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ELECTRIC VEHICLES AND SENSORS

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ABSTRACT :-

The amount of fossil energy is dwindling, while the amount of renewable energy is growing. Electric energy is a kind of renewable energy. Electricity is used to power electric cars. The most popular technique to minimise air pollution and greenhouse emissions is to use electric automobiles. The market for electric cars is a growingly significant component of the automobile industry. Electric cars have minimal maintenance costs, higher power efficiency, and a quieter, more comfortable ride. Customers are drawn to buying sensors for electric vehicles. The vehicle's sensors are much more useful for controlling it. Sensors are used in these situations because they are low-cost, have a low power factor, require less current, are voltage and temperature sensors, and can monitor a vehicle's weight and speed.In this essay, we have provided a brief summary of the many types of electric vehicles, including plug-in hybrid electric vehicles, fuel cell electric vehicles, and hybrid electric vehicles (PHEV). Newly developed conductivity composite sensors and various types of sensors, such as temperature-based, multi-sensor fusion-based longitudinal, map-based, NOx-based, and navigation-based sensors, are now available. You need the right sensors to control the robot with great precision. devices for a variety of uses in EVs.

KEYWORD:-

Electric vehicles, non-renewable, HEVs, BEVs, sensors, temperature sensors ,hall effect,Battery Management System,Electric Vehicle Transmission, Charger for Electric Cars,angular velocity.

INTRODUCTION

Places for renewable energy are expanding daily, while those for fossil energy are declining. Comparatively speaking, renewable energy is less expensive than non-renewable sources. All or part of the power for electric cars comes from electricity. Electric cars have garnered a lot of interest worldwide due to rising air pollution levels and energy consumption. Therefore, the automotive industry and related industries are appealing to electric cars. Electric cars are quiet and smooth to drive, pollution-free, minimally maintained, have small batteries, are simple to recharge, use less gasoline, and are simple to run for a one-time investment. Therefore, this benefit to modern society makes electric vehicles more appealing. model of a little electric car in Groningen in 1835. It has sophisticated signal processing modules, sensors, actuators, a

navigation system, and a camera that imports parts from EVs.

Various types of electric cars depend on the source Fuel cell electric vehicles (FCEVs), plug-in hybrid electric vehicles (PHEVs), battery electric vehicles, and hybrid electric . vehicles (PHEVs) a battery-powered electric motor with a conventional internal combustion engine (Ice).

EV sensors come in a huge variety of varieties in real life. Automotive sensors-based technology is gaining popularity among both investors and customers because sensors, or "magic eyes," as we like to call them, have become the industry's right hand. These sensors that we're going to describe are used in automobiles to manage operations like speed regulation, fuel/air ratio in the combustion region, temperature monitoring, engine vehicle speed, wheel speed sensors, speedometer sensors, parking sensors, and oxygen sensors.sorts of cars on various sensors used in electric cars and the significance of electric cars

I ELECTRIC VEHICLES

Electric vehicles first appeared in the middle of the nineteenth century when the underlying reason for motor vehicles was electricity, which provides a size and scope of solace and amelioration of action that gasoline vehicles could not achieve in an hour. As we saw technology advancements later in the 21st century, they had a significant influence on EV rejuvenation, leading to a rise in emphasis on renewable energy. For impulse generation, an electric vehicle may employ one or more traction motors or electric motors (EV). These cars can be powered by self-contained batteries, solar panels, fuel cells, or electric generators that convert fuel to energy .

In contrast to hybrid electric vehicles, which add battery power to a combustion engine but cannot be plugged in, electric vehicles may be charged from electric power stations as needed by the drive.(5)

TYPES OF ELECTRICAL VEHICLES

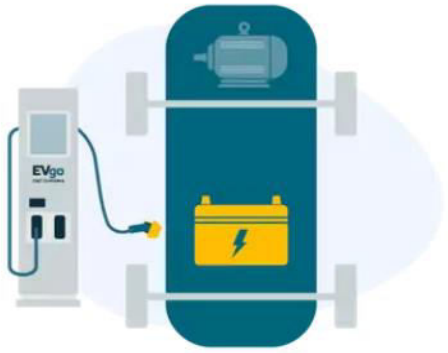
1.Battery electric vehicles (BEVs)
2. Hybrid electric vehicles (HEVs)
3 .Plug-in electric vehicles (PHEVs)
4.Fuel cell electric vehicles (FCEVs)

An electric car is a vehicle that uses one, occasionally two, electric motors to propel itself. It can be powered independently by a battery, a collection system, or energy from extravehicular sources. Examples of EVs include electric helicopters, electric spaceships, the Earth's crust, rail vehicles, and undersea watercraft.

The types of vehicles are broken down according to the sources. The first are regular cars, while the second are electric cars. There are two different types of electric cars: hybrid electric vehicles and battery electric vehicles. The combined form is known as an electric automobile.

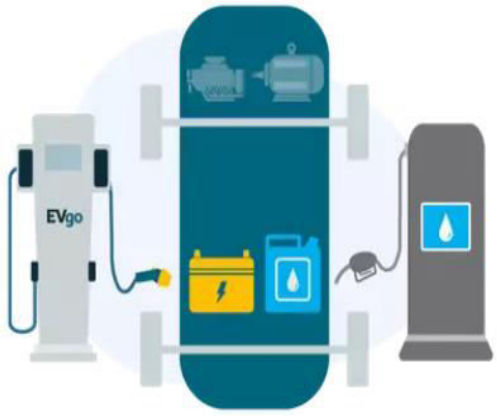
I.1.BATTERYELECTRIC VEHICLES (BEVs)

Electric vehicles (EVs) that only rely on chemical energy contained in replacement battery packs as their only source of propulsion are known as battery electric vehicles (BEVs), pure electric vehicles, only-electric vehicles, completely electric vehicles, or all-electric vehicles.



BEVs, often known as battery electric vehicles, are powered entirely by batteries. The usage of automobiles with rechargeable batteries The only driving part of a BEV is an electric motor. Noise pollution is absent. 0% parentage emission, but only short lengths are transtopped. commercially available, although the battery capacity is relatively limited and the run time is short.In contrast to pure or all-electric vehicles, hybrid electric vehicles employ either induction generators or internal combustion motors.capacity is relatively limited and the run time is short.In contrast to pure or all-electric vehicles, hybrid electric vehicles employ either induction generators or internal combustion motors.

I.2.HYBRID ELEECTRIC VEHICLES (HEVs)



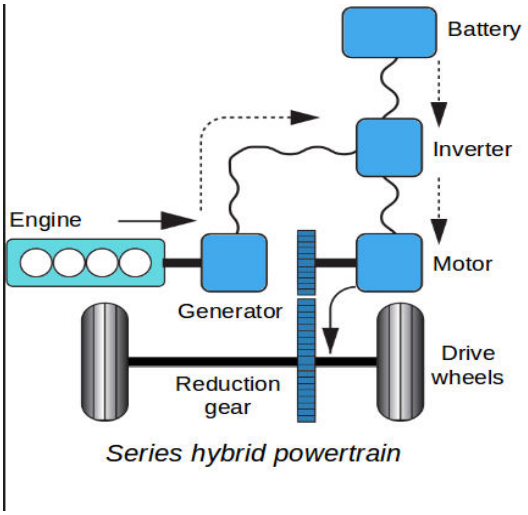
Another name for HEVs is "hybrid-electric vehicles." The motor and ice engine in HEV s are their driving components. Battery power is used to power the motor. The ice engine's sole source of power is its fuel. HEVs have minimal emissions. For extremely long journeys, use an electric vehicle. Old and important HEV s are the vehicles. HEVs might be further classified into many sorts depending on the degree of constriction due to the interior structure of the vehicles' high-capacity batteries.

Plug-in hybrid electric cars (PHEVs), which operate as battery-electric vehicles (BEVs) when their batteries are running low on charge, are hybrid electric vehicles with externally rechargeable batteries. Range-extended electric cars (REEVs), which include the Volkswagen Volt and Fisker Karma, are another name for plug-in hybrids with a series powertrain.Battery-powered electric vehicles (BEVs) and plug-in hybrid cars are included in the category of plug-in electric vehicles (PEVs), which is a subclass of electric vehicles (PHEVs).One of the two groups includes the conversions of traditional internal combustion engines (also known as all-combustion cars) and hybrid electric vehicles to electric propulsion.

I.2.1.SERIES HYBRIDS

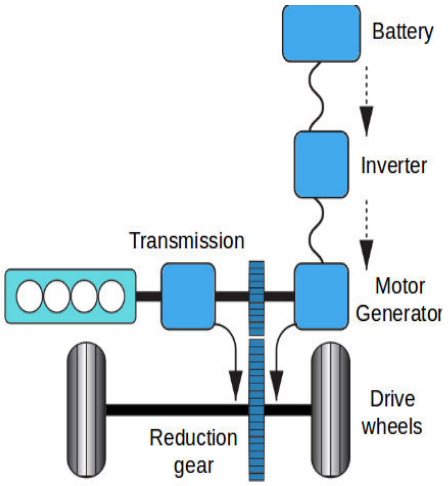
A series hybrid power train does not directly transmit torque to the drive wheels from the engine's internal combustion component. Instead, the engine drives an electrical generator that, in turn, powers the propulsion

electric motor. A series hybrid makes use of two electric motors.



Series hybrid powertrain

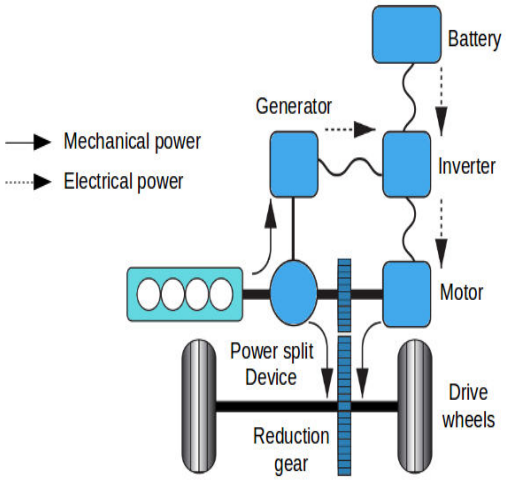
I.2.2.PARALLEL HYBRID VEHICLES



Parallel hybrid powertrain

Both the internal-combustion engine and the electrical generator can send torque to the driving wheel simultaneously or sequentially in a parallel hybrid power train. A typical hybrid power train architecture for a rear-wheel drive (RWD) vehicle places an electric motor between two clutches.

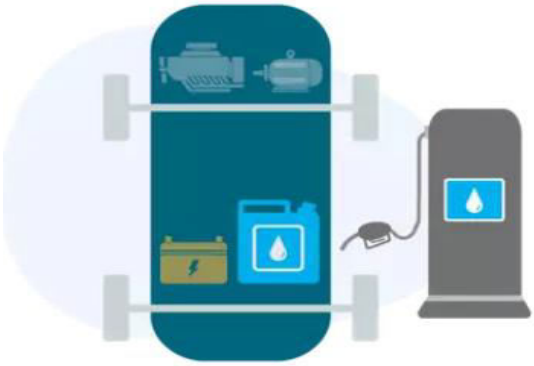
I.2.3.SERIES-PARALLEL HYBRID VEHICLES



Series-Parallel hybrid powertrain

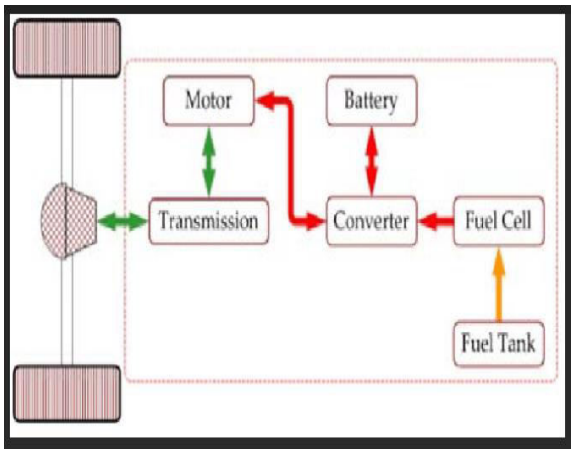
By incorporating a mechanical link (shift) between both the two electric machines, a series hybrid is transformed into a series-parallel hybrid. This architecture has the benefit of operating the engine at its most effective operating point when travelling at moderate speeds with the clutch open. The power train transforms into a parallel hybrid when the clutch is closed at high vehicle speed and the engine can send torque to the driving wheel.

I.3. PLUG-IN ELECTRIC VEHICLES (PHEVs)



Pulg in hybride is also called PHEVs in new model Any roadway automobile that can be replenished from an external source of energy, such as wall sockets, is referred to as a plug-in electric vehicle (PEV). The energy contained in the battery charger packs drives or assists in driving the wheels. PEVs are a subgroup of electric cars that include plug-in hybrids and all-electric or battery-electric vehicles (BEVs) (PHEVs). Plug-in electric cars are classified as "new energy cars" in China (NEVs). The initial mass sales... productions

I.4.Fuel cell electric vehicles



FCEVs also called as the fuel cell electric vehicles. FCEVs driving component is electric motor. The FCEVs energy sources is fuel cell and battery .this chemical reaction of hydrogen cell . the hydrogen is converted into electricity. The reaction is called electro chemical reaction. The main key features of the FCEVs high backup and high efficiency independent to the supply of electricity. But FCEVs is more cost because of fuel cell. this chemical reaction of hydrogen cell. Lack of fueling systems. An electrolyte, an anode, and a cathode are the three components that make up any fuel cell. In theory, a hydrogen-based fuel cell operates similarly to a battery in that it generates electricity that can power an electric motor. Nevertheless, the fuel cell may be replenished with hydrogen rather than needing to be recharged. PEM fuel cells, DMFC cells, phosphate fuel cells, MCFC cells, electrochemical capacitors, reformed methanol fuel cells, and regenerative fuel cells are among the several types of fuel cells.

II. SENSORs

An instrument that stores, communicates, or otherwise reacts to a physical attribute after detecting or measuring it During battery validation testing, EV manufacturers use movement or LVDT (linear variable differential transformer) instruments to assess pouch and prismatic cell swelling. This testing assists in determining the longevity within each cell and the proper kind and amount of battery housing, since capacitors bulge and contract over time. To read real-time measurements and data, there are several types of EV sensors available. This data and information are required to receive signals that will allow the control system and other vehicle systems to operate flawlessly. Actuators and sensors for electric cars are covered in this

article. The sensors we'll talk about are used to perform some of the most important functions and govern inside-vehicle operations, such as determining ignition timing, speed regulation, and air-fuel ratio in the combustion region.

S. NO	TYPES OF SENSORS	USE OF SENSORS
1	Position sensor	This used for the position of vehicle.measurement system that records the mechanical motion data from the traction motors.
2	Speed sensor	This used for the measure the speed of the vehicle.
3	Engine speed sensor	This is used for measure the speed of the engine. It will measure the engine speed by sensing the coil for each crankshaft
4	Wheel speed sensor	Wheel run at a different speed. Whiles making turns at the corners. This case engine speed sensors more useful. This information engine contor. This enables the features sucbks and another wheel mechanism.
5	Vehicle Navigation Based	One of the most frequently often installed systems in most automobiles, particularly in commercial vehicles, is the vehicle navigation system. Although GPS is a crucial component of tracking, it cannot supply all the necessary information by itself. Buildings and barriers that are elevated usually block these signals. For information on the location and forward path, GPS Sensor gyro sensors and low g-accelerometers are also required.(6)
6	Throttle position sensor	This used for the position of vehicle.
7	Mass air flow(MAF) rate sensor	This sensors is for measure the weigeht of the vehicle.
8	Exhaust gas oxygen concentration sensor	Hear force on the vehicle. This condition the sensor is used.
9	RPM sensor	The speed of motor.
10	Map sensor	This used for location of the vehicle.

11	Accelerometer (knock sensor)	Measure the speed of the vehicle.
12	Temperature sensor	Measure the temperature of the battery.
13	HALL sensor	Hall Sensors provide three redundant pulses that are staged, whether by 60° or 120° in this stage. By measuring the time differences between these two phases, this sensor can measure angular velocity.(10)
	Piezoresistive MEMS Sensor	The car industry has been employing MEMS sensors to measure pressure in huge quantities to calculate air and fluid pressure for some time. However, research into the usage of MEMS piezoresistive sensors in fuel cell electric vehicles (FCEVs) is still underway. One application is to monitor leakage among unit cells. A piezoresistor is used to transform the value of a diaphragm's deformed piezoresistor into an output voltage.(12)

Different types of sensors in electric vehicales.

II.1.ENGINE SPEED SENSORS

The engine speed sensors also called as crank sensors or crank shaft sensors this used the electrical vehicle engine . the rev meter measures in rpm (or)"revs per minute.

II.2.POSITION SENSORS

To make sure that the system works in synchrony, Place Sense is a measurement system that records the mechanical motion data from the traction motors. Various types of Rotating position sensors are used in traction motors designed for electric car (EV) applications to record this data. Once the position data is obtained, a control system or motor control module converts it into electric impulses to activate the feedback loop (MCU). Trade-offs in operating context, reliability, sensitivity, and budget must be made while choosing these sensors.(7)

II.3.SPEED SENSORS

The speed sensor is a component that measures how quickly the vehicle is going and sends that data to the ECU computer. This sensor may be located on the crankshaft of the vehicle or on the drive shaft of the gearbox. There are always two sensors present for computers to compare these signals.

II.4.ENGINE SPEED SENSOR

This same ESS is a sensor that is fastened to the engine crankshaft of the vehicle. It is distinct from the speed sensor in the car. The engine speed is monitored by the ESS. In those other ways, it is used to determine the crankshaft's speed.(14)

II.5.HALL EFFECT SENSOR

Hall Effect Sensor: Hall Sensors provide three redundant pulses that are staged, whether by 60° or 120° in this stage. By measuring the time differences between these two phases, this sensor can measure angular velocity.(7)

II.6.MAP SENSOR

The Mass Air Flow (MAF) sensor is the main sensor of a Mass Air or Mass Flow kind of EFI system. A Multidisciplinary Maximum Position (MAP) sensor is the frontline soldier of the second common form of EFI system, known as Speed Density. A mass air flow sensor is often installed anywhere before the throttle or next to the air filter box.

II.7.RPM SENSOR

Anyone can encounter greater travel convenience with electric vehicles. Since an electric motor produces rapid torque, electric vehicles can accelerate quickly and given.(8)

II.8.TEMPERATURE SENSOR

The majority of modern hybrid and electric vehicle batteries are measured by NTC temperature sensors. The demands of mass producing automobiles for various environmental criteria, such as humidity, dew, and mechanical pressure, in particular, place a high demand on temperature sensors for battery modules.

II.9.PIEZORESISTIVE SENSOR

The car industry has been employing MEMS sensors to measure pressure in huge quantities to calculate air and fluid pressure for some time.

However, research into the usage of MEMS piezoresistive sensors in fuel cell electric vehicles (FCEVs) is still underway. One application is to monitor leakage among unit cells. A piezoresistor is used to transform the value of a diaphragm's deformed piezoresistor into an output voltage.

CONCLUSION:-

This paper is explanation the total different types of sensors and different type of electric vehicles.what are the advantage of the electric vehicles .what is working of the sensor in the electric vehicle.construction of the varies types of electric vehicles.principal of the Position sensor,Temperature sensor,map sensor,Speed sensor,Engine speed sensor,RPM sensor etc…

By replacing current hybrid cars, EVs have enormous promise for the transportation of people and goods in the future. By protecting the globe from global warming and lowering the greenhouse gas emissions from current automobiles, EVs will become much more environmentally beneficial. In this chapter, the various sensor-based EV configuration technologies are covered in great depth. An in-depth discussion is given on automobile sensors, a few of which are also present in EVs.

Finally, we discussed the numerous types of microfabricated sensors that have recently entered the market as a result of MEMS-based research and may be utilised for a range of applications, including energy harvesting, motion detection, and power sensing.Some little sensors will assist in saving money and space while improving detecting capabilities. In order to provide us all with a better future with a pollution-free world, scientists must do extra studies on EVs and their sensors in cooperation with the automotive sector.

REFERNCE:-

1.A platoon control strategy for autonomous vehicle based on sliding-mode control theory HUXING ZHOU, Year of published 2017

62. Longitudinal Vehicle Speed Estimation for Four-Wheel-Independently-Actuated Electric Vehicles Based on Multi-Sensor Fusion; Xiaolin Ding ,Zhe ang, Year of published 2020

3.Attack Resilient Wireless Sensor Networks for Smart Electric Vehicles;Md Masud Rana Year of published 2019

4.Fengchun SunA Sensor Fault Diagnosis Method for a Lithium-Ion Battery Pack in Electric Vehicles;Rui Xiong, Senior Member, IEEE, Quanqing Yu, Student Member, IEEE, Weixiang Shen, Senior member, IEEE, Cheng Lin, Fengchun Sun ;Year of published 2019

5.Study On Electric Vehicles And Sensors: a Largest Market of Future In India;Arshul Agarwal, Vijay Laxmi Kalyanin Year of published 2016

6.Overview of Electric Vehicles (EVs) and EV Sensors;Aviru Kumar Basu; Shreyansh Tatiya;Shantanu Bhattacharya;Year of published 2019

7.Measurement Sensors in an Electric Vehicles; Philip Dost(IEEE), Abdoulkarim Bouabana (IEEE) ; year of published 2012

8.Condition Monitoring Sensor for Electric Vehicle Motor and Generator Insulation Systems;Ken Watkins ,*Los Angeles, California, May 6-9, 2012.*

*9.*Design and Implementation of a 780MHz Wireless Sensor Network for Electric Vehicle Management System,Yan Liang ,Xiaoming Wu ,Xiangyan Meng ,Kun Zhang,2019 IEEE 19th International Conference on Communication Technology

10.Embedded Sensors, Communication Technologies, Computing Platforms and Machine Learning for UAVs: A Review,A. N. Wilson, Abhinav Kumar, Senior Member, IEEE, Ajit Jha , and Linga Reddy Cenkeramaddi , Senior Member, IEEE,Year of published 2022.

11.Analysis of Electrical Vehicle behavior from real world data: a V2I Architecture ,Luca Bascetta, Giambattista Gruosso, Giancarlo Storti Gajani,Year of published2020.

12.RECENT ADVANCES IN SOFTWARE, SENSORS AND COMPUTATION PLATFORMS USED IN AUTONOMOUS VEHICLES, A SURVEY,Bishwajit Pal, Dr.Samitha Khaiyum, Dr. Y. S. Kumaraswamy,2019 IJRAR March 2019, Volume 6, Issue 1 .

13.Understanding the Future Impacts of

Electric Vehicles—An Analysis of Multiple Factors That Inflfluence the Market,Jonathan Wellings , David Greenwood and Stuart R. Coles , Year of published 2020.
14.Wireless Magnetic Sensor Node for Vehicle Detection With Optical Wake-Up,E. Sifuentes, O. Casas, and R. Pallas-Areny,Year of published 2011.