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Literature Survey

“IoT Enabled Integrated Intelligence System for Automatic Pothole Detection, Pollution Monitoring, Post Accident Medical Response and Breakdown Assistance”

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5. **Introduction:**

The Internet of Things (IoT) is a fairly new concept that is rapidly gaining ground in the modern world. The basic idea of this concept is the presence of sensors around us in a variety of things or objects – such as vehicles, fridges, electricity meters, actuators, mobile phones, etc. which through a network, are able to interact with each other and cooperate with their neighbors to reach common goals [1]. The main advantage of the Internet of Things idea is the high impact it will have on several aspects of everydaylife. From the point of view of a private user, the effects of the IoT introduction will be visible in both working and domestic fields. In this context, assisted living, e-health, enhanced learning are only a few examples of possible application scenarios. Similarly, from the perspective of business users, the most apparent consequences will be equally visible in fields such as, automation and industrial manufacturing, logistics, intelligent transportation of people and goods. The very essence of IoT is sensors residing in everyday things – vehicles, street lamps, food packages, furniture, paper documents, and more”.

However, with sensors collecting private data like this, possible threats do arise as these everyday objects become information security risks. Actually, many challenging issues still need to be addressed, technically as well as socially. Central issues are making a full network of interconnected devices possible, providing them with an always higher degree of smartness by enabling them to make their own decisions and provide autonomous behavior, while guaranteeing trust, privacy, and security. Also, the IoT poses several new problems concerning the networking aspects. The problem arises from the fact that the things composing the IoT will have low resources in terms of both computation and energy capacity. Accordingly, solutions need to pay special attention to these scarce resources. This literature survey looks into how IoT can be used in vehicles which are present in abundance, to collect data like -potholes and condition of roads, road accidents-their time and location to automatically call for help, how vehicles can figure out when they need repair and alert service stations around them, and call for help when they breakdown. In section 2, we look at the main aspects of IoT, in section 3 we conclude, and in 4, we describe the references used.

1. **Main Body:**

The topic of the Internet of Things is gaining momentum across all types of industries, businesses, processes and in people’s personal lives.

Long-standing automotive industry practices and processes are being changed forever by the Internet of Things. The automotive industry has direct contact with customers who fully embrace technology and demand innovation, as well as connections with vehicles in operation, parts and components suppliers, and more. Automotive manufacturers, fleet operators, and dealers must stay current with the latest technologies but also capitalize on the business value possible from earning customer loyalty. [3]

As recently as five years ago, vehicles were merely a means of transportation, but today cars have become the ultimate connected device. By 2020, 90 percent of new cars will be enabled though extensive connectivity platforms [4]. Automobiles that are increasingly intelligent are changing the concept of mobility to consumer-driven preferences that extend beyond the vehicle itself. IoT is blurring traditional industry boundaries. Automotive channel participants, manufacturers, suppliers, customers, and even vehicles themselves are at the heart of interactions between designers and engineers, production lines, supply chains, and sales and service organizations. With increasingly sophisticated technology, businesses, vehicles, and customers/drivers can now intersect to drive business and personal value across all interaction points and channels, including connected fueling and convenience offers; parking and toll collection; pay as, how, and where you drive; and traffic avoidance

[5]IoT is at the heart of this transformation. It connects people, machines, vehicles, parts, and services to streamline the flow of information, enable real-time decisions, and enhance automotive experiences. Leading automotive manufacturers, suppliers, and dealers are already investing heavily in IoT – and realizing returns that range from highly efficient inventory management to real-time promotions that grow sales. They are beginning to transform their business practices and recognize that, in time, IoT will touch nearly every area of automotive operations and customer engagement.

The objectives of our project is to develop a cost-effective single integrated application to solve the social related problems using the Internet of Things (IoT). The solution is cost-effective as the solutions solve social problems, all in one system and does not rely on separate individual modules.

Potholes have become a menace, causing many accidents, sometimes leading to death. The problem stems from the sheer number of potholes and the lack of identification mechanisms for the civil development authorities to fix them. Our application will detect the potholes and report it to the concerned authorities and other commuters who will travel in the same route.

Monitoring the emissions by a vehicle is difficult. Our application will monitor emission from the vehicle in real-time and report the same to the authorities in case of violations.

In case of accidents, getting medical help becomes difficult. Our application will report the location of such accidents to the nearest hospital and also alerts the registered emergency contact person of the driver. In the case of major accidents like those involving death, it is seen that it takes time for the guilty to be charged because of insufficient evidence. In the case of major accidents like those involving death, it is seen that it takes time for the guilty to be charged because of insufficient evidence. In case of a breakdown it becomes difficult for the user to find the nearest service centre and get help. Our application will send the location where the vehicle broke down, to the nearest service centre.

The functional components of our system requires a System-on-Chip, in our case a Raspberry Pi 2 Model B which enables this project to be an Internet of Things Solution. To accomplish the various objectives, we also use the sensors accelerometer, temperature sensor, impact sensor, carbon monoxide sensor. All the data and the processing is done on the cloud, a horizontally scalable system. Data that is relevant to organizations like the local civil authorities, the pollution control board, can request the data from our servers through our APIs.

Some of the constraints include the limited hardware capabilities of the software on SOC. So it should be designed to work on low processing capabilities as well. On the backend, the server would have to process a large amount of requests, and hence scripts on the back end would have to be light weight and should be able to execute in a short amount of time. Other requirements include secure access of confidential data, 24/7 availability, better component design to get performance at peak time.

Technology innovations will continue to profoundly influence how we price-and pay for cars, in-vehicle digital services. Fully autonomous vehicles are perhaps less than 10 years down the road. In the not so distant future, entire transportation grids will run intelligently from the cloud. There's no telling where such innovations will lead. One thing we know for sure, however, is that business will need to monetize with greater agility if they wish to cash in on the compelling revenue opportunities from the Internet of Cars.

1. **Conclusion:**

The Internet has changed the way we live, moving interactions between people at a virtual level in several contexts from the professional life to social relationships. The IoT has the potential to add a new dimension to this process by enabling communications with and among everyday objects. To this purpose, we observe that the IoT should be considered as part of the overall Internet of the future, which is likely to be dramatically different from the Internet we use today. The internet has been built in a host-to-host manner, but increasingly we only seem to be concerned about the data and not necessarily from which host this data came from. So this leads to a change from a host-to-host network, to a data-centric network. So the various sensors collecting and sending data, essentially the nodes, will have an address and we will be able to access these nodes to process the data they carry. Increasingly we are moving towards an age, where humans do not want to take ordinary decisions like when do you repair your vehicle or when do you switch off the streetlamps, etc. These are decisions that can be taken autonomously. The next aspect of the future of IoT is that certain decisions cannot be relied on humans to take. For example, when a vehicle is in an accident, relying on a passerby to call an ambulance is not intuitive. Thus sensors onboard vehicles can take these decisions, and already are. When a vehicle is engaged in an accident, airbags are deployed. Now, with the IoT, this accident information can be supplied to the nearest ambulance and hospital as well. This is how sensors in various everyday objects will enable humans to not spend time on making obvious decisions, make lesser mistakes, and focus more on intuitive aspects.

1. **References:**

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