

REAL TIME VEHICLE DETECTION, TRACKING AND COUNTING USING NODEMCU

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ABSTRACT

Population explosion leads to increase in the number of physical objects means number of vehicles on road. This result, the number of road accidents increases due to a very heavy traffic flow. Here traffic flow is monitored by using computer vision paradigm, where images provide a betterment on the road view. In order to detect vehicles, monitor and estimate traffic flow using low cost electronic devices, this research work utilizes camera module of raspberry-pi along with Raspberry Pi 3. It aims to develop a remote access using raspberry-pi to detect, track and count vehicles only when some variations occur in the monitored area. The proposed system captures video stream for providing video like vehicles in the monitored area to compute the information and transfer the compressed video stream for providing video based solution that is mainly implemented in Open CV by Python Programming. The

proposed method is considered as an economical solution for industries in high cost-effective solution are developed for traffic management.

INTRODUCTION

It is observed that, the major hindrance on road is due to heavy traffic flow during peak hours especially when people commute to work. The total number of vehicles or object exceeds its capacity by causing a blockage for emergency vehicles such as fire fighter and rescue vehicles. In order to develop an efficient, reliable, cleaner and safer mode of transportation, it is necessary to make the road transportation system automated as much as possible. The primary focus is dedicated towards the detection and tracking of vehicles, where it finally keeps the count of vehicles in the particular monitored area. The need of traffic surveillance system is to provide construction engineers and other associates to plan in an economical way and

proper decisions were taken based on density of the vehicles and the statistics obtained by the low cost electronic devices. It also provides solution to major problems such as vehicle accidents, vehicles theft detection, managing parking area and other security threats. The main cause for the interest in traffic management activity is to utilize the computer vision techniques in real real-time conditions. The major challenge that caused hindrance to our work is vehicle segmentation in various atmospheric conditions such as night, snowy or dusty wealth conditions. As a solution to it we have used a different pre-processing unit based on Histogram Equalization to improve the resolution of video and morphological operation to add or remove pixels in the boundaries of objects, where video depends on shape and size of the structuring elements before processing towards the next stage. It is also observed that the vehicles moving towards same point either in lighter or darker region or vice-versa might have the same colour as background for detecting vehicle remains move challenging and this leads to fault in count of vehicles. So, as a solution to it we have employed background subtraction technique to register the vehicle ID if it crosses the given threshold.

LITERATURE SURVEY

1. Nicolas Morizet, Frédéric Amiel, InsafDris Hamed, ThomasEa, “A ComparativeImplementation of PCA Face Recognition”,InstitutSuperieur d’Electronique de paris (I.S.E.B),2013

This paper presents PCA algorithm used in face recognition system and its implementation on different architectures in order to choose the best solution for designing a real time face recognition system. Benchmarks and comparisons will be given for PC, DSP and FPGA and results will show that FPGA soft core is too slow for this computation. An IP solution is the best choice. But DSP is also a good compromise for implementing easily the algorithm and having acceptable processing time. For more than 15 years, research in biometric systems has been increasing significantly due to international insecurity environment. Research groups around the world are developing algorithm and systems based on face, iris, fingerprint, palm print or voice... In our research laboratory, recognition with iris [1] and face, and their implementations on embedded platforms are studying. Face recognition algorithm is mainly based on Principal Component Analysis (PCA) [2].

PCA can be time consuming and this article will give quantitative data for choosing the best platform for implementing this algorithm. This paper is organized as follows: firstly, PCA algorithm description is presented in section 2. Secondly, reduced accuracy for number coding is presented in section 3. Thirdly, target platforms and results are described in section 4. Finally, a short summary and future work conclude this article in section 5.

2. Bahurupi Saurabh p.,D.S Chaudhary
“Principle Component Analysis for the
face Recognition”,International Journal of
Engineering and Advanced Technology
(IJEAT) ISSN:2249-8958.

Face recognition is a biometric technology with a wide range of potential applications such as access control, banking, information security, human computer interaction, virtual reality, database retrieval etc. This paper addresses the building of face recognition system by using Principal Component Analysis (PCA) method. PCA is a statistical approach used for reducing the number of variables in face recognition. While extracting the most relevant information (feature) contained in the images (face). In PCA, every image in the training set can be

represented as a linear combination of weighted eigenvectors called as “Eigenfaces”. These eigenvectors are obtained from covariance matrix of a training image set called as basis function. The weights are found out after selecting a set of most relevant Eigenfaces. Recognition is performed by projecting a new image (test image) onto the subspace spanned by the eigenfaces and then classification is done by distance measure methods such as Euclidean distance. A number of experiments were done to evaluate the performance of the face recognition system. Face is one of the most important visual objects in our life which playing a major role in conveying identity and emotion and includes rich information. Face recognition is a huge research area in computer vision, pattern recognition and plays a vital role in the applications of image analysis and understanding. Face recognition commonly includes feature extraction, feature reduction and recognition or classification. Feature extraction is to find the most representative description of the faces, making them can be most easily distinguished from others. Face reduction is to not only decompose and compress the original features but also not destroy the most important information. Recognition or

classification is to choose the available measure method such as Euclidean distance, which is used to classify the feature of images present in the database and test image. Because the face image is often with a high dimension, it is difficult to use the original data directly, so it is critical to choose the effectively distinguished features for extraction and reduction. In all kinds of the algorithms of face recognition, Principle Component Analysis (PCA) [1-6] is effective feature extraction method based on face as a global feature. It reduces the dimension of image effectively and holds the primary information at the same time. Manuscript published on 30 June 2012. * Correspondence Author (s) Saurabh P.Bahurupi Department of Electronics and Telecommunication Government College of Engineering Maharashtra, India, D.S.Chaudhari Department of Electronics and Telecommunication Government College of Engineering Maharashtra, India © The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CCBY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/> In this paper face recognition system is described and it is followed by the PCA

algorithm. Finally the experimental results are provided.

3. OnsenToygar and Adnan Acan “Face recognition using PCA, LDA and ICAapproaches on colored images”,Journal of Electrical &Electronics Engineering ,Istanbul University,Volume 3,2003,p735-743.

Vehicle Anti-Theft Detection and Protection with Shock employs a robust security system integrating facial recognition technology and shock protection mechanisms. A camera, connected to a Pythoninstalled PC, facilities facial recognition to identify authorized users. In the event of an unrecognized face, the system triggers an immediate response by sending an alert email to the registered user. This aspect adds an extra layer of security to deter potential thefts. In addition to the facial recognition feature, the project incorporates a shock protection mechanism inspired by a mosquito bat. This innovative approach involves integrating a shock mechanism that can be activated remotely. If unauthorized access or tampering is detected, the shock mechanism provides an additional deterrent, enhancing the security of the vehicle. The combination of facial recognition and shock protection contributes to a comprehensive

anti-theft system, ensuring both user authentication and a swift response to potential threats. The latest car anti-theft systems incorporate car alarms, flashing lights, and various sensors such as pressure, tilt, shock, and door sensors. However, these systems have shortcomings such as cost and their inability to trace thieves. Traditional car security systems rely on multiple sensors, initially consisting of electromechanical devices and later evolving into fully integrated microprocessor-based systems using diverse electronic sensors. Advancements have been made in the hardware and software of GPS and GSM grids. A vehicle tracking system, utilizing GPS and GSM technology, enables the owner or a third party to track the vehicle's location. This system, based on embedded systems, continuously monitors a moving vehicle and provides its status upon request. Rashed et al. proposed a GPS-based tracking system that monitors a vehicle's location and speed using a mobile phone text messaging system. The system provides real-time text alerts for speed and location changes, and it can lock onto the current location, alerting the owner if the vehicle is moved from that position. Pethakar et al. developed an RFID, GPS, and GSM-based Vehicle Tracking and

Employee Security System. This system involves installing an electronic device in a vehicle and implementing purpose-designed software to enable the organization to track the vehicle's location. When an employee boards the vehicle, they must swipe their RFID card. The microcontroller matches the RFID card number with its database records and sends the employee's ID, taxi ID, and taxi position coordinates to the organization unit via the GSM module. If an employee encounters a problem, they can press a button, triggering the microcontroller to send a signal to the GSM module, which communicates with the organization unit and the police.

4. Ms.S.S.Pethakar, Prof. N. Srivastava, Ms.S.D.Suryawanshi ,“RFID, GPS and GSM Based Vehicle Tracing and Employee Security System ”, International Journal of Advanced Research in Computer Science and Electronics Engineering, vol. 1, no. 10, Dec 2017.

This talk will review the emerging research in Terrorism Informatics based on a web mining perspective. Recent progress in the internationally renowned Dark Web project will be reviewed, including: deep/dark web spidering (web sites, forums, Youtube, virtual

worlds), web metrics analysis, dark network analysis, web-based authorship analysis, and sentiment and affect analysis for terrorism tracking. In collaboration with selected international terrorism research centers and intelligence agencies, the Dark Web project has generated one of the largest databases in the world about extremist/terrorist-generated Internet contents (web sites, forums, blogs, and multimedia documents). Dark Web research has received significant international press coverage, including: Associated Press, USA Today, The Economist, NSF Press, Washington Post, Fox News, BBC, PBS, Business Week, Discover magazine, WIRED magazine, Government Computing Week, Second German TV (ZDF), Toronto Star, and Arizona Daily Star, among others. Recent Dark Web research includes: (1) epidemiological and social network modeling of internet radicalization and violent intents; (2) Dark Web Forum Portal and Video Portal for researchers and analysts; and (3) Geopolitical Web research of social media and news tracking for multicultural at-risk regions. As shady as it sounds, Dark Web is an area of the internet which cannot be accessed directly and remains hidden beneath the web pages and social networks we browse. The internet is a big

place, much bigger than what we are able to see by simply visiting Facebook or looking up on Google – the content on the dark web remains hidden and cannot be searched through conventional search engines. The content which only exists on personal encrypted networks or peer-to-peer configurations is called the Dark Web. It can only be accessed using special software and decryption tools such as a Tor browser and most of the websites on the Dark Web contain fishy content which need that kind of encryption. These websites cannot be visited using search engines or traditional browsers as their address are encrypted and cannot be traced using conventional methods. The Dark Web sites generally use the Tor encryption tool to mask their identities due to which they can keep their activities hidden. The tool basically functions just like a VPN and consistently randomizes the host's location to a different country so its almost impossible to detect where the user is. Tor-encrypted websites can easily be accessed using a Tor browser. It provides secrecy for both ends – the website and the visitor both. The IP addresses using the browser bounce constantly to random locations while getting concealed under several layers of encryption. The websites can be visited by any user in

any part of the world by simply inputting the address in their Tor browser, however, its difficult to spot the location or identity of the websites. Depending on how actionable the Dark Web-based activity is, it can be extremely dangerous if the user's identity gets revealed. You don't have to be a web wizard to have heard the stories of the dark, fantastical Deep Web. You know, the websites or Deep Web search engines where criminals and hackers collude to steal identities, change stock prices, or shut down a site of their choosing. The Deep Web history goes back a long way, but its presence has only recently been told as scary Internet campfire stories. However, the Deep Web is not only much larger than these stories imply, but it's also much more benign in nature than many have been led to believe. The "Dark" corner and the Deep Web space are based on anonymity. However, both are only accessible with a specifically designed web browser, meaning that you won't stumble upon a secret drug ring by just typing an inquiry into your search engine.

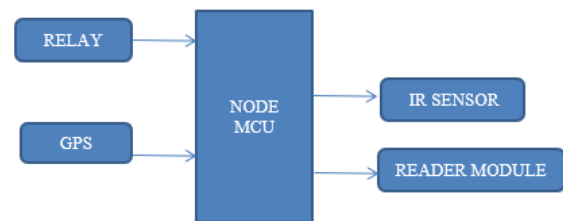
5. Hu-Jian-ming, Li Jie and Li Guang-Hui ,“Automobile Anti-theft SystemBased on GSM and GPS Module”, Fifth International Conference on Intelligent Networks and Intelligent Systems, 2017.

In developed India information technology and electronics engineering are on fast track. Now a day's digital electronics has become a very important part of new developed technologies. Today practically it is impossible to avoid interaction with digital equipments. The world has gone digital technology and so India has also. Development of GSM technology has made business and industry more easy and profitable. This system must be provides monitoring and controlling system for inter-cities transportation vehicle such as autos and buses. The digital electronics and GSM technologies will create the digital environment and digital homes and also make digital INDIA. This system uses GPS and GSM technologies. As thus GPS technologies having high range of frequencies, the user can get the information as fast. The paper includes the hardware part which include of GPS, GSM, Atmega microcontroller 89C51, level converter MAX 232, 16x2 LCD and software part. As the you send SMS through GSM as a status, the GSM will trigger and on the signal to the micro-controller circuit and it will identify the location using GPS and send a particular text message via GSM to the receiving members i.e. friend, family etc. In last few years INDIA

has developed at such a high performance that many companies have strongly verified themselves here. The development of satellite communication technology is easy to find out the vehicle location. GPS used in cars, ambulances, fleets and police vehicles are common sides on the roads of developed countries. All new technology support tracking of theft vehicle station. This system has Global Positioning System (GPS) which can receive the coordinates from the satellites calculate other type of information. Tracking system is very important in developed digital world. The system is microcontroller based that composed of a global positioning system (GPS) and global system for mobile communication (GSM). This project used only one GPS device and a two way communication process is executed using a GSM modem. GSM modem, provided with a SIM card uses the same communication process as we are using in regular phone. In short if theft vehicle is identified the system send SMS to the vehicle owner. After that vehicle owner sends the SMS to the microcontroller. The system is not limited to find the location of the target but also calculates the distance travelled between two stations. The use of this system is to design an integrate a new system which is integrated

GPS and GSM to provide following feature:
a)Position information, b)Real time tracking using SMS, C)Track car driver activity.

Block diagram



CONCLUSION

The advanced structure will be more well planned by executing the GSM of high baud rate and also together with GPS module for the arranges and it is evident that the decision of this face recognition system is worthy but there is range for forthcoming growth.. Because of time constraints we were not ready to execute a few objective that ought to have better the study work a charge. The principle change will seek after the exhibitions, perceives the ongoing face acknowledgment. I might want to enhance my code for face picture acknowledgment and also tidy up the code keeping in mind the end goal to enhance execution. Numerous

challenges has been confronted when perceived face pictures from database, for example, lighting varieties, expression varieties, age varieties, and facial impediments. In future to enhance the posture remedy, quality based edge determination, maturing correction, and stamp based coordinating procedures can be joined to manufacture a unified framework for video based face acknowledgment.

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