IOSR Journal of Electronics and Communication Engineering (IOSR-JECE)
e-ISSN: 2278-2834,p-ISSN: 2278-8735
PP 46-50
www.iosrjournals.org

Smart Traffic Models for M2m Devices in Intelligent Transportation Systems

G.R.Kanimozhi, N.Kumaresan
PG Scholar, Department of ECE Anna University Regional Campus, Coimbatore,Tamilnadu, India.
grkkanimozhi@gmail.com
AP/ECE,Anna University Regional Campus, Coimbatore, Tamilnadu, India.
nkumaresanauc@gmail.com

Abstract: *Intelligent Transportation System (ITS) Enables the better use of infrastructure by connecting vehicles to other vehicles as well as infrastructure and thus delivers a faster communication opportunity to ensure safe and secure driving using M2M communication is one of the latest information and communication technologies which offers ubiquitous connectivity among several smart devices. The use of M2M communication has emerged due to the wide range, high reliability, increased data rates decreased cost as well as short term deployment opportunities but degrade the performance of mobile networks due to large no of devices. The proposed system using the microcontroller unit reducing the collision passing the message to the mobile communication which provide the fastest communication with high efficiency.*
Keywords: *Road congestion, Machine 2 machine communication, Intelligent transportation system.*

I. Introduction

Machine-to-Machine (M2M) communication is a form of data communication that involves one or more entities that do not necessarily require human interaction or intervention in the process of communication. M2M is also named as Machine Type Communication (MTC) in 3GPP. It is different from the current communication models in the ways that it involves M2M communication could be carried over mobile networks (e.g. GSM-GPRS, CDMA EVDO networks). In the M2M communication, the role of mobile network is largely confined to serve as a transport network. With a potential market of probably 50 million connected devices, M2M offers tremendous opportunities as well as unique challenges. These devices vary from highly-mobile vehicles communicating in real-time, to immobile meter-reading appliances that send small amounts of data sporadically.

Equipment that uses M2M capabilities to ensure M2M Devices inter-working and interconnection to the communication network. Gateways and routers are the endpoints of the operator's network in scenarios where sensors and M2M devices do not connect directly to the network. Thus, the task of gateways and routers are twofold. Firstly, they have to ensure that the devices of the capillary network may be reached from outside and vice versa. These functions are addressed by the access enablers, such as identification, addressing, accounting etc., from the operator's platform and have to be supported at the gateway's side as well. Thus, platform and gateway form a distributed system, where generic and abstract capabilities are implemented on the gateway's side. Consequently, there will be a control flow between gateway and operator's platform that has to be distinguished from the data channel that is to transfer M2M application data.

Secondly, there may be the need to map bulky internet protocols to their lightweight counterpart in low-power sensor networks. However, the latter application might lose its relevance since there are implementations of IPv6 for sensor networks available, that allow an all-IP approach.

II. Related Works

Machine-to-machine (M2M) communication is becoming an increasingly essential part of mobile traffic and thus also a major focus of the latest 4G and upcoming 5G mobile networks. M2M communication offers various ubiquitous services and is one of the main enablers of the Internet-of-things (IoTs) vision.. Moreover, mobile M2M traffic is anticipated to degrade the performance of traditional cellular traffic due to inefficient utilization of the scarce radio spectrum. a novel data aggregation and multiplexing scheme for mobile M2M traffic and thus focuses on the latest 3GPP (3*rd* Generation Partnership Project) tong-term-evolution-advanced (LTE-A) networks. 3GPP standardized layer 3 in band Relay Nodes (RNs) are used to aggregate uplink M2M traffic by sharing the Physical Resource Blocks (PRBs) among several devices. Our simulation results show that besides coverage extensions, RNs serve approximately 40% more M2M devices with the proposed data multiplexing scheme compared to the conventional without multiplexing approach.[1]

As the city road network is growing day by day, the question of how to obtain information about the road is becoming more and more challenging. Traffic problems nowadays are increasing because of the growing number of vehicles and the limited resources provided by current infrastructures. an automatic road traffic control, monitoring system and an efficient way to avoid traffic congestion for daytime sequences using **Image processing** techniques and wireless communication networks. A camera will be installed alongside the road-side unit /traffic light. It will capture image sequences. According to traffic conditions on the road, traffic light can be controlled. Based on that analysis, system will wirelessly transmit the information (using **ZIGBEE** protocol) of road scene to the nearby Road –side units (RSU) and the message will be displayed there. It can help people by providing pre-knowledge of traffic congestion/jams[2]. The machine-to-machine (m2m) represents a prospective solution for achieving these objectives. owing to low power, cost efficiency and low human intervention, m2m communication has become a main driving force for a number of wide variety of real-time applications[3]. This proposed investigates several traffic models and highlights the impact of M2M traffic in logistics and transportation on LTE data traffic. We evaluate the overall LTE network performance in terms of E2E delays for file transfer, voice, and video users[4].

III. System Overview

The overview of this approach is illustrated in the Figure. In order to represent the road congestion has the various blocks in the system is as follows. The block diagram of the machine to machine communication in the road congestion to avoid the collision detection.

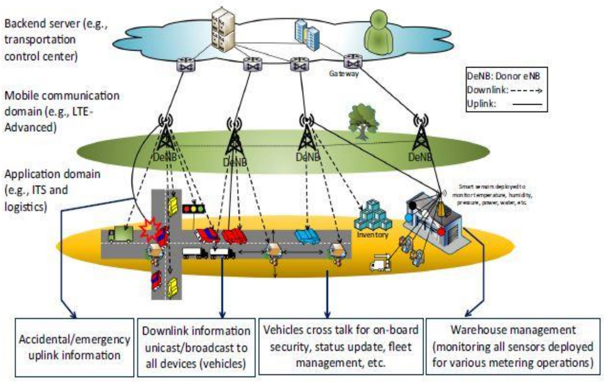

Fig.1 mobile M2M communication architecture along with an overview of major M2M applications in intelligent transportation and logistics.

The each block can be explained in the following sections in the human detecting the deformable parts and the outliers, occlusions, missing vehicles Fleet management is also one of the major M2M applications in logistics . The movements of vehicles, containers, buses, and cars are being tracked regularly through devices which collect data of the location, vehicle speed, temperature, distribution progress, fuel consumption and send this information to monitoring servers. Through regular monitoring, several activities of the system can be performed in an efficient way. For instance, the goods which are transported from one place to another are monitored regularly in order to accomplish in time delivery and to handle any undesirable situation during shipment processes.

In addition to the above applications, M2M communication provides additional services in logistics such as decreased operational cost, high inventory flexibility, increased supply chain visibility, and reduced loss of vehicles and containers . In supply chains, M2Mtechnology enables tracking the status of goods in real-time via M2M devices. This increasing visibility allows for significant reduction in uncertainties in supply chain. Similarly, in a warehouse, M2M devices can be deployed to track the inventory so that stockholders and enterprises can respond to the market dynamics and to decide when to refill and when to go on sale. Moreover, cross talk among vehicles can also be effective to get immediate assistance. Additionally, direct delivery of inventory from one vehicle to another without storing it in a warehouse can also be accomplished through mutual information sharing. Consequently ,it can significantly reduce the required space of warehouse, customer's waiting time as well as the operational costs for business entities.

IV. Proposed Work

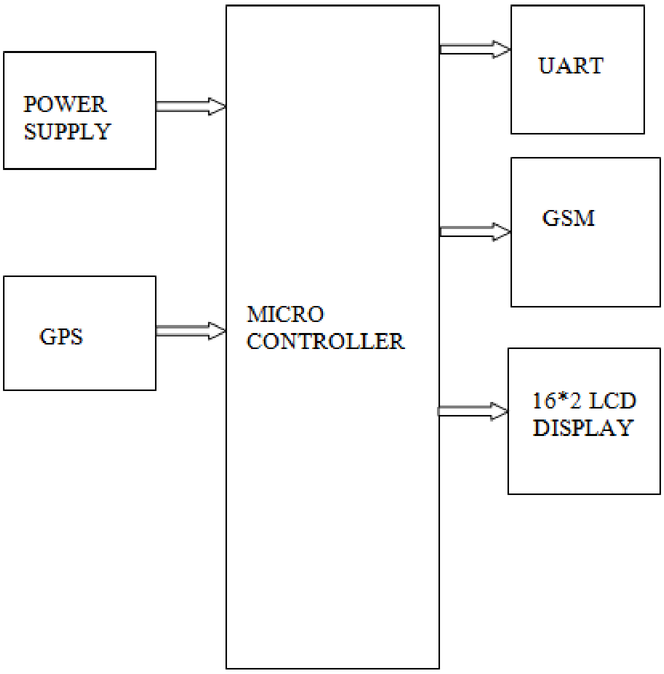

Fig 3.block diagram of vehicle unit

A. Microcontroller

A computer-on-a-chip is a variation of a microprocessor, which combines the processor core (CPU), some memory, and I/O (input/output) lines, all on one chip. The computer-on-a-chip is called the microcomputer whose proper meaning is a computer using a (number of) microprocessor(s) as its CPUs, while the concept of the microcomputer is known to be a microcontroller. A microcontroller can be viewed as a set of digital logic circuits integrated on a single silicon chip. This chip is used for only specific applications.

PIC 16f877A microcontroller. For most applications, we will be able to find a device within the family that meets our specifications with a minimum of external devices, or an external but which will make attaching external devices easier, both in terms of wiring and programming.

For many microcontrollers, programmers can build very cheaply, or even built into the final application circuit, eliminating the need for a separate circuit. Also simplifying this requirement is the availability of micro-controllers wit SRAM and EEPROM for control store, which will allow program development without having to remove the micro controller from the application circuit.

B. GPS

The GPS (Global Positioning System) is a "constellation" of approximately 30 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location. The location accuracy is anywhere from 100 to 10 meters for most equipment. Accuracy can be pinpointed to within one meter with special military-approved equipment. GPS equipment is widely used in science and has now become sufficiently low-cost so that almost anyone can own a GPS receiver.

The **Global Positioning System** (**GPS**), also known as **Navstar GPS** or simply **Navstar**, is a global navigation satellite system (GNSS) that provides geolocation and time information to a GPS receiver in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The GPS system operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. freely accessible to anyone with a GPS receiver.

C. Power Supply

A simple desktop power supply with power output connector seen at lower-left and power input connector (not shown) located at the rear**.** A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to as electric power converters. Some power supplies are discrete, stand-alone devices, whereas others are built into larger devices along with their loads. Examples of the latter include power supplies found in desktop computers and consumer electronics devices.

E.Universal Asynchronous Receiver/Transmitter

A universal asynchronous receiver/transmitter , is a computer hardware device for asynchronous serial communication in which the data format and transmission speeds are configurable. The electric signaling levels and methods (such as differential signaling, etc.) are handled by a driver circuit external to the UART.

UARTs are commonly used in conjunction with communication standards such as TIA (formerly EIA) RS-232, RS-422 or RS-485. A UART is usually an individual (or part of an) integrated circuit (IC) used for serial communications over a computer or peripheral device serial port. UARTs are now commonly included in microcontrollers. A dual UART, or DUART, combines two UARTs into a single chip. Similarly, a quadruple UART or QUART, combines four UARTs into one package, such as the NXP 28L194. An octal UART or OCTART combines eight UARTs into one package, such as the Exar XR16L788 or the NXP SCC2698. A related device, the Universal Synchronous/Asynchronous Receiver/Transmitter (USART) also supports synchronous operation.

V. Results And Discussion

The simulation results shows the effective working of the smart m2m devices in intelligent transportation system. The following images shows the process of output operations of the simulation results.

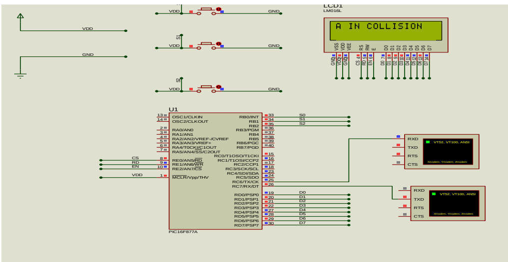

Fig 4 Full view of simulation

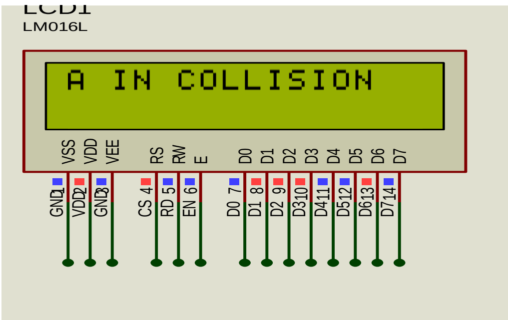

Fig 5 Simulation Results shown in LCD display

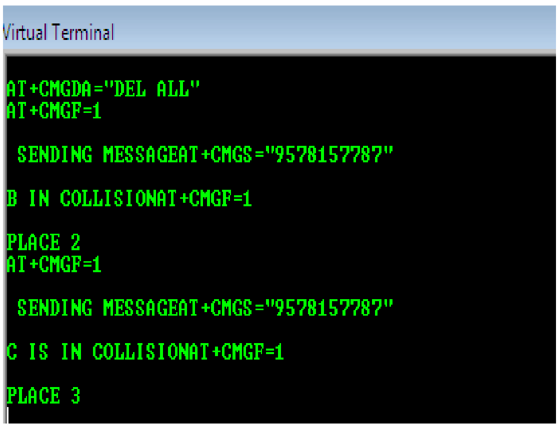

Fig 6 Result shows that where the collision avoidance takes place .

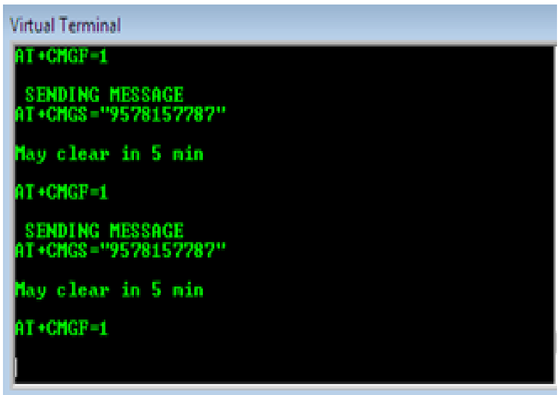

Fig 7 Result shows that the time interval of collision avoidance.

VI. Conclusion

The design of transportation has been implemented in real time embedded system using smart intelligent transportation. To overcome the above problems in networks should involved as packets for sending data on existing system. To proposed system by using GSM and GPS for transmitting and receiving the signal focused on dominating non-cellular technologies to support mobile to mobile communication by using LCD display we can find where the collision occurs it identifies particular area and also detect where it happened. To reduce the network load by starting the information using microcontroller among several devices and can be a very useful scheme for network operators as well as service provides through smart phone communication.

References

[1]. Ahmad, F., et al. (2014). ‘ Machine-to-Machine Sensor Data Multiplexing using LTE Advanced Relay Node for Logistics’. Proc. LDIC, Bremen, Germany.

[2]. Atzori L, Iera A, Morabito G (2010) ‘The internet of things: a survey’. Comput Netw 54(15):2787–280.

[3]. Chandrasekhar V, Andrews JG, Gatherer A (2008)‘Femtocell networks: a survey’ IEEE Commun Mag 46(9):59–67.

[4]. Chen Y, Wang W (2010) ‘ Machine-to-machine communication in LTE-A’In: IEEE 72nd vehicular technology conference fall (VTC 2010-all) IEEE, pp 1–4.

[5]. Chou CM, Li CY, Chien WM, Lan KC (2009) ‘A feasibility study on vehicle-to-infrastructure communication: Wifi vs. wimax’. In:Tenth international conference on mobile data management: systems, services and middleware, 2009. MDM’09. IEEE, pp 397–398.

[6]. Cox C (2012) ‘An introduction to LTE: LTE, LTE-advanced, SAE and 4G mobile communications’. Wiley, New York.

[7]. Ghavimi, F., Chen, H-H. (2015). ‘M2M Communications in 3GPP LTE/ LTE-A Networks: Architectures, Service Requirements, Challenges and Applications’. IEEE Communications Surveys & Tutorials, accepted for publication

[8]. Greenwood DA, Dannegger C, Dorer K, Calisti M (2009) ‘ Dynamic dispatching and transport optimization-real-world experience with perspectives on pervasive technology integration’. In: HICSS, pp 1–9.

[9]. Laner M, Svoboda P, Nikaein N, Rupp M (2013) ‘Traffic models for machine type communications’. In: Proceedings of the tenth international symposium on wireless communication systems (ISWCS). VDE, pp 1–5.

[10]. Lee HL, Whang S (2004) ‘E-business and supply chain integration’, In: The Practice of supply chain management: where theory and application Converge. Springer, pp 123–138.