

AUTOMATIC TOLL TICKETING FOR E-TRANSPORTATION

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Abstract: INTERNET of things is an integral part in today's development of smart city, now without internet is became like nothing is possible in the world especially for corporate systems where they use internet for communication purpose. Internet communicates through radio waves, line of sight not required. Internet of things (IoT) is expanding it's outreach to every aspect of our daily life and our needs. The IoT energy consumption can also be reduced by utilizing network coding in Internet of things in day- to -day life. In Automatic Toll collection system uses RFID technology where they help to reduce the Toll gate traffic and avoid other illegal passage of vehicles through a Toll gate. The latest developments and future vision about sensor cloud, which is a novel paradigm in green IoT. This paper shows, for the first time, that Toll booth can be completely managed using the 'Internet of Things' concept based on the RFID technology.

Keywords: Internet of things, wireless sensor networks, distributed cloud storage.

1. Introduction

Today, Transportation is the major contributor to the nation's economy. Improvements in the field of transportation enabled us to have a fast pace lifestyle characterized by exceptional independence of movement, huge trades in manufactured goods and services, high jobs and social movements. The nation's economic treasure can be said to be directly proportional to the productive transportation methods. As we know number of vehicles on the road are increasing day by day, problems such as congestion, accidents, air pollution have become a major factor of concern.

Every industry has its different method of transportation to reduce excessive costs spent on transportation. Thus, providing good quality transportation will significantly contribute to better economy and productivity. Cost reduction in transporting raw material to factories and moving finished products to consumer market is an important factor in economic and

social growth. To reduce congestion and travel time, increase safety, increase efficiency are some important challenges that are faced. Hence by increasing system's efficiency and making an efficient utilization of modern technology, one can achieve better optimization of the current constraint resources. The IoT Toll Collection systems were aimed to automate the toll plazas for maintaining the fairness in the transactions during the collections on toll systems.

Smart world is envisioned as an era in which objects (i.e, watches, mobile phones, computers, cars, buses, and trains are the examples) can automatically an intelligently serve people in a collaborative manner. Internet of Things (IoT) connects every thing in the smart world as paving the way for smart world through internet. RFID based automatic Toll collection system provides paperless passage of Toll gates with fully automated Toll collection.

2. Related Work

The objective of Internet of things is to equip everything related to human beings with smart chips integrating sensors, actuators and transceivers. Smart devices equipped with smart chips within a certain range can communicate with each other and form networks. These networks can be further connected to the Internet through proper interconnecting. In this paper, we will mainly focus on the IoT core network and the distributed cloud storage which stores the data generated by the IoT core network.

A. IoT Core Network: IoT core network consists of the smart devices mentioned above and the networks among these devices. Several challenges of the IoT core network exists. First, it lacks of a unified infrastructure and protocol stack. Second, the monitor and control of the network lacks of flexibility. Third, the functionality of the network cannot be changed without reprogramming the smart devices when the application environment changes. To overcome these shortcomings, software defined wireless networking (SDWN) [5] was proposed

based on the paradigm of software defined networking (SDN) [17]. In the context of SDN, the network elements in the data plane are smart devices which act as both end users and switches. The data flow is separated from the control flow. We can easily change the network behaviors through exchange of the control flow among smart devices. In [18] the authors propose to combine network coding and software defined networking, where the code rate of the network coding is fixed. Although this approach can improve the communication throughput, the strategy is not flexible to cope with the changing channel qualities in wireless environments. In this paper, we will show that the transmission efficiency of the IoT core network can be greatly improved through our adaptive network coding scheme, where the code rate of the network coding can be dynamically adjusted in a centralized manner with the global view of the whole network.

B. Distributed Cloud Storage: The volume of all global data will be boosted dramatically with the developing of Internet of things, where there will be hundreds of thousands of sensors deployed to create more and more data. To the year 2020, the amount of data would grow to 40 zettabytes. How to properly store the data has become a major challenge in Internet of things.

Traditional centralized data center is not suitable for the context of Internet of things. If something unexpected happens such as power outage or military actions, the precious data stored in the data center could be lost and unrecoverable. To ensure a high reliability of the data storage, a typical solution is to store the data across multiple servers in the distributed cloud storage. The main idea is that instead of storing the entire data in one server, we can split the data into n data components and store the components separately. The original data can be recovered only when the required (threshold) number of components, say k , are collected. The storage efficiency is much higher than simply replicating the data over multiple servers. The distributed cloud storage can also increase data availability while reducing network congestion, thus leading to increased resiliency. A popular approach is to employ an (n, k) maximum distance separable (MDS) code, such as the Reed-Solomon (RS) code in the Total Recall system [19]. In later sections, we will show that by applying network coding in the distributed cloud storage we can further improve the performance of data storage.

In network coding section, we will briefly introduce the concept of network coding and its advantages in improving the communication throughput and the distributed cloud storage reliability, which could eventually contribute to the 'green IoT networking'. Network coding was first introduced in the seminal paper

by Ahlswede et al. in [20]. By allowing the intermediate relay nodes to encode the incoming packets, the network could achieve the maximum multicast capacity.

A network is equivalent to a directed graph $G = (V, E)$, where V represents the set of vertices corresponding to the network nodes and E represents all the directed edges between vertices corresponding to the communication link. The start vertex v of an edge e is called the tail of e and written as $v = \text{tail}(e)$, while the end vertex u of an edge e is called the head of e and written as $u = \text{head}(e)$.

Network Coding in Communication: Assume the capacity of all the edges is C , the capacity of this network is $2C$ according to the max-flow min-cut theorem. Only by encoding the incoming packet symbols x_1, x_2 at node R_3 , this network can achieve the maximum capacity. Since node R_3 only need to send out one symbol $x_1 + x_2$ instead of two symbols, the energy consumption of R_3 in data transmission could be reduced by 50%.

Radio Frequency Identification (RFID): Radio Frequency Identification deploys electromagnetic fields to automatically identify and track tags attached to objects. The most commonly used frequency range is LF (125-134kHz) and HF (13.56MHz).

1. **RFID Tags** The RFID tags contain electronically stored information. These are classified as passive and active RFID tags. Passive tags do not contain a battery and draws power from the radio waves from the reader. Active tags have their own power supply and a transmitter and can be read from a distance of hundred feet or more.
2. **Reader module** RFID reader module reads signal from the antennas in the RFID tags. The EM-18 RFID reader module is operated at a frequency of 125kHz and it can read signals within the range of 10cm.

C. Sensors: A Sensor is an electronic device that detects and responds to some physical quantities from the environment.

1. **Pressure sensor** Pressure sensor is connected to one of the ADC pins in microcontroller. It consists of LM358 which acts as an A/D converter thereby converting the amount of pressure given by the vehicle into a digital signal and detects the amount for toll tax proportional to the weight of the vehicle. When the pressure exceeds an interrupt signal is provided to the controller.
2. **Gas sensor** Gas sensors are used to detect the presence of dangerous LPG leak in vehicles. MQ-6 gas sensor can detect gas concentrations anywhere from 200 to 10000ppm. The sensor has excellent sensitivity combined with a quick response time. The sensor can also sense iso-butane, propane, LNG and cigarette smoke.

D. Buzzer: Buzzer is an audio signalling device. Here the buzzer is combined with the gas sensor to provide an alarm signal when explosive gases are detected.

E. Relay: A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. When the explosive gas is detected, the relay circuit is closed thereby driving the motor to close the gate.

F. Motor drive: The motor drive is used to control the opening and closing of the gate which is assisted with the relay circuit. we can vary the speed of motor by changing the voltage across the motor terminals.

G. LCD: Dot matrix LCD modules is used for display the parameters and fault condition. 16 characters 2 lines display is used. An LCD consists of two glass panels, with the liquid crystal material sandwiched in between them. The inner surface of the glass plates are coated with transparent electrodes to display character, symbols or patterns.

Our world is consisted of various “things”. As one of the enablers of smart world, internet of things (IoT) targets to connect various objects (e.g., mobile phones, computers, cars, appliances) with unique addresses, to enable them interacting with each other and with the world. Further, green IoT targets at a sustainable smart world, by reducing the energy consumption of IoT. In this paper, aiming at fulfilling a sustainable smart world, we position our focus on green IoT and study various technologies towards green IoT. Specifically, an overview about IoT and green IoT is performed first. Then the hot green information and communications technologies (ICT) (e.g., green radio-frequency identification (RFID) [8], green wireless sensor network (WSN) [9], green cloud computing (CC) [10], green machine to machine (M2M) [11], green data center (DC) [12]) enabling green IoT are discussed, followed with the summary of general green ICT principles. With that, towards green IoT, we review the latest developments in sensor-cloud [13], [14] which is a novel paradigm in green IoT, and further envision the future sensor-cloud. Eventually, future research directions and open problems about green IoT are shown. To the best of our knowledge, this work is the first that discusses the realization of smart world from the view of green IoT. We hope this work could be an enlightening and latest guidance for research concerning green IoT and smart world.

The automatic toll e-ticketing system is the approach used for the vehicle when it reaches the toll plaza, this is detected by using Infrared Proximity Sensor. RFID tags

are used to read each vehicle with the help of RFID reader. An IR receiver is used to receive these pulses and sends it to a controller, which then transmits the vehicle number through the RF transmitter located in vehicle. We assume that vehicles have 16-bit identification numbers. The RFID tags to readers read the signal and information about vehicles owners. These RF signals are received by an RF receiver at the toll plaza, which send data to a computer's parallel port. A software program running on the computer retrieves vehicle details from its vehicle database. Depending on this information, appropriate toll tax is deducted from the pre-paid account of the vehicle's owners. The owner receives an SMS message on his/her mobile about the details of the payment. If the balance in the owner's account is low or if the vehicle is not equipped with an RF system, the toll gate remains close. Next method proposes a very simple method for enhancing the performance of infrared electronic-toll-collection systems, in such a case, the vehicle owner will have to pay the toll tax in case and collect the receipt. We need a system for handling violation and acknowledgement when a vehicle does not have an RFID module installed, a vehicle's ID number is not found in the database, or a driver has insufficient funds to pay toll. If an acknowledgement is not received in a predefined time from the database, the toll plaza gate remains closed.

With respect to the sensor-cloud framework, proposes a novel sensory data processing framework named as NSDPF to integrate WSN with mobile cloud. The problem researched is sensory data processing in sensor-cloud. The aim of NSDPF is to deliver desirable sensory data to the mobile users fast, reliably, and securely. Particularly, the sensor gateway and the cloud gateway are with data traffic monitoring, filtering, prediction, compression, and decompression capabilities. For offering data recommendation capability, the strong processing capacity of the cloud is adopted. For improving capacity, data encryption and decryption techniques are applied in the cloud, mobile devices, and sensor and cloud gateways. Analytical and experimental results are provided regarding the proposed NSDPF, in terms of enhancing the performance of sensor-cloud (e.g., enhancing the network lifetime, enhancing the storage requirement, enhancing the security and monitoring performance of WSNs, enhancing the security of the transmitted sensory data, reducing the traffic and bandwidth required for sensory data transmissions, reducing the cloud storage and processing overhead). About the energy efficiency of sensor-cloud, two novel collaborative location-based sleep scheduling (CLSS) mechanisms are shown in for WSNs integrated with MCC. Specifically, the focus of CLSS is enhancing the WSN lifetime, while still catering mobile users' data

requests in sensor-cloud. For decreasing the integrated WSN's energy consumption, the detailed technique is dynamically changing the awake or asleep state of every sensor node, based on the mobile users' locations. CLSS1 targets at maximizing the integrated WSN's energy consumption saving, while CLSS2 also takes into account the integrated WSN's scalability and robustness. Theoretical and simulation results are both performed to demonstrate the effectiveness of the proposed CLSS mechanisms. Concerning the sensory data transmission in sensor-cloud, a scheme named TPSS is designed in ,aiming at reliably offering more useful data to mobile cloud from WSN. Particularly, the key issues that affect sensory data's usefulness and WSN's reliability are identified first. Then TPSS which consists of two main parts is introduced. Considering the time and priority features regarding mobile users' data requests, Part 1) is time and priority-based selective data transmission (TPSDT), for WSN gateway to selectively deliver more useful sensory data to the cloud. Part 2) is priority-based sleep scheduling (PSS) algorithm, for WSN to save energy consumption so that sensory data can be collected and delivered more reliably. Analytical and experimental results show the effectiveness of TPSS about enhancing sensory data's usefulness and WSN's reliability for sensor-cloud. Regarding the security of sensor-cloud, a novel authenticated trust and reputation calculation and management (ATRCM) system is presented in motivated by the following two critical security issues. Issue 1: Genuine CSPs and genuine SNPs could be impersonated by vicious attackers to perform communications with CSUs and CSPs, respectively. As a result, any service cannot be obtained by CSUs and CSPs from the fake CSPs and SNPs, while the trust and reputation of the authentic CSPs and SNPs are strongly decreased by these fake CSPs and SNPs. Issue 2: Lacking trust and reputation calculation and management of CSPs and SNPs, CSU may easily choose an untrustworthy CSP and CSP probably easily selects an untrustworthy SNP. Then the delivery of the service (from CSP to CSU, from SNP to CSP) owns an unacceptable large latency, or cannot be delivered successfully quite often, or could only be offered for a very short time period unexpectedly. To solve these two issues (i.e., authentication of CSPs and SNPs, trust and reputation calculation and management of CSPs and SNPs), they are with analysis first. With that, ATRCM is proposed, considering (i) CSP's authenticity and SNP's authenticity; (ii) CSU's attribute requirement and CSP's attribute requirement; (iii) the cost, trust and reputation regarding CSP's service and SNP's service. With detailed analysis and design as well as functionality evaluation results about ATRCM, it is presented that ATRCM is able to 1) assist CSU in selecting authentic and appropriate CSP; 2) help CSP choose

authentic and desirable SNP. Discussing job scheduling in sensor-cloud, is interested in job scheduling for CC integrated with WSN, which is an unexplored topic. Particularly, the features of job scheduling about sensor-cloud are analyzed first and two popular and traditional job scheduling methods (i.e., Min-Min and Max-Min) are studied. Then two novel job scheduling methods (i.e., PTMM (priority-based two phase Min-Min) and PTAM (priority-based two phase Max-Min)) are put forward for CC integrated with WSN. Compared with Min-Min and Max-Min, extensive experimental results about PTMM and PTAM exhibit that they obtain shorter expected completion time (ECT) for integrated with WSN. With the purpose to enhance the quality of service (QoS) of sensor-cloud about achieving sensory data from the cloud by users, TASC (trust-assisted sensor-cloud) is proposed in [59]. In TASC, trusted sensors (i.e., sensors with trust values that exceed a threshold) in WSN gather and transmit sensory data to the cloud. Meanwhile, trusted data centers (i.e., data centers with trust values that exceed a threshold) in cloud store, process and further on demand deliver the sensory data to users. Extensive simulation results present that TASC is able to greatly enhance the throughput and response time that users achieve sensory data from the cloud, in contrast to SCWTA(sensor-cloud with out trust assistance). With special attention to sensor-cloud pricing which is barely explored, five sensor-cloud pricing models (i.e., SCPM1, SCPM2, SCPM3, SCPM4 and SCPM5) are introduced in. In particular, a sensor-cloud user is charged, considering 1) user's lease period; 2) needed working time of SC; 3) SC resources used by the user; 2158 VOLUME 3, 2015

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4) sensory data's volume achieved by the user; 5) SC path delivering sensory data to the user from the WSN, respectively. To discuss and demonstrate the performance of the proposed SCPMs, further analysis is also. The pricing schemes and conducted analysis in this work could be a very valuable guidance for future research concerning pricing in sensor-cloud.

In this section, we will show our adaptive network coding (ANC) scheme in the IoT core network. The size of the data to be transmitted in the IoT core network may be larger than the size limit of a single packet, such as new firm wares to update the smart devices on-air. So the data needs to be divided into data fragments first then transmitted in multiple packets with one data fragment per packet. A node has to correctly receive enough linearly independent packets to reassemble the original data.

Limitations of existing works since the communication between smart devices are through wireless channel and there may be various fading and

interferences in the channel, some of the nodes may experience packets loss in the communication. When network coding is not utilized, retransmission is a common method to mitigate the packets loss. In some cases, certain packets may get lost most of the time so these packets have to be retransmitted many times until they are correctly received. Thus the overall transmission efficiency will be low. Here the transmission efficiency is defined as the ratio between the minimum number of the packets needed to reassemble the original data and the number of total packets transmitted from the source node and the intermediate nodes. When network coding is utilized, a node can retrieve the original data as long as the node can correctly receive enough number of packets. The entire transmission of the data will not be affected by lacking of certain particular packets. So the overall transmission efficiency will be higher. However, there are still limitations for simply applying the network coding in the IoT core network, where the number of encoded packets to be generated and sent in the intermediate nodes is predetermined. If too few packets are generated, the sink node may not even be able to collect enough packets to decode the original data. If too many packets are generated, the transmission efficiency will be low. Moreover, the fact that the quality of wireless channel is changing over time makes the situation even worse. As an example, when the channel quality becomes better and the packet loss rate goes lower, some of the encoded packets will be useless and the transmission efficiency could be higher. The encoding strategy should be able to dynamically adjusted according to the transmission conditions.

ANC Scheme for the IoT core network To overcome the limitations mentioned above, we propose an adaptive network coding (ANC) scheme to further improve the transmission efficiency of the IoT core network with SDWN. In this example, end users could communicate with the IoT core network with SDWN through Internet for monitoring/control purposes. The data transmission inside the IoT core network could benefit from our ANC scheme. In the figure, the IoT core network formed by the smart devices could be the smart appliance network at home, the surveillance camera network on streets or the emission detecting network in factories, etc. Here we only include the data plane and control plane of the SWDN to show the main idea of the ANC scheme. For the data plane, the source node will send out linear combinations of the original packets. Each intermediate node will perform random linear network coding. The incoming packets will be linearly combined using random coefficients then sent out to succeeding nodes.

The code rate r of the network coding is defined as the ratio of the number of encoded packets to the number of incoming packets. And the coderates of the network

coding will be automatically adjusted by the SWDN controller mentioned below. The sink nodes will decode the original packets after receiving enough number of linearly independent packets. Meanwhile, for the control plane, the smart devices will report packets receiving statistics to the SDWN controller periodically through the control path. Based on the information reported, the SDWN controller will dynamically adjust the network coding strategies to eliminate unnecessary transmis 2169-3536 (c) 2016 IEEE. Translations and content mining are permitted for academic research only. Personal use is also permitted, but republication/redistribution requires IEEE permission.

If the packet loss becomes higher around some node, more encoded packets will be generated in the corresponding intermediate nodes. If the packet loss becomes lower, the number of encoded packets will be decreased. Since the SDWN controller has the global information of the network, this centralized control will be more effective.

3. Proposed System

The proposed automatic toll collection system uses passive RFID technology (passive tag). A passive tag is an RFID tag that does not contain a battery. The power is supplied by the reader. The main advantage of a passive tag is that the tag functions without a battery. Passive tags have a useful life of twenty years or more. The tag is typically much less expensive and smaller. The proposed system features are as follows.

- > Automatic toll collection
- > Reduction in toll
- > Theft detection

Active RFID

Active radio frequency identification (RFID) is a wireless, automatic identification method, which uses self-powered tags to broadcast information about its identity and location. The battery powers the RFID circuitry and enables the active RFID tag to transmit identifying information, either by continuously beaconing to a tag reader, or when prompted to do so by a reader. Active RFID tags are used to automatically identify, locate, track, monitor and protect assets, humans and animals.

An active RFID can be programmed to send a signal on demand, or transmit at set intervals. The tags can also be activated to start transmitting at certain locations, or when a change in a sensed parameter is detected. The change could be in temperature, humidity or movement. Active RFID systems operate at ultra-high frequencies and have long read ranges of up to 100 M. The devices have a memory capacity of 512 kb or more, which allows

the active tag to store asset information that can be retrieved directly from the tag. Advantages of active RFID include longer range, more data, higher data transmission rates, increased productivity, efficiency, security and visibility. However, it has some drawbacks such as high cost, short life, larger size and limited operating temperature range. The cost and size of an active RFID varies depending on the battery life, memory, type of housing, and added value features such as integrated motion detectors, temperature sensors and telemetry interface.

Batteries are usually not replaceable and last for about five years, after which the tag is discarded. Active RFID is used in a wide range on applications such as medical equipment, computer equipment, electronic test gear, containers and trailers in the transport industry as well as for locating people and items, facility access control, animal tracking, assembly line processes and more.

Frequency refers to the size of the radio waves used to communicate between system components. RFID systems throughout the world operate in low frequency (LF), high frequency (HF), and ultra-high frequency (UHF) bands. Radio waves behave differently at each of these frequencies and there are advantages and disadvantages associated with using each frequency band. For example, if an RFID system operates at a lower frequency, it has a slower data read rate, but increased capabilities for reading near or on metal or liquid surfaces. If a system operates at a higher frequency, it generally has faster data transfer rates and longer read ranges, but more sensitivity to radio wave interference caused by liquids and metals in the environment. However technology innovations in recent years have made it possible to use ultra-high frequency RFID systems around liquids and metals.

Low Frequency (LF) RFID:

The LF band covers frequencies from 30 KHz to 300 KHz. Typically LF RFID systems operate at 125 KHz, although there are some that operate at 134 KHz. This frequency band provides a short read range of 10 cm, and has slower read speed than the higher frequencies, but is not very sensitive to radio wave interference. LF RFID applications include access control and livestock tracking. Standards for LF animal-tracking systems are defined in ISO 14223, and ISO/IEC 18000-2. The LF spectrum is not considered a truly global application because of slight differences in frequency and power levels throughout the world.

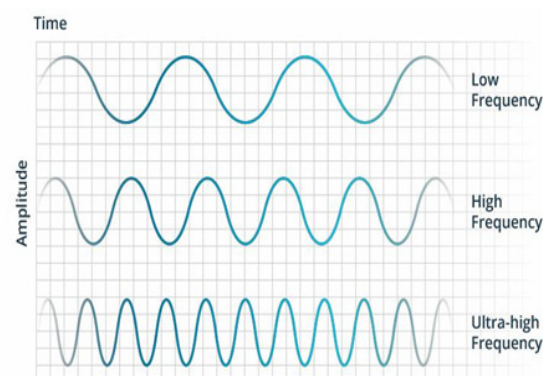
High Frequency (HF) RFID:

The HF band ranges from 3 to 30 MHz. Most HF RFID systems operate at 13.56 MHz with read ranges between

10 cm and 1 m. HF systems experience moderate sensitivity to interference. HF RFID is commonly used for ticketing, payment, and data transfer applications. There are several HF RFID standards in place, such as the ISO 15693 standard for tracking items, and the ECMA-340 and ISO/IEC 18092 standards for Near Field Communication (NFC), a short range technology that is commonly used for data exchange between devices. Other HF standards include the ISO/IEC 14443 A and ISO/IEC 14443 standards for MIFARE technology, which used in smart cards and proximity cards, and the JIS X 6319-4 for FeliCa, which is a smart card system commonly used in electronic money cards.

Ultra Frequency (UHF) RFID:

The UHF frequency band covers the range from 300 MHz to 3 GHz. RAIN RFID systems comply with the UHF Gen2 standard and use the 860 to 960 MHz band. While there is some variance in frequency from region to region, RAIN RFID systems in most countries operate between 900 and 915 MHz. The read range of passive UHF systems can be as long as 12 m, and UHF RFID has a faster data transfer rate than LF or HF. UHF RFID is the most sensitive to interference, but many UHF product manufacturers have found ways of designing tags, antennas, and readers to keep performance high even in difficult environments. Passive UHF tags are easier and cheaper to manufacture than LF and HF tags.



Advantages are there in Iot such as

- > RFID tag can't cloned, so cannot be cheated.
- > Very efficient saving of time.
- > Wastage of money reduced.
- > Consumption of fuel is reduced.
- > Pollution is reduced to a large extent.
- > Speedy transport.
- > Less congestion on the roadways.

There are some applications also and few of them are

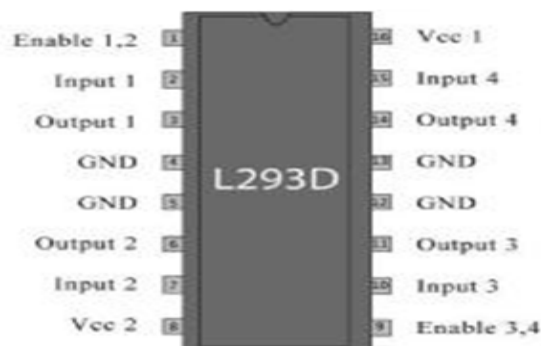
- Automated vehicle identification.
- Automated vehicle classification.
- Transaction processing
- Can be used to trace the vehicle if this system is centralized.
- Parking system.

Motor Driver:

Which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. Dual H-bridge Motor Driver integrated circuit(IC).The L293d can drive small and quiet big motors as well, check the Voltage Specification at the end of this page for more info. You can Buy L293D IC in any electronic shop very easily and it costs around 70 Rupees (INR) or around 1 \$ Dollar (approx Cost) or even lesser cost. You can find the necessary pin diagram, working, a circuit diagram, Logic description and Project as you read through. Concept. It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, Hence H-bridge IC are ideal for driving a DC motor.

In a single L293d chip there two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic application for controlling DC motors. Given below is the pin diagram of a L293D motor controller. There are two Enable pins on L293d. Pin 1 and pin 9, for being able to drive the motor, the pin 1 and 9 need to be high. For driving the motor with left H-bridge you need to enable pin 1 to high. And for right H-Bridge you need to make the pin 9 to high. If anyone of the either pin1 or pin9 goes low then the motor in the corresponding section will suspend working. It's like a switch.

TIP: you can simply connect the pin16 VCC (5v) to pin 1 and pin 9 to make them high.



Working of L293D:

There are 4 input pins for L293d, pin 2,7 on the left and pin 15,10 on the right as shown on the pin diagram. Left input pins will regulate the rotation of motor connected across left side and right input for motor on the right hand side. The motors are rotated on the basis of the inputs provided across the input pins as LOGIC 0 or LOGIC 1. In simple you need to provide Logic 0 or 1 across the input pins for rotating the motor.

L293D Logic Table

Lets consider a Motor connected on left side output pins (pin 3,6). For rotating the motor in clockwise direction the input pins has to be provided with Logic 1 and Logic 0.

- Pin 2 = Logic 1 and Pin 7 = Logic 0 | Clockwise Direction
- Pin 2 = Logic 0 and Pin 7 = Logic 1 | Anticlockwise Direction
- Pin 2 = Logic 0 and Pin 7 = Logic 0 | Idle [No rotation] [Hi-Impedance state]
- Pin 2 = Logic 1 and Pin 7 = Logic 1 | Idle [No rotation]

In a very similar way the motor can also operated across input pin 15, 10 for motor on the right hand side.

4. Conclusion

We have tried to analyze some of the current RFID toll collection systems and their practicality. All the system tries to reduce the traffic overheads at toll plaza. These systems include benefits to both toll authorities and facility users, in terms of time and cost saving, improved security and high capacity. Today, Transportation is the major contributor to the nation's economy. IoT Toll Collection systems are aimed at automating the toll plazas so as to maintain fairness in the transactions during toll collections.

Every industry has its different method of transportation to reduce excessive costs spent on transportation. Thus, providing good quality transportation will significantly contribute to better economy and productivity.

5. Further Scope of the Project

Every application has its own merits and demerits. This work has covered almost all the requirements. Designed to a system to give complete solution traffic and transport related problems such as toll gate control, traffic signal control, traffic rules violation control, parking. Changing the existing modules or adding new modules can append improvements. Compare to normal manually system is

better and in this we can further to implementing to every vehicle owner having the one tag that tag is contain total information of vehicle.

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