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IOT Solution for Automobiles

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Abstract **- In today's changing world of advanced technologies, automobiles are one industry with improved features. And 'Things' are connected to allow for communication and information sharing. IoT is a new way that the internet helps to transform information and provides real life to people. It also provides the easiest way for communication through the internet between sensors, and actuators. The Internet of Things (IoT) is a workpiece technology that has the ability to improve the world, to open up new technologies, they use various devices and inexpensive internet-connected sensors.**

Automobiles are one field where we can see enhanced environments and features in our world of developing new technologies. Smart vehicles perform an issue when we are talking about the automobile industry. The IoT applications in the automobile sector are growing day by day and also rebuilding a few areas, like automotive. It helps to build innovative and advanced solutions. IoT solutions turn automobiles into digital modes of transportation that make use of remote monitoring systems, easy communication between cars and various technologies to give better driving efficiency to individuals and consumers. IoT is used by auto industries to improve workflow, reduce the risk of human mistake as well as human work, and improve work control.

The current research introduces the applications, features, and services offered by IoT in the automobile sector.

Keywords **– Internet of thing (IoT) communication sensors, Smart vehicle, Automobile industry**

I. INTRODUCTION

Today's generation has changed due to the change in lifestyle. The recently developed vehicles have some new features like security, but they are costly as well. Because of the high cost, the common man needs to compromise on many features such as security, voice instructions, and a connected car facility. But due to these features, there is less user interaction needed and road safety will be decreased which affects more on society. The automotive industry is developing solutions like self-driving vehicles, tracking vehicles, navigation vehicles, and many more. With the development of IoT, conventional ideas of the auto industry are quickly changing. As well, security is the main challenge to overcome building interfaces and security standards for connected cars.

According to industry analysts, there are between 10 to 20 billion things connected to the Internet today. The IoT ecosystem formed due to a chain of connected objects. The range of connected objects by 2020 will be 40 to 50 billion and includes everything from pens to vehicles to homes and equipment. In 2015, India's First Driverless car was developed in Ahmedabad, Gujarat. It includes features such as a night vision camera, Hi-Tech sensors, Wi-Fi enabled, and GPS inbound vehicle.

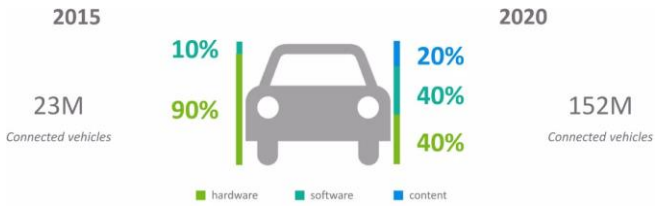

Fig: I.1

The above fig describes the ratio and also clarifies that there are a lot of changes occurring day by day. As IoT plays a very crucial role in today's environment. Everything, including vehicles, houses, and equipment is being converted into smart things.

Nowadays in the world, the automobile sector is one of the biggest manufacturing industries. The absence of creative

features in cars is one of the reasons the automotive industry has struggled to shatter records for annual production and sales. In a car, buyers not only expect just four tires and a steering wheel, they are looking for creative cars that connect and communicate. IoT in the automotive industry helps in producing a number of next-generation vehicles.

The paper is organized as follows: the next section II describes the literature review and related research with facts and features.

II. LITERATURE REVIEW

There is a lot of research being done on IOT solutions for automobiles. The study of the suggested system referred to the material.

[1] REVIEW PAPER ON IOT BASED TECHNOLOGY IN AUTOMOBILES

Road accidents are becoming more and more common day by day. According to The Times of India survey, 73.83 percent of the cars in Punjab and Haryana are highly polluted. According to them, 400 accidents occur each day. The main cause of this incident is the use of high-beam light. Trying to overtake while the lights are on high beams is not a smart idea. "Adaptive driving beam" (ADB) headlights are one of the more recent headlamp systems that have been given the green light for general use. ADB headlamps essentially serve as high beams by default (increasing driver vision), but with an automatic dimming function that will lower certain areas of the beam when an approaching vehicle is recognized by sensors.

[2] EVOLUTION BASED ON THE IOT-ENABLED CONNECTIVITY AND APPLICATIONS IN THE AUTOMOTIVE INDUSTRY

This study provides a comprehensive review of the literature on the use of IoT technology in the automobile sector, with a focus on the advancement of innovation connectivity and applications. Along with a thorough analysis of the development of technology enabling IoT connectivity and applications, a discussion of the transformation and creation of IoT-enabled smart systems for the automobile is presented. Following a detailed analysis of the advantages and difficulties of installing IoT applications, it is properly determined what the present and expected technological problems in the automobile sector include.

[3] IOT IN AUTOMOTIVE INDUSTRY : CONNECTING CARS

The concept of transportation will alter as a result of connected cars with autonomous driving capabilities, which will advance technology. On this, scientists are working to develop sensors that can discern the surroundings. The outcomes thus far, however, are preliminary, and legislation is urgently required to simplify the processes and protocols involved in this matter. Legislation is the key to a successful implementation of the entire proposal. The developed sensors will include technologies that improve algorithm software technology in addition to Nanosensor technology. Both reflect a secure procedure that goes above and beyond pre-existing security standards and norms.

[4] CONNECTED CAR & IOT OVERVIEW

The development in automotive technology known as Advanced Driver Assistance Systems (ADAS) combines certain functions into a more comprehensive system, necessitating extra parts, sensors, cameras, and connections. Adding more weight is necessary to create a bigger, smarter system. The weight of the vehicle can now be significantly increased by cables and other equipment (up to 50 kg).

Additionally, using a wired connection makes it difficult to install and maintain aftermarket sensors (which offer additional functionality). Recent developments in wireless sensor networks and communications technology have opened up intriguing possibilities where ECUs and sensors are made up of in-vehicle wireless sensor networks, greatly decreasing deployment costs and complexity. As a result, you may increase the number of features, making your vehicle safer and smaller, all without increasing weight.

[5] IOT BASED CARS

IoT is a new technology for the automotive industry, bringing an entirely new dimension to the current Car concept. Upgrade to a smart automobile for a cutting-edge way to travel and keep in touch with the outside world simultaneously. MQTT, an IoT protocol, permits a variety of interactions. Such intelligent features include sensors, control units, electronics, GPS, positioning systems, road traffic, cloud computing, and other objects (cars, vehicles, etc.). The introduction of the Internet of Things into the automotive sector enables manufacturers to introduce in-demand improvements that could ultimately turn automobiles into nearly artificial intelligence.

III. IOT IN THE AUTOMOTIVE INDUSTRY

The automotive industry is among those being rebuilt by the Internet of Things (IoT). IoT technologies assist the automobile sector in developing cutting-edge and creative solutions. For example, connected car solutions, Advanced Driver-Assistance Systems (ADAS), in-vehicle infotainment systems, navigation & telematics solutions, etc. In the vehicle sector, IoT has enabled more significant transportation efficiency. Automotive sectors and related businesses must recognize the value of IoT.

According to a Forecast Analysis by Gartner "The enterprise and automotive IoT platform market will represent an $11.3 billion opportunity in 2025, up at a 33% CAGR from 2020. The most significant revenue-generating industries at the end of the forecast period will be manufacturing and natural resources, transportation, and building automation.

A. Solutions for IoT in the Automotive Sector

Traditional perceptions of the auto business are quickly changing. And evolving as IoT technology advances. Like predictive maintenance, Wi-Fi facilities powered by 3G/4G/5G functionality, and Car2Car connectivity. There are many IoT solutions that are revolutionizing the way consumers interact with their vehicles. Some time and money-saving steps toward various stages of the automotive industry are listed below.

1) Fleet Management

Nowadays, sensors for vehicle monitoring and weight calculation are integrated into vehicles. Below are some of the advantages of fleet management.

1. Fleet location tracking in real-time.

2. Route management

3. Monitoring the flow of traffic on the highway/roads.

4. Time and Driver management

2) Connected Cars

The communication between connected cars can be two-way. It offers the web-based capability to distribute information quickly to other devices within and outside the vehicle. Additionally, this technology increases drivers' reaction time through enhanced vehicle communication.

Automotive maintenance System:

With the help of this maintenance system, an individual may take the required steps to stop abrupt failure of auto parts. as an illustration, a car's dashboard indicators. These system alerts are typically delivered to the driver's phone well in advance of the problem. This aids the driver in preventing component failure while they are on the road.

B. What role does this technology play in the automobile sector?

Today Our daily lives are changing as a result of IoT gadgets. IoT-enabled vehicles offer performance metrics to users. Additionally, one can control a few things, like air conditioning. Additionally, they may measure physical health markers with just a few clicks.

Listed below are a few IoT-related uses in the automotive sector:

1) Fleet and Driver management

The most prominent recent IoT use case in the automotive industry is fleet and driver management. It takes advantage of IoT and gives administrators a wide range of benefits for their daily business operations.

However, the cooperation to monitor driver performance is the primary benefit of IoT applications in cars.

Fleet management has a lot of benefits such as:

- Tracking vehicles
- Monitoring fuel use
- Collecting information about the fitness and performance of drivers.

Additionally, a major part of the system, vehicle tracking, makes use of GPS to provide data on the location, direction, and speed of the vehicle.

2) Real-Time Vehicle Telematics

A real-time vehicle tracking system may be a full security solution. This technology aids in locating a vehicle using many techniques, such as GPS. It also makes use of other satellite- and ground-based navigation technologies. Inside the vehicle, a tracking system is installed. Moreover, it provides effective real-time location and data. This data is often stored in a computer that can be used for analysis in the future.

3) Cellular Vehicle to Everything(CV2X)

Individual vehicles are connected by Cellular Vehicles to Everything by facilitating the development of cooperative intelligent transportation systems. This helps to reduce traffic and pollution. With this car solution, trip quality could be improved by reworking data and safety services.CV2X is designed to provide services, such as LTE networks for effective communications.

4) Predictive Maintenance Using IoT

By continuously monitoring the status of the vehicle's assets, this technological solution enables people by determining the effectiveness and health of their equipment. IoT devices can gather data from various assets and systems, enabling businesses to act creatively in response to any situation. Predictive maintenance is typically carried out while the machinery is running normally. Finally, it serves in preventing any disruptions within the company.

5) Excess Production and Related Costs

Overcapacity is currently the biggest issue the automobile industry is dealing with. Consequently, firms have begun making significant investments in the development of vehicles that will not really need to be constructed due to shifting supply chain management conditions. But by the time the manufacturer understands this, enough money will have already been spent on other things. Such as work, output, a staple, etc.

VII. ADVANTAGES

1. The Internet of things (IoT) in the automation industry is proving to be a game changer for automation companies.

2. The Internet of Things (IoT) helps to create new technologies to solve problems, enhance operations, and increase productivity.

3. The IoT can be explained as the connection of inimitably identifiable electronic devices using Internet 'data plumbing' including Internet Protocol (IP), cloud computing, and web services.

IV. FUTURE SCOPE

If I examine the future potential, the IoT solution can be explored in every sector of today's life, so we are able to make cars even smarter, make transportation systems faster, etc as well as homes can be interfaced with sensors like motion sensors, light sensors, and temperature sensors and provide automated toggling of equipment based on conditions. This is an example of home automation. More energy can be conserved by ensuring occupation of the house before turning on devices and checking the brightness and turning off lights if not necessary. The technology can be tightly connected with home security options to give homeowners more control and protection.

Extending this technique to automate a large-scale environment, like offices and factories, would be the next stage. A standard for compatible items is provided by home automation. Smart houses with the ability to regulate the environment, lighting, appliances, energy management, security, and the expandability to link to other networks are made possible by standardization.

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V. CONCLUSION

In the upcoming generation fully autonomous generated cars will be established by the companies. But, for now, barriers to widespread adoption remain. However, this is an exciting, multi-faceted, and high-growth area in the IoT's development – enabling enhanced fleet management, Real-time road safety, smart traffic management, advanced navigation assistance, passenger entertainment, and much more.

In conclusion, the Internet of Things is moving toward the Automotive industry. The development of this field has brought about the rise of earth-shattering headways in autonomous as far as connected and robotized vehicles. Because IoT asset monitoring systems allow for planned vehicle health checks, industries can do so.

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