

**ABSTRACT**

The internetworking of physical devices, vehicles buildings and other items—embedded with electronics, software, sensors, and network connectivity that enable these objects to collect and exchange data. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency. In this paper we are discussing the problems exist in the parking system and its betterment.

**INTRODUCTION**

The internetworking of physical devices, vehicles buildings and other items—embedded with electronics, software, sensors, and network connectivity that enable these objects to collect and exchange data. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure.

IOT in the field of transportation:

The IoT can assist in integration of communications, control, and information processing across various transportation systems. Application of the IoT extends to all aspects of transportation systems (i.e. the vehicle, the infrastructure, and the driver or user). Dynamic interaction between these components of a transport system enables inter and intra vehicular communication, smart traffic control, smart parking, electronic toll collection systems, logistic and fleet management, vehicle control, and safety and road assistance.

**PROBLEM**

**Indore** is the most populous city of Madhya Pradesh. It serves as the headquarters of both Indore District and Indore Division. Indore was described by the *Economic Times* as the commercial capital of the state. It is the most densely populated major city in the central province. Being the most densely populated state, parking is also a major issue in Indore. Places like Rajwada, Siyaganj, Malwa Mill, Appollo Tower etc. have very less or no parking spaces, whereas these areas are highly populated.

**EXISTING SOLUTION**

To tackle the parking issues during peak hours, different malls have come up with multilevel parking, wherein the cars can be parked on different floors. The problem with this system is that the driver has to himself, go to different floors and search for a parking space and then park manually. In the same way, driver himself has to go and search for his car and fetch it. This results in unnecessary wastage of time. Also, there is a requirement of a lot of manpower to guide the driver for parking spaces (such as security guards in mall basements). This results in loss of manpower too.

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**PROPOSED SOLUTION****Idea 1 :****Smart IoT Technologies for Adaptive Traffic Management Using a Wireless Mesh Sensor Network**

Start with Indore's parking problem. What if we placed a sensor in each parking space? The sensors wouldn't need much power, as they would transmit when there was a change in a parking space's status. Small lithium battery will work and would only need to be replaced after few years. The sensors wouldn't require much bandwidth, either, so there would be no need for wired connections. This network that will resilient enough to be reliable in unpredictable environments. This would be a perfect application for a low power, wireless mesh network. On a wireless mesh sensor network, each sensor node will have routing capabilities, and data will find its way to the network gateway through any combination of network nodes. That means that the network gateway will not have to be within wireless range of all of the parking space sensors. A node that is out of range will transmit its data to another node, and the process would be repeated until the data reaches the network gateway. The gateway will report the data to a controlling computer, or a cloud application on the Internet, and drivers could access that data in real time. Instead of searching for empty parking spaces, drivers would know exactly where to go. Mesh topology is one of the ways that wireless networks can address radio interference. Individual nodes can be temporarily blocked without affecting the other networks. But a wireless network can also use channel hopping to seek out best available connections and to avoid the channels that work poorly in the local environment. The most useful network gateways can connect via either Ethernet or cellular data networks. That makes it possible to place sensors and Internet gateways anywhere there's cell phone service, even if wired Ethernet connections are not available. The traffic management system would be able to alter traffic signal patterns, provide drivers with information and alerts, and manage traffic in real time.

**Idea 2:****MULTILEVEL PARKING - The Giant Wheel Style:**

For areas in city where there is very less land available, (like Siyaganj in Indore ) multi-level parking can be an option. There would be huge cages for cars as are seating areas for humans in a giant wheel and each cage will have a sensor that will show whether the cage is full or empty. When the first car will enter the cage at bottom, it would open and the car can easily enter. The driver will receive a card containing a barcode which will point to the cage in which his car is present. As the second car would be at the entrance, the swing would move in clockwise Direction and the empty cage would come to bottom so that the car can easily enter. Same process would be repeated until all the cages are full. If someone wants to take their car out, they can scan their barcode and the Swing will move in clockwise/anticlockwise direction (through whichever rotation the required cage is nearby). As the cage having their car reaches the bottom, the doors will open and one can easily take their car out. The swing will run on solar energy and will be energy efficient.

**REFERENCES**

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