International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878 (Online), Volume-8, Issue-1, May 2019

A Pragmatic Approach on the Internet of Things for Smart Applications

M Srinivasan, S Koteeswaran

Abstract*: The world is moving towards smart cities, for being smart all objects in the city should be able to communicate with each other, through a connected or wireless medium. These intelligent objects which can communicate with each other are called intelligent objects. With the ability to communicate with each other, these intelligent objects provide a convenient environment which is known as the Internet of Things (IoT). The main aim of the Internet of Things is connecting the objects in such a way that they can compute and communicate so that they can help in social good. IoT has many objectives, one of them is the smart vehicle communication as a vehicle plays an important role in a smart city. Internet of Vehicles (IoV) is a concept similar to IoT that equips the vehicles with the ability to compute and communicate. Vehicles can speak with one another in smart condition with the assistance of Vehicular Ad hoc Networks. We study the dynamic in trust models/frameworks and routing protocols in VANETs. At that point, a remarkable two-layer structure for application-oriented setting mindful trust-based correspondence (FACT) in VANETs is proposed, wherever hubs exclusively utilize their most trusty neighbors to advance the message else, they convey the message without anyone else. When a message is gotten, FACT first applies 3 security checks inside the admission module to make certain the message started from a trusty locale and navigated a trusty path; Then, actuality admits the message and drives it to the scattering module to be sent through a trusty path.

***Index Terms*: Internet of Things, Parking Revenue, Traffic, and Pollution Reduction.**

I. INTRODUCTION

The Internet of Things (IoT) has started to saturate about each part of our day by day lives; from diversion to security to self-driving vehicles, it's elusive one industry that hasn't exploited the IoT's capacity to consistently interface smart gadgets and encourage correspondence. While the IoT gives a large group of advantages to various markets, urban territories are at the highest priority on the rundown of those seeing the most critical effect. The IoT enables what's known as the Smart City, characterized as a district "that utilizes data and Correspondence advances to increment operational effectiveness, share data with the general population and improve both the nature of taxpayer-supported organizations and native welfare." Fig 1 demonstrates a fundamental architecture [1] of IoT. The sensor takes contribution from the earth and sends that to IoT Gateway, which processes the information and sends it to the cloud. The cloud stores the information which can be gotten to by any verified client.

Smart City activities hence depend on the IoT and its associated gadgets to improve framework and prosperity. Actually, as indicated by late research from IoT Investigation on 1,600 genuine IoT use cases, the biggest measure of undertakings was a piece of Smart City activities. The IoT provides Smart Cities with numerous advantages, such as the ability to streamline waste management and structural health. New York City's Smart City efforts, for example, include energy conservation through smart lighting and air quality monitoring. The IoT gives many advantages to the governing bodies and IoT plays a crucial role in public transportation and traffic management systems. Almost everyone is familiar with the complications that can accompany parking, whether you're struggling to find a space for an event or simply at your favorite retailer. The various challenges with respect to traffic and parking faced by civic bodies are given below, but not limited to:

- Parking space lookup the time
- Exceeded emissions limits
- Illegal parking
- Valuable parking space not being monetized
- Costly yet ineffective parking space management systems and procedures.

Solutions that utilize the interconnectivity and innovation of the IoT can successfully alleviate these problems through multiple elements.

A. Real-Time Communication

Immediate and up-to-date detection of available on-street parking spaces decreases the mandatory time and aloofness to park, improving movement. Overhead parking sensors mounted on lampposts connected through the IoT can analyze and measure the appropriate data, sending information to digital signage, ideally also integrated on the lamppost that can display the latest updates for drivers.

B. Traffic and Pollution Reduction

IoT arrangements enable drivers to settle on smart leaving choices dependent on certainties as opposed to karma, guaranteeing less clog with respect to both the measure of vehicles supported up in a specific region and the discharges discharged into the air.

Revised Manuscript Received on 30 May 2019.

***** Correspondence Author

M Srinivasan ME*, Research Scholar, Department of Computer Science and Engineering, School of Computing, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Avadi, Chennai-600 062, TamilNadu, India, Associate Professor, Department of Information Technology, P.S.V College of Engineering and Technology, Krishnagiri, Tamilnadu, India.

S Koteeswaran PhD, Associate Professor, Department of Computer Science and Engineering, School of Computing, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Avadi, Chennai-600 062, TamilNadu, India.

It is fundamental for drivers to have the option to depend on precise continuous data about where to go, and all the more critically, where not to go when all spaces are involved. The decision to park right away in a nearby garage, rather than circling in the inner city to find an on-street parking space, is essential to avoid unnecessary emissions and traffic.

C. Parking Revenue

Spaces dedicated to parking are one of a city's most valuable assets, but in most cases, drivers aren't paying for these precious spots. By providing them with real-time information about the location of available spaces through reliable on-street parking data, drivers are motivated and incentivized to pay for the service and the valuable space as their search time, costs and frustration are substantially reduced.

D. Improved Monitoring

To enable civic bodies with Clever parking services [2] and management solutions, more time and money has to be invested. These solutions allow users to identify trends and prioritize controls according to real occupancy and payment data. For example, the appropriate use of dedicated zones, such as handicap or delivery areas, can be continuously monitored. Safety in the city can be increased and the identification of a hazard or non-authorized vehicles in certain zones can be easily established.

IoT Gateway Users

Fig 1. IoT Architecture

These components can then be incorporated into the implementation of a Smart City project, bringing together additional pieces that revolutionize the entire parking experience. Officials can manage parking pricing dynamically according to supply and demand, and integrate the management of electric cars, shared cars, and charging points.

II. LITERATURE SURVEY

SAT (Situation Aware Trust)[3], a trusted design for VANETs, uncovers the individuality of the clients by utilizing a social network. Truth be told, the substance of the message characterizes the trust esteem. The message is produced by various vehicles that have diverse trust levels. The Markov chain-based trust model for VANETs exhibited in is a half and half model assessing trust based on the data and the entity together, so as to sift through malicious and childish hubs. Aside from the multifaceted nature of the proposed technique, it isn't clear how this calculation functions when there is no availability in the network or when the application needs a lot of deferral dependability prerequisites. The point of a TRIP (Trust and Reputation Infrastructure-based Proposal) [4] for vehicular specially appointed networks is broadcast communication in VANET. A hand-off hub in sending a message produces its very own assessment, basis the sender on the off chance or basis the equivalent got messages before and sends the supposition alongside the message. In any case, considering the vibrant nature of VANETs, VARS basically depends on others supposition alongside roundabout trust esteems for a beneficiary on trusting a message, which is insufficiently trusted and legitimate hotspots for the recipient. Likewise, the proposed trust model spotlights on the broadcast correspondence of prosperity related messages which are confined to utilizing the sign of a message issued by the originator to ensure the trust of the messages. A sender finds comparable vehicles to advance the message. A roadside unit (RSU) and reference point based trust the board system[5] is recommended that went for broadcasting message feelings rapidly. Their goal was directing procedure in which they endeavored to encourage quality of service (QoS) support in it. To get confided in rush hour gridlock data by a vehicle, Teller, and Cristea [6] arranged a trust-based security structure, were paying little notice to the wellspring of the information, the trust is evaluated for individual bits of information insinuating a specific event. In this model, a driver surveyed the trust of information, and after that scatters the trust a motivating force to various vehicles in order to improve the precision in the dependability of an event used Markov to sanctify assortment and its security of the trust metric in their model for VANET. In their model, each vehicle screens and updates the trust metric of its neighbors dependent on the lead of the neighbors. Haddadou and Rachedi[7] proposed DTM2 went for the issue of vindictive and egotistical hubs in the VANET. brought in to the record the reliability of the message originator and the sending hubs, accepting any, to figure the trust of the message itself, in a vehicle-to-vehicle (V2V) correspondence. The in general improved traffic the board accomplished through IoT gadgets adds to a far-reaching Smart City activity that can tremendously increase basic leadership and tasks. And the IoT's impact doesn't stop there: urban areas are seeing upgrades to human services, business, taxpayer driven organizations and more. Smart frameworks can all the more proficiently transmit electricity, while remote water system networks can advance water preservation. The opportunities the IoT gives to urban areas are genuinely progressive and stand to patch up and help an unending number of frameworks. And the models above are only the start; as more data is gathered and further use cases are distinguished, the conceivable outcomes will just expand.

Looking forward, Greece's first Smart City, Trikala, gives a case of a considerable lot of the IoT frameworks and gadgets we can hope to find later on. The city has just observed accomplishment in its sending of an e-protest framework, driverless transports, sensor-prepared stoplights for lessening electricity and more. In any case, the region would like to set out on considerably more noteworthy ventures, for example, smart houses that screen the soundness of old residents and smart cultivating that develops old restorative plants.

On a city level, IoT innovation can assist districts with organizing their urban areas all the more successfully and reasonably. Sensors can be utilized to screen urban commotion and air quality in tricky territories. Smart traffic arrangements can divert drivers to various courses to discharge weight from high-traffic-zones.

Along these lines, IoT can drive ideal space use. With smart lighting frameworks, road furniture can be modified to acclimate to their surroundings with the assistance of light and movement sensors.

A case of imaginative IoT use is the smart stopping arrangements in Montpellier[8]. With data from movement sensors, the area of free parking spaces can be discussed to drivers progressively. This takes out the time spent on driving around looking for accessible stopping and makes the city more eco-accommodating over the long haul.

Making Refuse Accumulation Progressively Productive - Urbiotica's M2M[9] is a remote self-governing sensor that utilizes ultrasound to tell how full a junk container is. The data is transmitted to a Urbiotica software stage that joins up with frameworks intended to advance garbage gathering courses. The sensor is useful in situations where squander is being created at rates that are slower or increasingly a factor. Streamlining courses likewise implies less traffic and truck emissions.

System	Tasks
Ad-hoc Traffic Balancing	• Monitoring of traffic – real time • Monitoring of road condition, • Load management of passengers, • Occurrence management
Smart Parking	• Empty parking lot allotment (App based)
Ecology Monitoring Solutions	• Internal climate management (historical data analysis)
Smart Public Safety Systems	• The city closed circuit cameras (live mode) • Street signs - Interactive, • Smart commercial boards, • car/bike sharing, • Individual asset tracking
Efficient Public Services Tracking	• Anytime - Anywhere – Access (AAA) of public services (online)

The hope is that the latter project will create jobs for the city, yet another remarkable outcome of using the IoT in municipalities. Whether it's through simplified traffic and parking management, waste reduction, energy preservation or more – it's abundantly clear that the IoT can go a long way to positively impacting cities and the lives of each and every inhabitant within them.

People are the reason for by far most of the accidents. A noteworthy extent of mishaps are the aftereffects of diverted or distracted driving. Organizations like Zen drive have created innovation that utilizes sensors incorporated with smartphones to measure driver conduct. When adequate data is gathered, the application can offer to instruct to make you a more secure driver. The organizations are focusing on both insurance agencies and fleet supervisors.

Transportation and logistics need however much data as could reasonably be expected for precise and mistake-free administration. Timing is of the substance – particularly while depending on a blend of various transport modes, for example, rail, road, and ocean transport. The logistics business was among the principal adopters of IoT[12] advancements in activities: It acquainted handheld scanners with digitizing the conveyance procedure and various sensors to screen payload and conveyance truck execution.

Presently everything is connected, from adaptable warehousing tasks to inventory network the executives: Resources, transporters, storerooms, parking garages, trucks, and different sorts of infrastructure. This aide in pinpointing underused assets and making arrangements for upgraded improvement. Thus, IoT-empowered tasks set aside some cash, help guarantee progressively dependable planning and increment conveyance promptness. For instance, DHL utilizes IoT innovations [13] for cargo transportation. It enables them to increase clear permeability of the development and status of products at all phases of the logistics venture. Sensors screen the cargo area, yet in addition compartment openings, vibrations, strokes, or any harm to the freight.

This guarantees the moved products land on schedule, at the correct spot and flawless.

Connected vehicles are utilizing IoT to associate everything from engine diagnostics to GPS data and infotainment frameworks

- *Connected Vehicle Frameworks Observing*
  Advancement of connected autos with highlights like city route, area-based services, drive-help applications, vehicle on-demand services, remote diagnostics, utilization-based protection and part more.

- *Real-Time Fleet Administration*
  Improvement of start to finish fleet administration and vehicle wellbeing and telematics arrangements

- *Driver Wellbeing Frameworks*
  Exceedingly down to earth safety belt use and driver sleepiness location arrangements that trigger programmed alarms on the crisis

Getting rid of Perilous Police Pursues - Law requirement organizations have been evaluating a framework called Star Chase [10] that wipes out the requirement for police to participate in risky rapid pursues of suspects. An air blower launcher on the facade of the watch vehicle fires a sticky GPS locator with a transmitter. Police can then remotely follow the vehicle as opposed to pursuing it, securing the presume when the vehicle stops.

IoT is a key factor in smart lighting frameworks [11] and progressively effective transportation and stopping frameworks, including smart traffic lights that adjust to traffic conditions continuously. They can even be designed to permit crisis responders and medicinal groups to synchronize with traffic lights to speed access to the basic area—or to change the lights so vehicles don't need to hold up when there's no other traffic. Service organizations, in the interim, are moving past smart meters to use IoT to empower on-demand garbage pickup.

Few of the following management systems are used by various civic bodies in the recent past.

• *Smart Driving*

Checking directing developments and controlling in-path positions

Connected vehicles are extremely popular at this point. In most straightforward terms, these are PC upgraded vehicles [14] that robotize numerous typical driving assignments – sometimes, notwithstanding driving themselves. Current frameworks filter painted lines as one of a few identification strategies; attractive rails and different types of upgraded parkways may direct future frameworks. Fig 2 demonstrates a review of connected vehicles. Trust in a VANET faces two primary difficulties:

1) Communication time between connective and routing devices is always less because of the vehicle's speed. and

2) The absence of a brought together outsider to assess and keep up the trust esteems. When the source is confirmed, the message can be trustworthy. Both of these models experience the ill effects of scalability and the entity-driven models have the supposition that there is dependably an outsider authentication guarantor in the region that is often not legitimate with regards to VANETs.

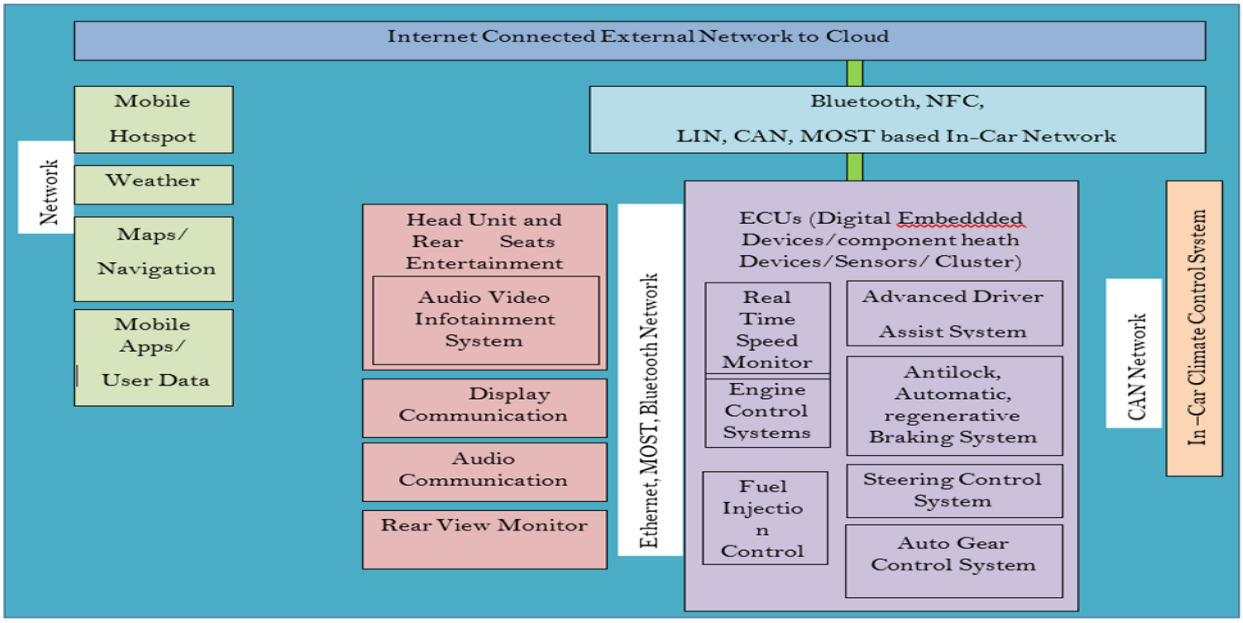

Fig 2. Overview of an Internet-connected car

Fig 2. Review of connected vehicles

III. THE SOLUTION

FACT[15] appeared in figure 3, gives network architects a full bundle, that conveys reliable messages through a sheltered path with high dependability and in a short measure of time. Secure routing, protection, and trust in VANETs have picked up attention from the examination community in the course of recent years. Likewise, to improve the effectiveness of the proposed plan, they permit a dynamic detection likelihood dictated by the trust of clients by connecting detection likelihood with the status of that hub.

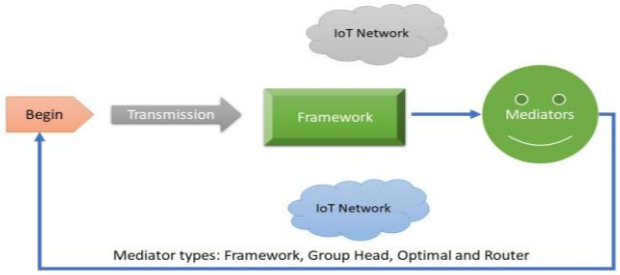

Fig. 3. Framework for application-oriented context-aware trust-based communication

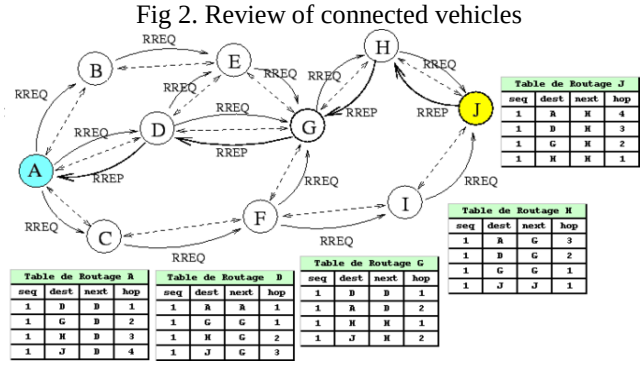

Fig 4. ad hoc on-demand distance vector routing

The fig. 4 uncovered the proposed instrument is gone for ad hoc environment by structuring a routing AODV(ad hoc on-demand distance vector)[16] based routing convention that joins the hop count and trust esteem. At the point when a source thinks about various path opportunity, it increases the trust estimation of every hub to acquire the trust estimation of the path. In spite of the fact that it might be valid in the bundle conveyance proportion, the trust estimation of the path can't be constantly determined by an increase of the trust estimation of the hubs along the path. In addition, the projected routing convention in trust-based went for versatile ad hoc networking (MANET) that quintessence on energy effectiveness.

III. CHALLENGES

Advancement in the adoption of associated cars has exploded beginning late and is alluding to no support off, especially the vehicle-to-foundation and vehicle-to-retail areas. As adoption grows exponentially, the challenges by the way we develop these applications rise as well. One of the best troubles to consider will be availability [17], and how we associate and system a great many associated cars on the road. In what manner may we ensure that data gets from Demonstrate A Point B constantly? By what means may we ensure that data trade is secure? What's more, how might we oversee power, battery, and bandwidth requirement?

A. Signaling

At the focal point of an associated car, the arrangement is bidirectional data gushing between associated cars, servers, and client applications. The associated car turns around keeping low-powered, ease attachments open to send and get data. This data can fuse route, traffic, following, vehicle prosperity and state (Nearness); fundamentally anything you have to do with the associated car. Hailing is basic in the lab, yet testing in nature. There is an unbounded proportion of obstructions for associated cars, from sections to bad system network, so strong availability is essential. Data ought to be held, recreated, or more all sent constantly between associated cars, servers, and clients.

B. Security

At that point by then, there's security, and we all in all know the criticalness of that concerning associated car (and the Web of Things when all is said in done). Data encryption (AES and SSL) [18], verification, and data channel get the opportunity to control are the major IoT data security parts. In observing data channel get the chance to control, having fine-grain appropriate and purchase in authorizations down to solitary channel or customer is a powerful instrument for IoT security. It empowers designers, as far as possible, and close open channels between client applications, associated car, and servers. With an associated car, IoT architects can create point-to-point applications, where data streams bidirectional between gadgets. Having the option to surrender and deny access to customer association is essentially one greater security layer over AES and SSL encryption.

- **Power and Battery Consumption**

While restricting power and battery utilization, by what means will we balance the keeping up of open attachments and ensuring predominantly? Moreover, with other compact applications, for the associated car, power and battery utilization contemplations are central. M2M disperse/purchase in illuminating protocols [19] like MQTT are worked for just this, to ensure movement in bandwidth, high dormancy, and hazardous situations. MQTT works in educating for reliably on, low-powered gadgets, a perfect fit for associated car originators.

- **Presence**

Associated gadgets are exorbitant, so we need a way to deal with screen our associated cars, paying little respect to whether it be for armada and cargo the officials, taxi dispatch, or geolocation. 'Nearness' usefulness is a way to deal with screen individual or social occasions of IoT gadgets consistently and has found adoption over the associated car space. Specialists can build custom vehicle states and screen those persistently as they go on the web/disconnected, change state, etc. Take armada administration for example. Exactly when transport trucks are out on course, their ability status is reflected constantly with a nearness structure. For taxi and dispatch, the dispatch structure knows when a taxi is open or when it's at present full. Also, with geolocation, area data is revived by the millisecond, which can in like manner be associated with taxi dispatch and cargo the administrators.

- **Bandwidth Consumption**

Much equivalent to power and battery, bandwidth utilization is the fifth associated car challenge we face today. For bidirectional correspondence, we need open attachment associations, yet we can't influence them to use colossal loads of bandwidth. Using M2M educating shows like the previously mentioned MQTT [20] allows us to do just that. Building the associated car on a data educating system with low overhead, we can keep attachment associations open with confined bandwidth utilization. Instead of hitting the servers once on various events consistently, keeping an open attachment empowers data to stream bidirectionally without anticipating that solicitations should the server.

III. DISCUSSIONS AND FUTURE SCOPE

There are a few advantages to self-driving cars. Mishap evasion is a noteworthy motivating force, on the grounds that the car can respond quicker than a human. A definitive manifestation is the general reduction of vehicles. Driverless taxicabs could supplant a family's second car that sits inactive throughout the day. More vehicles can travel nearer on the road in the meantime, and the PC can work the vehicle more economically than the vast majority. Cameras, radar, and lasers are among the sensors nourishing information into the differential GPS.

Cameras let the car's PCs see what's around it, while radar enables vehicles to see up to 100 meters away in obscurity, downpour, or snow. Lasers, which resemble a turning alarm light, continuously filter the world around the car and furnish the vehicle with a continuous, 3-D omnidirectional perspective on its environment. These sensors are giving you crude information about the world. You need refined calculations to process such information, much the same as a human would.

IV. CONCLUSION

This work clarifies connected vehicles with IoT and cloud. It reviews the frameworks and routing conventions in VANETs. It likewise proposed a fresh2-layerFACT in VANETs, where hubs only utilize their most trusted neighbors to advancing the message else, they transmit the message without anyone else. Once a message received, the admission module to ensure the message commenced from a trustworthy region and traversed a trusted path by enforcing 3-way check mechanism; At that point, Reality admits the message and drives it to the dissemination module to be progressed through a trusted path. It additionally examines different issues and difficulties in connected vehicles by giving future research directions. By taking into account the issues and difficulties of associated vehicles one can manufacture intelligent Transport System (ITS).

Connected vehicles with keen transportation framework give a major revolution for no collision, smart high effectiveness transportation framework with low traffic bottleneck and better-improved fuel and energy consumption.

REFERENCES

1. Pallavi and Smruti R., “Internet of Things: Architectures, Protocols, and Applications”, Journal of Electrical and Computer Engineering, Volume 2017, Article ID 9324035, 25 pages, https://doi.org/10.1155/2017/9324035
2. Antoine Bagula, Lorenzo Castelli, and Marco Zennaro,"On the Design of Smart Parking Networks in the Smart Cities: An Optimal Sensor Placement Model", Sensors (Basel). 2015 Jul; 15(7): 15443–15467.
3. Dijiang Huang et al, "Situation-aware trust architecture for vehicular networks", IEEE Communications Magazine Volume: 48 Issue: 11.
4. Félix Gómez Mármol and Gregorio Martínez Pérez, "TRIP, a trust and reputation infrastructure-based proposal for vehicular ad hoc networks", Journal of Network and Computer Applications, Volume 35, Issue 3, May 2012, Pages 934-941.
5. Yi-Ming Chen and Yu-Chih Wei, "A beacon-based trust management system for enhancing user-centric location privacy in VANETs", Journal of Communications and Networks, 2013, Volume: 15, Issue: 2.
6. Karim et, al., Sathish Gopalakrishnan, Victor C. M. Leung, "A Context-Aware Trust-Based Information Dissemination Framework for Vehicular Networks", Internet of Things Journal IEEE, vol. 2, no. 2, pp. 121-132, 2015.
7. N. Haddadou, A. Rachedi, and Y. Ghamri-Doudane, "Modeling and performance evaluation of advanced diffusion with classified data in vehicular sensor networks, " Wireless Communications and Mobile Computing, vol. 11, no. 12, pp. 1689-1701, Oct. 2011.
8. Cluj-Napoca: the “Silicon Valley” of Eastern Europe, Partner Spotlight: News from Deutsche Telekom - The New Era of Parking: Towards Parking 2.0 and Smart Parking, (online) Available "https://eu.smartcitiescouncil.com/article/cluj-napoca-silicon-valley-eastern-europe?relatedarticles=", accessed on 9th April 2019.
9. ALIAS Generico, "Smart Cities solutions, Smart parking"(online) Available "https://www.urbiotica.com/en/urbiotica-announces-the-next-launch-of-its-u-spot-parking-sensor-with-nb-iot-communication/”, accessed on 19th April 2019.
10. Matt Stroud, "Police 'GPS cannons' can shoot trackers at fleeing cars, but are they legal?", (online) Available "https://www.theverge.com/2013/10/31/5051352/gps-cannons-could-take-the-danger-out-of-police-car-chases-but-are", accessed on 10th Feb 2019.
11. Y Yan, Y Qian, H Sharif, D Tipper, "A survey on smart grid communication infrastructures: Motivations, requirements and challenges", IEEE Communications Surveys & Tutorials, Volume 15 Issue 1, First Quarter-2013.
12. Sneha S Kothari, Simran V Jain and Prof Abhishek Venkteshwar, "The Impact of IOT in Supply Chain Management", International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 08 | Aug 2018.
13. DHL Blog, "Harnessing The Power of IoT for the Logistics Industry", (online) Available "https://logisticsofthings.dhl/harnessing-the-power-of-iot-for-the-logistics-industry/", accessed on 18th Feb 2019.
14. Bagloee, S.A., Tavana, M., Asadi, M. et al. J. Mod. "Autonomous vehicles: challenges, opportunities, and future implications for transportation policies", Journal of Modern Transportation. (2016) 24: 284. https://doi.org/10.1007/s40534-016-0117-3.
15. Karim Rostamzadeh, HasenNicanfar, Sathish Gopalakrishnan and Victor C. M. Leung, "A context-aware trust-based communication framework for VNets", IEEE Internet of Things Journal, Volume: 2 Issue: 2.
16. C.E. Perkins and E.M. Royer, "Ad-hoc on-demand distance vector routing ", Proceedings WMCSA'99. Second IEEE Workshop on Mobile Computing Systems and Applications.
17. Godfrey AnugaAkpakwu et.al, "A Survey on 5G Networks for the Internet of Things: Communication Technologies and Challenges", IEEE access, Volume 6, 2018.
18. Prerna and Parul Agarwal, "Cryptography Based Security for Cloud Computing System", International Journal of Advanced Research in Computer Science, Volume 8, No. 5, May-June 2017, PP2193.
19. Samer Jaloudi, "Communication Protocols of an Industrial Internet of Things Environment: A Comparative Study", Future Internet 2019, 11, 66; DOI:10.3390/fi11030066.
20. DipaSoni and Ashwin Makwana, "A Survey On Mqtt: A Protocol Of Internet Of Things(IoT)”, Conference: International Conference on Telecommunication, Power Analysis And Computing Techniques (ICTPACT - 2017).

AUTHORS PROFILE

Mr. M. Srinivasan, currently working as an Associate Professor in the Department of Information Technology at P.S.V Engineering College, Krishnagiri, Tamilnadu, India. He is pursuing Ph.D. in the Department of Computer Science and Engineering at Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Avadi, Chennai. He has a total of 12 years of teaching Experience. He did his Under Graduate B.Tech Information Technology at Vel Tech Engineering College, Avadi, Chennai He did his Post Graduate M.E Computer Science and Engineering at SKP Engineering College, Thiruvannamalai. His research area is Cloud computing and IoT. He has applied many project proposals to various funding agencies like SERB, MODROPS, etc. He is a Member of ISTE, IAENG, IACSIT, UACEE, CSTA, IEEE, and IAOE.

Dr. Koteeswaran Seerangan, currently working as an Associate Professor in the Department of Computer Science and Engineering at Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai-62, Tamilnadu, India. He has authored and co-authored several papers in various reputed journals and conference proceedings. He is a reviewer for more than a dozen journals. His research interests include Theory of Computation, Software Engineering, Internet of Things, Data Science and Analytics. He is a Member of ACM, Member of IET, Senior Member of IEEE and Life Member of ISTE.