the impact of potential changes on the performance of the system. Furthermore, Digital Twins in the healthcare sector can identify faults with the various equipment involved in various medical fields. Take an example of cardiologists; they used digital twins of the patient's heart to precisely determine the positioning of leads that would work best on this specific patient that too before surgery decreasing the risk of failure.
4. **Retail:** The implementation of this concept of a Digital Twin plays a key role in augmenting the retail customer experience by manufacturing a simulation that could accurately represent how a specific model of a product takes place in an individual's life.

5. Smart Cities: Cities have numerous moving and interconnected building blocks. With a well suited advanced model, civil engineers, governments and other related companies can test new solutions in the best possible way. This tool can prove highly advantageous for analyzing the different forms of transport and pedestrian movement patterns and for sound planning to ensure that their requirements are met.

Future of Digital Twins

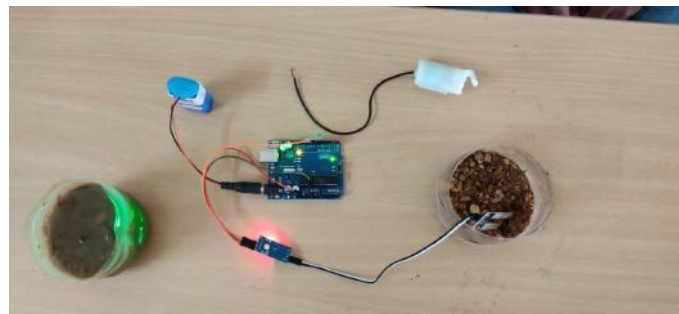
The global market for digital twins is expected to grow very rapidly. Talking in numbers, by almost 38 percent annually, reaching \$15.7 billion by 2023, according to Markets and Markets research. But this is not as easy as it seems as agencies face many challenges in constructing a digital twin. Its construction is only the tip of the iceberg, the actual challenge lies in lack of clear standards for implementing them, a need to train people to use them and a plan for governance. Digital twins hold the potential to change healthcare immensely in the future. They will allow the power to push past the limitations of medicine, and utilize data as a tool to truly understand the human body. Using this information, many concerns such as health and crime issues can be solved. But all along with the emerging technology, we will have to work through crappy stages before we get the good stuff. A lot of big names such as Bosch, Microsoft, IBM, GE and many more have started investing in this technology and the ones who lag may suffer a downfall for their companies.

<https://www.twi-global.com/technical-knowledge/faqs/what-is-digital-twin>

By
H. Sravani
Roll no: 19VV1A0225

PROJECTS UNDER ENGINEERING EXPLORATION- DESIGN THINKING AUTOMATED IRRIGATION SYSTEM USING ARDUINO

The project is about automation of farm irrigation and soil moisture control by Arduino using soil moisture sensor. This automatic irrigation system senses the moisture content of the soil and automatically switches the pump when the soil is dry. A proper usage of irrigation system is necessary because of shortage of land reserved water due to lack of rains. This automatic plant watering and soil moisture monitoring system is very useful in all climatic conditions. India is the agriculture based country. Most of people are completely depended on the agricultural harvesting. Agriculture is a source of employment of majority Indians and has great impact on the economy of the country. In dry areas or in case of lacking rainfall, irrigation becomes difficult. So, it needs to be automated for proper watering a plant and handled remotely by farmer. When soil goes dry, pump will start watering. Automated irrigation can be used for saving time and power.



KOTA ABHIRAM

19VV1A0231



MULLU LEELA PRASAD

19VV1A0237

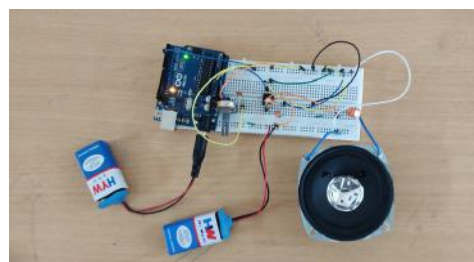


A. JASWANTH SAI

19VV1A0201

Text to speech converter using Arduino

In our society it is very rare to see anyone without electronic gadget. These gadgets are helping the mankind to move along with the fast changing technologies. These changes are made easy by using some of the fabricated boards as they are compatible. One such electronic assembled board that can be used for various purposes is Arduino. The Arduino is an open-source electronics platform based on easy-to-use hardware and software used to build electronics projects. All Arduino boards have one thing in common which is a microcontroller. A microcontroller is basically a really small computer. Arduino is a microcontroller-based open source electronic prototyping board which can be programmed with an easy-to-use Arduino IDE (Integrated Development Environment). There are many boards in the Arduino family like Arduino UNO, Arduino Lilypad, Arduino Mini, Arduino Mega, and Arduino Nano. However, the Arduino UNO board became more popular than other boards in the family because it has documentation that is much more detailed. With the Arduino, makers and electricians can easily prototype their products and make their ideas come to life. Text-to-speech or TTS system is a type of assistive technology that read digital technology aloud. This technology sometimes called as read aloud technology. There are many examples of Text to Speech conversions like the announcements at public transport, the customer care calls, voice assistants in smart phones, or the navigation menu of any machine. Even the TTS is available in Microsoft Word where any individual can set it to speak out the text written in the document. This led to its increased adoption for electronic prototyping, creating a vast community of electronic gadgets. Here in this project the device is designed using Arduino board and other components and successfully tested.



D. ADTYA
19VV1A0219



Y.S D V V ANAND
19VV1A0264



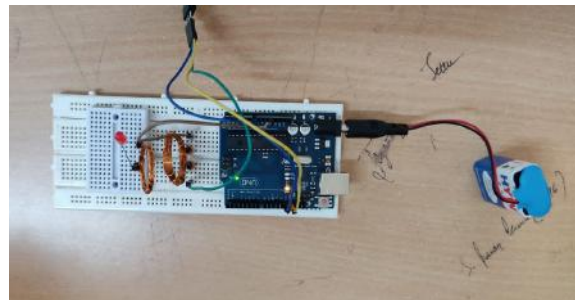
DAKE ANVESH
19VV1A0217



SHAIK SHABBER
19VV1A0257

WIRELESS POWER TRANSMISSION USING ADUINO

In our society it is very rare to see anyone without electronic gadget. These gadgets are helping the mankind to move along with the fast changing technologies. These changes are made easy by using some of the fabricated boards as they are compatible. One such electronic assembled board that can be used for various purposes is Arduino. Arduino is a microcontroller-based open source electronic prototyping board which can be programmed with an easy-to-use Arduino IDE (Integrated Development Environment). There are many boards in the Arduino family like Arduino UNO, Arduino Lilypad, Arduino Mini, Arduino Mega, and Arduino Nano. However, the Arduino UNO board became more popular than other boards in the family because it has documentation that is much more detailed. Wireless communication would be the transmission in the energy spanning a distance without the usage of wires or cables, where distance can be short or long. Wireless operations permits services, for example long-range communications, which are merely unfeasible using wires. Wireless energy transfer or wireless power transmission may be the transmittance of electric power from your power source for an electrical load without interconnecting wires. Wireless transmission is advantageous in instances where interconnecting wires are inconvenient, hazardous, or impossible.



C. ANANDA HRUDAY
19VV1A0216



KANCHARANA AJAY
19VV1A0227



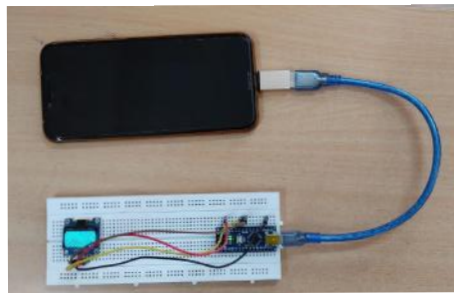
DARAPU HEMANTH
19VV1A0218



PANDRANKI VASU
19VV1A0240

GENERATION OF QR CODE USING ARDUINO

QR codes are everywhere: you can find them printed on the packaging of your latest gadgets, you can find them on business cards, included on presentations at conferences, you can even see them painted on buildings. People and companies use them to store and distribute all kinds of information, in a manner that is quickly accessible to anyone with a smartphone. The use of QR Code is increasing widely day by day . Now a days QR codes are preferred over Bar codes as they even allow Fast and secure payments like Google pay . QR codes are even used to a store large amount of data & we can have a free access For example our identity Aadhaar card has a QR code which even stores our fingerprint print & iris pattern . QR codes are the future to contactless data transfer data .In this project , will generate a very own QR code by using a Arduino Nano board , SSD 1306 OLED , breadboard & jumper wires which will be helpful in the understanding the way QR code is generated ? Patterns involved in a QR code ? Coding of a QR Code?



N PRUDHVI TEJA
19VV1A0239



B Mouli Chand
19VV1A0205



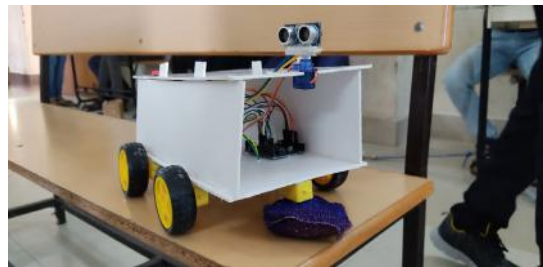
P LIKITH
19VV1A0249



P BHASKAR
19VV1A0245

AUTOMATIC FLOOR CLEANING ROBOT

In recent days, everything in this world is getting linked to machines and technology. As we know, every field is making its foot forward when it comes to technology. From the day of roti pickle to the day of wheel to the day of rail free train.,- From the day of mooki to the day of 3d animated ., From the day of smoke fumed kitchen to the day of micro owed kitchen.., Everything in this world is getting developed... as a matter of fact, kitchen too has to make its foot forward.. And as a trial, we put forward our prototype “automatic floor cleaning robot”.. As cleaning is a routine time wasting task.. We planned to hand it over to a robot.. This robot is driven by an “arduino uno” .. This robot is made with an inbuilt driver which controls its movement. It has an ultrasonic sensor to detect obstacles in its path and notify.. And also a servo motor to move the sensor.. In this way it is made with some components. At last, without the intervention of any other person, our robot solely will clean the floor. Which could be used by old people, bachelors, handicapped people and in restaurants etc.



B. KUMAR RAJA
19VV1A0206



Y. VAMSHI
19VV1A0263



A. AKHIL SAI SATISH
19VV1A0203

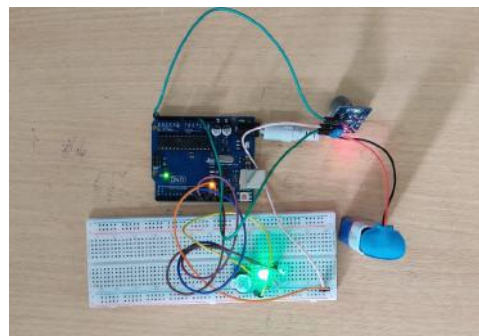


V. HARIBABU
19VV1A0261

Batch-06

FIRE AND GAS DETECTION SYSTEM USING ARDUINO

LPG leakages are a mutual hindrance in household and manufacturing nowadays. It is a very life threatening if you will not distinguish and modified in a right way. While LPG is an essential need of every household, its leakage could lead to a disaster. To alert on LPG leakage and prevent any mishappening there are various products to detect the leakage. The idea behind our project is to give a solution by sensing the leakage with the help of a sensor and warning the user with the help of blinking lights and electromagnetic buzzer. Fire accident causes huge loss every year in the world. Analyzing past FIRE incidents, facts are revealed. Some of the main causes are insufficient fire defence materials, faulty electrical wiring causes electrical short circuit, presence of inflammable materials, fire safety violation and lack of awareness about the gas leakages etc. The project has been designed to avoid such loses and warn the authorized person before gas and fire explosions.



P.RESHAB
19VV1A0246



Y. LOKESH
19VV1A0265



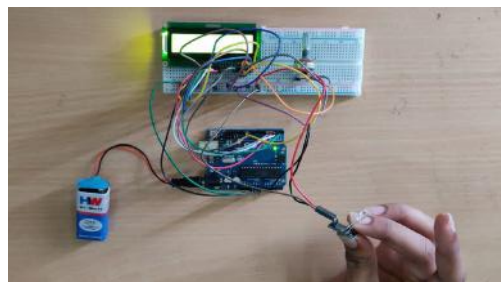
S.VEERA BRAHMAM
19VV1A0259



P. JAGADEESH
19VV1A0250

Batch 7: HEART BEAT SENSOR USING ARDUINO

Heart is the most wanted part of human being to live in a world, at the same time the heart rate analysis is increased in medical field and the heart analysis is important parameter of human health. The various heart rate analysis method is available in medical field like ECG and pulse sensing system this pulse analysis is depends on the blood force of heart artery . This artery is closed to the skin in that reason the pulse is identified easily. The proposed system analysis the pulse rate in the way of fingertip using Arduino controller, and it's based on photo phelthysmography principle. This method to analysis the blood pressure difference and identified the variations of the value of blood pressure and send to the controller. The function of heart beat is occur the whole body blood is pumping, so it depends upon the fingertip blood artery is also change. This type of changes is identified with help of the heart beat sensor is placed in the finger to measure the value, and the signal is send to the controller via serial communication system it is help to monitoring the heart beat range. The photo diode and infra-red led is placed in the sensor to detect the blood volume, the infrared diode is transmit the infrared light to the fingertip, this light passing over the blood inside arteries of finger. The photo diode is analysis the light signal and reflected back to the device, so the difference between the light signal the value is send to the controller. It is continuously processed in the every circulation of blood in the fingertip region, and send the variation of changes in the light signal to the controller via serial communication. The reflected light is converted into the pulse range to easily identify the heart beat range.



R Chiranjeevi
19VV1A0251



B Gowtham
19VV1A0213



K Vamsi
19VV1A0228



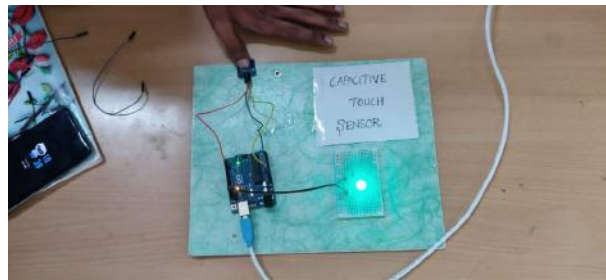
B Ashok Kumar
19VV1A0212



V Hemanth reddy
19VV1A0262

BATCH 08 : CAPACITIVE TOUCH SENSOR USING ARDUINO

In our society it is very rare to see anyone without electronic gadget. These gadgets are helping the mankind to move along with the fast changing technologies. These changes are made easy by using some of the fabricated boards as they are compatible. One such electronic assembled board that can be used for various purposes is Arduino. Arduino is a microcontroller-based open source electronic prototyping board which can be programmed with an easy-to-use Arduino IDE (Integrated Development Environment). There are many boards in the Arduino family like Arduino UNO, Arduino LilyPad, Arduino Mini, Arduino Mega, and Arduino Nano. However, the Arduino UNO board became more popular than other boards in the family because it has documentation that is much more detailed. Capacitive touch sensors are widely used in most of the portable devices like mobile phones and MP3 players. Capacitive touch sensors can be found even in home appliances, automotive and industrial applications. The reasons for this development are durability, robustness, attractive product design and cost. Should we have to add our roll no's also mam? Touch sensors, unlike mechanical devices, do not contain moving parts. Hence, they are more durable than mechanical input devices. Touch sensors are robust as there are no openings for humidity and dust to enter.



G. YOGENDRA SAI
HEMANTH NAIDU
19VV1A0220



K. HEMANTH
19VV1A0232



K. HEMA
MAHENDRA REDDY
19VV1A0229



C. NISHI
19VV1A0215

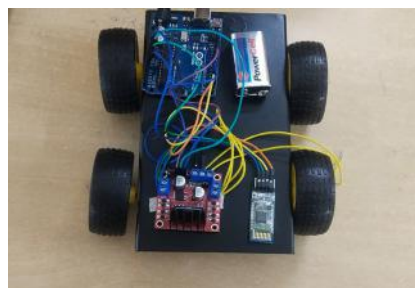


P.PAVAN KUMAR
19VV1A0244

VOICE CONTROLLED CAR USING ARDUINO

In our society it is very rare to see anyone without electronic gadget. These gadgets are helping the mankind to move along with the fast changing technologies. These changes are made easy by using some of the fabricated boards as they are compatible. One such electronic assembled board that can be used for various purposes is Arduino.

Arduino is a microcontroller-based open source electronic prototyping board which can be programmed with an easy-to-use Arduino IDE (Integrated Development Environment). There are many boards in the Arduino family like Arduino UNO, Arduino Lilypad, Arduino Mini, Arduino Mega, and Arduino Nano. However, the Arduino UNO board became more popular than other boards in the family because it has documentation that is much more detailed. The aim of our project is to make a Voice Control Robot Car. The working is based on Arduino micro-controller, motor drivers, a Bluetooth module. Arduino is an open-source hardware (single-board microcontrollers and kits) used for building digital devices. The idea is to first design the Hardware of the Robot Car and then code the entire working using our previous knowledge of programming. The code will then be simulated on software (IDE) and later be interfaced with the hardware. The coordination of control unit with Bluetooth gadget is accomplished utilizing a Bluetooth module to catch and read the voice orders. The controlling remote is a smart android device with Bluetooth Application. We picked this as our project as robotics has become a major part of our everyday lifestyle and also have a wide scope in the engineering field. It plays a vital role in the development of new technology.



P.Lavanya
19VV1A0242



M. Badilibhai
19VV1A0236



M.Jahnavi
19VV1A0235



M. Mounika
19VV1A0234

BATCH-10.

SINGLE AXIS SOLAR TRACKING SYSTEM

In this globalization era, demand of electricity keeps on increasing year by year. The demanding of electricity gives an impact on the loss of main resources to produce electrical energy. Mankind have explored more ways and technologies for the production of electrical energy using the renewable energy resources. Renewable energy is an energy which generate from natural resources which are naturally replenished. Among all the renewable energy resources that have been discovered, solar energy is the most suitable. The solar energy provides light, heat and energy to all living things. Solar energy is a free energy which does not have any price if using it. Furthermore, solar energy does not produce any pollution, environmental friendly and endless supplies. Solar energy is an energy generated by the sun in the form of solar radiation. Solar radiation from the sun is collected and absorbed by the solar panels and convert into electrical energy.

Despite of solar energy being a good source of energy, there is a need to improve the methods to harness this energy. This can be achieved by using solar tracking system instead of fixed system. come out with an idea to develop a single axis solar tracker for solar panel. The circuit is controlled by microcontroller Atmega328P, two dependent resistor (LDR) and a servo motor. The purpose of the research is to observe comparison of voltage reading between fixed and tracking solar panel. Solar panel assemble and connected to a stepper motor to track the sun so that maximum sunlight will be directly shine on the panel at any given time of the day and year. deals with the design and execution of a solar tracker system dedicated to the PV conversion panels using a single axis solar tracker device to ensures the optimization of the conversion of solar energy into electricity by properly move and turn the PV panel into the real position of the sunlight. discuss on the important of using solar tracking system for extracting solar energy. The researcher discussed on mechanism of building an efficient solar tracking system with the help of LabVIEW software. This thesis discussed on determining the accuracy of solar trackers by measuring the tracker angles. The tracker angles of the the solar trackers were measured under varying conditions. It examines the degree to which the solar tracking system were able to achieve optimal solar angles (optimal accuracy) over the course of a day and under different operating conditions. proposed the mechanism of solar tracking which was implemented by the use of an image processing software which combines the effect of sensors and processed image of sun to control the solar panel accordingly.

The purposes of this research are to develop a tracking system that control and monitor the movement of solar panel based on the intensity of the light, to measure output voltage, current and power, $P=IV$ and to compare the efficiency increase of a solar system between fixed solar system and solar tracking system.



G..Aruna
19VV1A0224



B..Mounika
19VV1A0208



S..Madavi
19VV1A0254

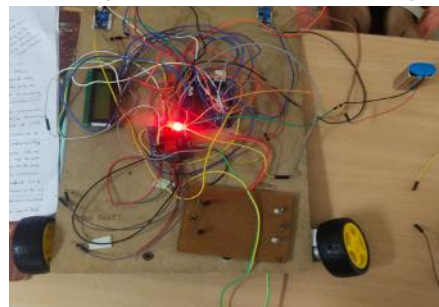


B.Nandini
19VV1A0211

Batch number:11 DRIVERLESS TRAIN

Nowadays, the modern technologies are helpful in all aspects of our life. Due to this lots of developments are done in the every field. Besides this, automation is increasing day by day in our daily life like automatic lights, automatic street lighting, automatic fans, air-conditioners etc. we wish we could use the same automation technique in the field of transportation, particularly in trains. In previous years, with the use of regular train, accidents occur due to various reasons like the fault of the driver, signal errors and another problem is, the human operated train has no control over time, mean inaccuracy in time which affect the railway network management system. To solve this problem we have a new concept of driverless train. Driverless train improve the management system of the railway network reduce human errors consume less power and it provides comfort and safety to passengers during travelling.

In this train shuttling of the train between the stations is controlled by a micro controller, namely Arduino UNO. Arduino UNO, IR sensors, L298N motor driver, DC motors are the main components of this project. IR sensor is an electronic device, that emits the light in order to send the signals of some objects of the surroundings. Any IR sensor can measure the heat of an object as well as detects the motion. IR photodiode is the detector and IR LED is the emitter. When IR emitter emits radiation, it reaches the object and some of the radiation reflects back to the IR receiver. Based on the intensity of the reception by the receiver, the output of the sensor defines. Here the motion of the motor is operated on the action of keeping an obstacle in front of IR sensor. When an object is detected in front of the IR sensor the motor stops running and whenever no obstacle is present in front of it the motor starts working. we use L298N motor driver which is capable of running two DC motors at the same time, also the direction of these two motors independently. When a train reaches a station, a signal will be made to fall on the IR sensor and the micro controller gives commands to stop the running of motors and whenever it starts the obstacle i.e. the signal at the station is removed from the IR sensor then the train starts to move. Here the direction of the motor i.e. anticlockwise direction or clockwise direction will be driven by L298N motor driver module. Thus without the need of a driver we can make a driverless train using the microcontroller Arduino. All the activities like sensing the obstacle by sensor, shuttling of the motor between the stations will be controlled by Arduino UNO. With the help of this train, trains run fast, attractiveness of public transport will increase, high quality of service with high frequencies will be given and consumption of energy is less.



P. Satyasree
19VV1A0248



H. Sravani
19VV1A0225



A. Usha Rani
19VV1A0202



B. Sai Nikitha
19VV1A0214

BATCH 12

AUTOMATIC ACCESS CONTROL USING ARDUINO AND RFID SENSOR

Wireless security based applications have rapidly increased due to the dramatic improvement of modern technologies. Many access control systems were designed or implemented based on different types of wireless communication technologies by different people.

Radio Frequency Identification (RFID) is a contactless technology that is widely used in several industries for tasks like access control system, book tracking in libraries, tollgate system, supply chain management, and so on. Initially RFID tags were made to eventually replace barcodes in different chains. Their advantages are that they can be read wirelessly and with no line of sight, contain more data than barcodes, and are stronger. As the paper describes the recent technology, include the frequency ranges used and standards required. With the increase in ubiquity of RFID tags, however, privacy became unease.

Automatic RFID-based access control system using Arduino was designed. The system combines RFID technology and Arduino to accomplish the required task. When the RFID reader installed at the entrance detects an RFID tag, the system captures the user unique identifier (UID) and compares it with the stored UID for a match. If the user UID captured match with any of the stored UID, access is granted; otherwise access is denied. The results clearly show that the system is cheap, effective, and a reliable means of granting or denying access in a secured environment.



Seelaboina Rekha
19VV1A0255



Kosuri Venkata Satya Kavitha
19VV1A0230



B.N.V Ishitha Gayathri
19VV1A0207



G. Alice Chandrika Gloria
19VV1A0223

Batch_13

Smart Dustbin using Arduino

The main objective of the project is to design a smart dustbin which will help in keeping our environment clean and also ecofriendly. We are inspired from Swatch Bharat Mission. Nowadays technologies are getting smarter day-by-day so, as to clean the environment we are designing a smart dustbin by using Arduino. This smart dustbin management system is built on the microcontroller-based system having ultrasonic sensors on the dustbin. If dustbin is not maintained than these can cause an unhealthy environment and can cause pollute that affect our health. In this proposed technology we have designed a smart dustbin using ARDUINO UNO, along with ultrasonic sensor, servo motor, and battery jumper wire. After all hardware and software connection, now Smart Dustbin program will be run. Dustbin lid will when someone comes near at some range than wait for user to put garbage and close it. It's properly running or not. For social it will help toward health and hygiene, for business for we try to make it affordable to many as many possible. So that normal people to rich people can take benefit from it.



Uppe Sai Prasuna
19VV1A0260



Boddu Seshanjali
19VV1A0210



Perikala Srujana
19VV1A0243

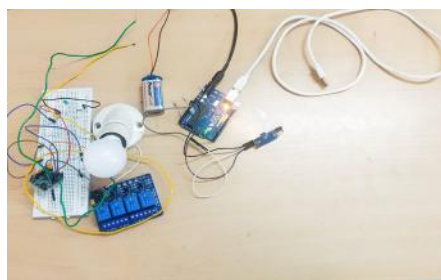


Shaik Ameesha
19VV1A0256

BATCH 14

AUTOMATIC ROOM LIGHT CONTROLLER USING ARDUINO

In our society it is very rare to see anyone without electronic gadget. These gadgets are helping the mankind to move along with the fast changing technologies. These changes are made easy by using some of the fabricated boards as they are compatible. One such electronic assembled board that can be used for various purposes is Arduino. Arduino is a microcontroller-based open source electronic prototyping board which can be programmed with an easy-to-use Arduino IDE (Integrated Development Environment). There are many boards in the Arduino family like Arduino UNO, Arduino Lily pad, Arduino Mini, Arduino Mega, and Arduino Nano. However, the Arduino UNO board became more popular than other boards in the family because it has documentation that is much more detailed. Automatic Gadget Control System using Arduino and PIR (Passive Infrared) Sensor can be used to turn ON and OFF the lighting system of home automatically by detecting the presence of human. This system can be used in garages, classrooms, staircases, bathrooms, etc. where there is no need of continuous light but only when there is a human. Also, there is no need to worry about electricity bills as the lights get OFF when there is no human and hence one need to pay the bills as per use. This paper proposed as about automatic gadget control system which automatically control the room lights using Arduino and PIR sensor. The main components used in this system are Arduino Uno, PIR sensor and Relay Module. Out of these components, the operation of system mainly depends on PIR sensor which helps in detecting human presence. Experimental results show that at least 50% of power can be saved by using the proposed system.



G. Hemalatha
19VV1A0222



G. P. V. V. Sridevi
19VV1A0221



N. Chakradevivenisri
19VV1A0238

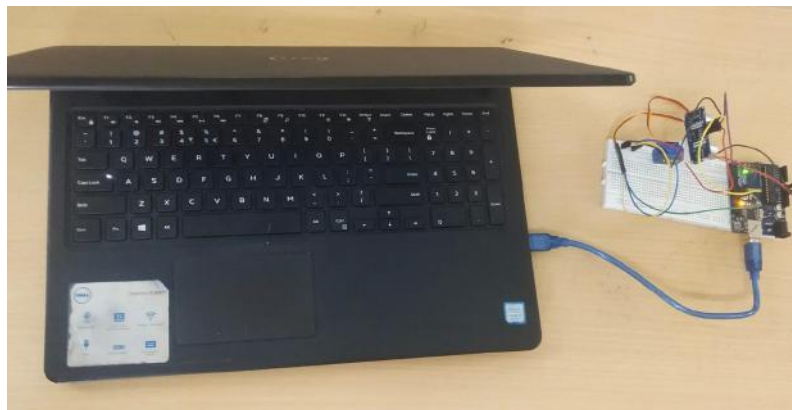


P. ApuRupaRani
19VV1A0241

Batch number:15

ARDUINO RADAR USING ULTRASONIC SENSOR

Radars today are used to detect and aircrafts, spacecraft, and ships at seas as well as insects and birds in the atmosphere; measure the speed of automobiles; map the surface of the earth from space; and measure properties of the atmosphere and oceans. The main aspect of this project is to make a simple radar using Ultrasonic sensor. This Arduino Radar using Ultrasonic sensor is implemented with the help of processing application. The Arduino radar project is more of a visual project than it is a circuit application. This project is made of different components like Arduino Uno, Ultrasonic sensor and servo motor but the main aspect is the visual representation in processing application. When obstacle is placed in front of Ultrasonic sensor it detects the distance, angle and position of the obstacle. When the obstacle is detected the graph in pc changes from green colour to red colour. we will receive the values for the angle and the distance measured by the sensor from the Arduino Board into the Processing IDE using the Serial Event() function which reads the data from the Serial Port and we will put the values of the angle and the distance into the variables Angle and Distance. These variables will be used for drawing the radar, the lines, the detected objects and some of the text.



Sk.karimunnisa
19VV1A0258



S.Likhitha
19VV1A0253



M.Sharvani
19VV1A0233



R.Chinna Anjamma
19VV1A0252