ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

IJARCCE
International Journal of Advanced Research in Computer and Communication Engineering
nCORETech
LBS College of Engineering, Kasaragod
Vol. 5, Special Issue 1, Feburary 2016

Integrating Cloud Computing For Internet of Things Based Intelligent Transport System

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Abstract: This report deals with incorporating Internet of Things (IoT) with Intelligent Transport System (ITS) to bring a composite interconnected system that allows gathering and deploying information like an instant message system. There are several systems that allow us to know about highways and its conditions. One such system is waze. However waze requires a great amount of memory and phone hardware resources. In this paper, I present a new way of monitoring taking advantage of an internets approach in order to co-operate with the ITS. Here we use IoT platforms like cloud computing in order to create an ITS application that provides traffic information about highway through common instant message application.

Keywords: Internet of Things, IoT, Intelligent Transport System, ITS, Cloud computing, traffic monitoring, instant message.

I. INTRODUCTION

Currently new technology approaches are changing the world in terms of how the people can feel or sense what is happening. As regard of this and focusing on the transportation sector, the inhabitants of whatever country wish to know what is happening on the highways, even when they are travelling, in order to be able to take decisions in their routing and timing. There are several systems allow us knowing about the highways and its conditions, a well-known system is waze. However, waze requires a great amount of memory and phone hardware resources and many people do not have the kind of phone terminals that can support the requirements. In this paper, we present a new way of monitoring taking advantage of an Internet of Things (iot) approach in order to cooperate with the Intelligent Transportation Systems (ITS).

Iot extends internet of computers to include objects or things in real world & to access them to enable ubiquitous computing. The Internet of Things (IoT) is the network of physical objects, devices, vehicles, buildings and other items which are embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more-direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy and economic benefit; 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.

ITS is defined as the application of advanced sensors, computers, electronics& communication technologies and management strategies in an integrated manner to improve safety and efficiency of surface transportation system. Intelligent transportation systems (ITS) are advanced applications which, without embodying intelligence as such, aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks. Although ITS may refer to all modes of transport EU Directive 2010/40/EU (7 July 2010) defines ITS as systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for interfaces with other modes of transport.

In our scope, IoT brings to ITS a composite interconnected system that allows gathering and deploying information like an instant message system for the pedestrians, travellers and drivers. Also a connected vehicle is capable of sharing its information using wireless links with other vehicles on road. Also it can communicate with infrastructures like signal, road sign, bus stop, etc.

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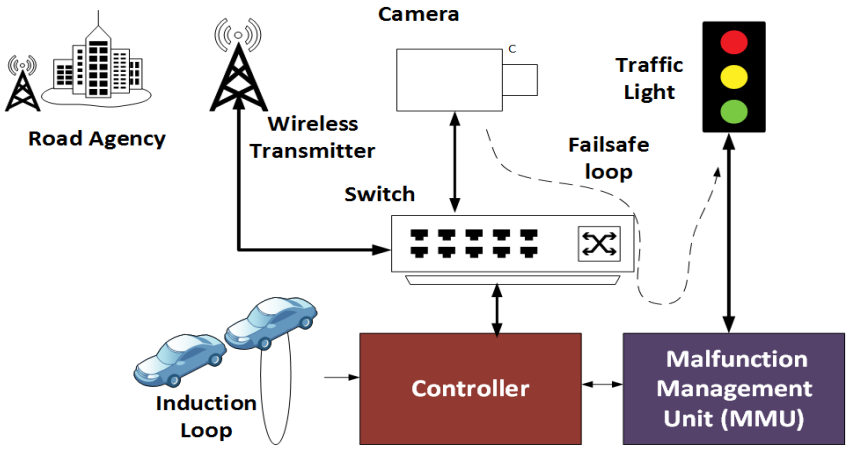
II. EXISTING SYSTEM

Existing system consists of very large number of smart physical objects mostly using wireless communication and with a local server for overall control. One such system is connected vehicles. Connected vehicles are capable of sharing its information using wireless links with other vehicles on road. Also it can communicate with infrastructures like signals, road sign, bus stop, toll stations, fuel pumps, etc using vehicle to infrastructure communication. Each smart object has intelligence to read data from sensors and to drive the actuators as pre programmed logic. Smart objects may not be stationary and the network must be self configuring. The required response time for smart object is critical to implement real time control. The object needs to be supported with information and processing power by the server. Wireless communication technologies used by a connected vehicle include GSM, Bluetooth, Zigbee, Wi-Fi & Wi-Max and DSRC. Communication technologies in connected vehicle have large range of up to 1000 meters and have a higher potential to protect the vehicle from crash with obstacles and other vehicles on rods as compared to on-vehicle radars, cameras and LIDAR system. Information security of network is important to guard privacy and to protect the smart objects from unauthorized access.



III. IOT APPLICATIONS FOR CONNECTED VEHICLES AND ITS.

1. Using smart phone for remote vehicles.
2. Monitoring driving habits using smart phone.
3. GPS based vehicle tracking and fleet management.
4. Assisted GPS for intra-city navigation.
5. Emergency help and E-call system for vehicles.
6. Remote vehicle diagnostics.
7. Remote engine monitoring in real time.
8. Electronic toll collection system.
9. BRTS and smart signals.
10. Parking space management.
11. Collision avoidance.

IV. PROPOSED SYSTEM

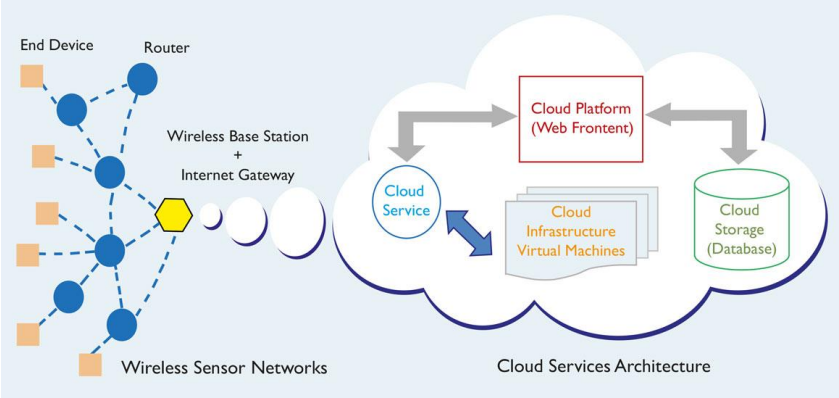


Figure 1: Wireless Sensor Network integrated with cloud services for Internet of Things

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In proposed system, Internet of computer workstations shares resources for storage and computing. These shared resources are located in a central data center away from the workstation and are said to form a cloud. Cloud provides services to meet computing needs of all client workstations and the paradigm is called as cloud computing.

But the limited communication and computing resources of smart objects do not permit direct connection to Cloud Server. This can be overcome by introducing small servers as client of main cloud server and locate these very near to the smart objects forming Internet of Things.

Also the latency in response from cloud server may not be adequate for real time analysis and control applications in Internet of things. Thus instead of main server in cloud, fog servers are used.
Fog servers reduce latency by acting at 3 levels:

1. Data latency is reduced by taking snapshot of data in memory just when it is required.
2. Analysis latency is reduced by using real time analytics which uses in memory technique to use snapshots of data from multiple smart objects.
3. Action latency is reduced by direct connection with smart object.

V. CONCLUSION

Cloud computing is an important technology for storing large amount of data. Privacy preserving policies and techniques have been introduced in cloud computing to protect the sensitive data. In this paper, the relationship between cloud computing and IoT have been explored to incorporate with Intelligent Transport System to address its existing threats and drawbacks.

ACKNOWLEDGMENT

In this paper, I would like to thank CSE Department, L.B.S College of Engineering, kasaragod for giving this opportunity and Sir Sarith Divakar M, Asst. Professor, CSE Department, LBS College of Engineering, Kasaragod for his valuable guidance. I would also like to thank all the authors of the papers which I referred to get enough information.

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BIOGRAPHY

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