iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** VI **Month of publication:** June 2020

DOI: http://doi.org/10.22214/ijraset.2020.6132

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

IOT based Virtual Fencing Technique for Children Monitoring

Mr. Md. Shafiulla[1], Padmaja Y Shetti[2], Pooja K[3], Sai Nikitha C[4], V Geetha Sri[5]
[1]*Assistant Professor,* [2,3,4,5]*UG student, Department of Computer Science & Engineering, Ballari Institute of Technology& Management, Ballari.*

Abstract: ***The era of time that we people live in safety and security of a child in the society is questionable with number of crimes on children and also lack of good security to children. The proposed system will be made with the integration of IOT and cloud where using the most trending digital technologies it ensures children protection. The project aims at providing an effective solution for monitoring children at schools, play areas and residential areas by using virtual fencing technique. The system has two logins, one for admin and other for users such as parents, guardians. The proposed system would be useful for its end users by providing effective security system in which children will be monitored in specified premises and parents will be alarmed by notifications. The proposed system will be intended to perform functionalities like notifying parents during their arrival time and once arrived if a child crosses the premises, through android application. There are a lot of projects done on wildlife monitoring where cattle raring has been made easy by using virtual fencing, but usually virtual fencing was not majorly used for human beings and the proposed system aims at providing border line security for human beings such as mainly children in this project. The project includes QR scanning for particular child to be detected or the child detection can be done using RFID detection, the android application will also be implemented with the specified logins to receive notifications. The SMS gateway called text local will be used for sending SMSs. Using the most cost efficient and simple equipment the project will be developed for children safety. The project also includes ultrasonic sensors which are best for object detection with their distance parameters and also the Raspberry PI which is the most trending small chip sized computer best for reading sensor values and connecting to internet for real time data.***

I. INTRODUCTION

Nowadays providing security for the children is challenging task. There are particularly very few measures to take care of children like making children have small devices to track them. Constructing the wall in certain area. Constructing the fencing manually. For all the existing models a physical infrastructure has to be built. All these manual systems are not cost effective. The proposed model is based on virtual fencing technique using ultrasonic sensors. The proposed model will be made to ensure cost effective and efficient children monitoring system based on IOT. This proposed system involves task like fixing all ultrasonic sensors in all corners of the area to set as a boundary and using raspberry pi, real time data will be given to the end user. Raspberry Pi will take the action it will notify to the Android application and Raspberry Pi will send the SMS alert to the registered end user. An open source cloud called firebase database is used to support the proposed application. The proposed project provides enough security to children by enabling alerts in the android application which is more cost effective and robust. The project aims at providing an effective solution for monitoring children at schools, play areas and residential areas by using virtual fencing technique. The proposed system would be useful for its end users by providing effective security system in which children will be monitored in specified premises and parents will be alarmed by notifications. The proposed system will be intended to perform functionalities like notifying parents during their arrival time and once arrived if a child crosses the premises, through android application. System provide automated solution for data prediction. The proposed system can also have its usage in border security system, home automation system, school zones, and in railway tracks and it has low cost and good performance.

A. Literature Survey

1) Internet of Things (IOT) is a very common term nowadays. It's not a second internet; rather it's a network of devices that are connected to the Internet that is used every day to search Google, upload images and connect with friends. It's a network of products that are connected to the Internet, thus they have their own IP address and can connect to each other to automate simple tasks. However, IOT is still in its infancy. It has not been completely developed and is fragmented. For the IOT to be fully realized all devices need to be able to connect to each other, regardless of what company manufactured the product or which companies have business relationships with each other. In technical terms, the Internet of Things (IOT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to computer interaction.

©IJRASET: All Rights are Reserved

2) The RADAR solution was proposed ,RF based person location tracking system ,which uses the received signal strength to triangulate the users spatial coordinates .They have constructed a test bed with three base stations B1,B2 and B3 and mobile host. Each mobile host and Base station is equipped with Digital Roam, Network Interface Card (NIC), based on Lucents popular WaveLAN RF LAN technology. Range of this network is 200m for open space, 50 m for semi opened environment and 25m for closed environment. It is proven that RADAR based model outperforms with strongest base station method. RFID based detection has been proposed in,RFID chips are implanted in wrist bands .Through this technology, individuals could be tracked and exact count of inmates can be determined.
3) In this ever changing world of global data communication, inexpensive Internet connection and fast paced software development, security has become more and more of an issue. Automation is becoming more and more popular day by day due to its numerous advantages. This can be achieved by local networking or by remote control. The Raspberry Pi is a low cost single-board computer which has recently become very popular. Raspberry Pi makes network security cost effective and easy to implement. Raspberry PI are open and well documented as well and things you can build and modify yourself. It has powerful hardware and also upgraded power system (up to 900MHz to 1.2GHz) with four USB Ports .This Literature review aims at discussing a different applications such as virtual fencing being one of them.
4) The IOT based project was developed for wildlife monitoring to safeguard animals from crossing certain field borders, their raring farms etc. the project was even used on elephants and other wildlife to track and protect them from facing any accidents on roads and railways the entire virtual fencing idea proved to be efficient and helped a lot of wildlife for its safety. The cattle are well protected by using some collar for their location detection and protection, microcontrollers and other sensors were used to maintain the collar readings and notifications were give out to the landlords. The proposed is based on the idea of wildlife monitoring using virtual fencing the proposed system will also prove the functionalities be applicable to the human beings as well most efficiently to kids.

B. *Terminology*

1) *Internet of Things:* The internet of things is the inter-connection of many physical devices that is used to send and receive data.
2) *Ultrasonic sensor:* To effectively sense and detect the collision between specified premises and boundaries.
3) *Raspberry pi*: Monitoring process is done by Raspberry pi with the connection of several ultrasonic sensors which in turn sends the sensor information to Raspberry pi.
4) *QR code:* To provide notifications regarding arrival and exit of children from specified premises using QR scanning for each child.

II. PROPOSED METHODOLOGY

In this paper, virtual fencing for kids is being introduced with the help of ultrasonic sensors and this sensors will be in all the corners of the school premises.

When a child is trying to cross the school premises during the school time then the ultrasonic sensors will detected it and the raspberry pi will trigger the buzzer and buzzer will be ON which alerts the watchman and he gets the student position and time in the android application that a child crossing the school zoon, watchman will scan the QR code of that particular child and a notification will be send to the android application to their parent also an SMS will be send to the particular child parent number . When the parent accept/reject, the watchman will receive the acknowledgement by parents and the same action will be taken based on parent's acknowledgement.

A. *Working of Proposed Methodology*

Major modules are as follows:

1) *Admin*

a) The proposed system once installed by the school management they have the responsibility of adding student information into the database.
b) The information of the student will be used by the android application after the student code will be scanned for his/her identification.
c) The school management will add the parent as registered person to the application.

©IJRASET: All Rights are Reserved

2) Hardware Module

a) The proposed system is an IoT system with the combined functionality of ultrasonic sensors, buzzers and Raspberry PI kit.

b) The ultrasonic sensors are the key elements in detecting the activity of the child and sending sensor data to the Raspberry PI which will process the information and trigger buzzers if the child has crossed the predefined boundary.

c) The buzzers will notify the next module and ensures efficient performance of the system.

d) The entire system will be switched on through power supply.

3) Monitoring and Notification Module

a) The second stage of the module is the responsibility of the watchman once the buzzers are on it should alert the watchman.

b) Watchman should check the area where the buzzers were alerted and he/she should scan the student code using QR scanner to know the student identification.

c) Once the student identification is clear the system activates the android application in order to send notifications to parents.

d) The acknowledgement of parent will also be received by the watchman and necessary action will be taken to ensure student safety.

4) Acknowledgment and action Module

a) The parent/guardian of the student will be registered to the android application by the admin who is in turn the employee of the school.

b) Parents of the student has to give the right information to the school management in order to ensure safety of their children.

c) Parent will receive the notification once the OQ scanner will identify the student saying the student is trying to cross the school premises.

d) The parent has to acknowledge the message with a clear message indicating the action to be taken.

e) The appropriate action will be taken by the security guard.

B. Architectural Diagram

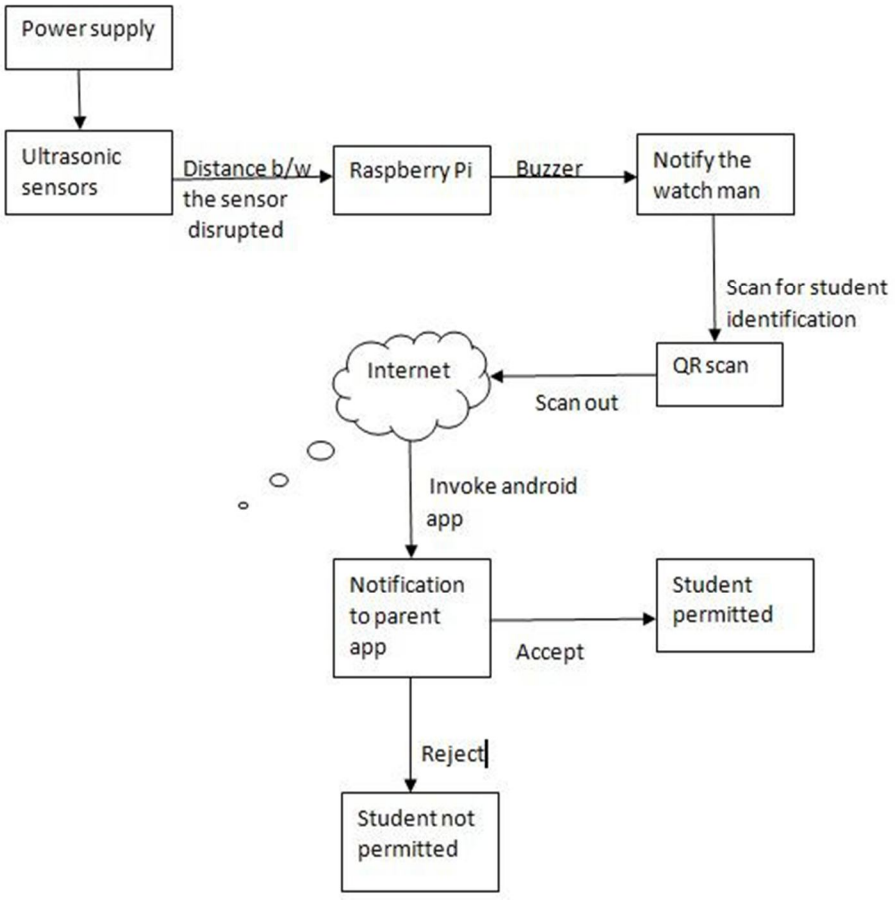


Figure 1: Architectural diagram of IOT based Virtual Fencing technique for children monitoring.

©IJRASET: All Rights are Reserved

C. Results

1) *Android Application:* The software implementation is mainly developing an application which will have the major functionality. The android application is developed in Android studio version 3.6. The android application has a home page providing facility to login for admin, parent, and watchman. The application is connected to firebase database consists of all the records of students. The QR SCANNING and QR CODE GENERATION algorithms are also implemented in the application as per the requirement of the project.

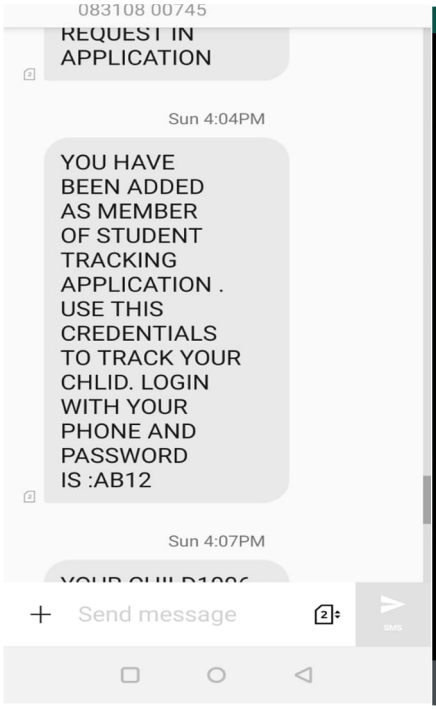


Figure 2: Message send to the parent after successful registration



Figure 3: QR scanning



Figure 4: OR scanning option for watchman

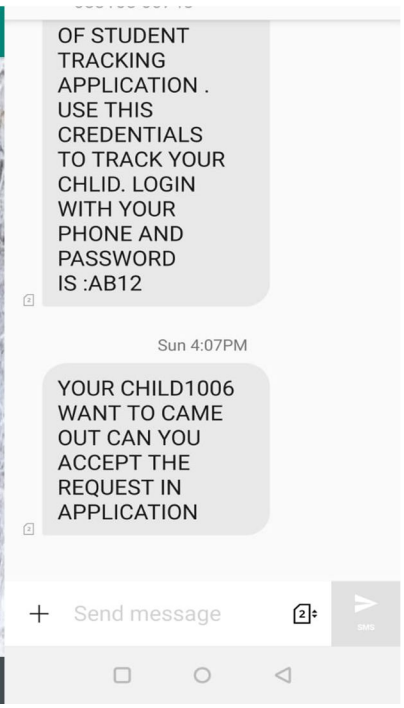


Figure 5: Message send to the parent

©IJRASET: All Rights are Reserved

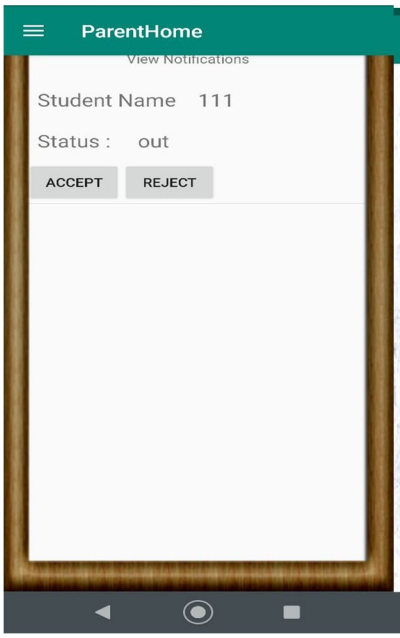


Figure 6: Notification send to patent

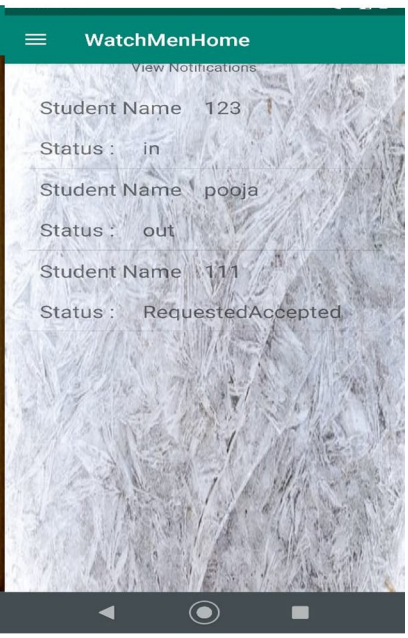


Figure 7: Request accepted by the parent send to the watchman

2) *Hardware Implementation:* The proposed system is an IoT system with the combined functionality of ultrasonic sensors, buzzers and Raspberry PI kit. The ultrasonic sensors are the key elements in detecting the activity of the child and sending sensor data to the Raspberry PI which will process the information and trigger buzzers if the child has crossed the predefined boundary. The buzzers will notify the next module and ensures efficient performance of the system. The entire system will be switched on through power supply.

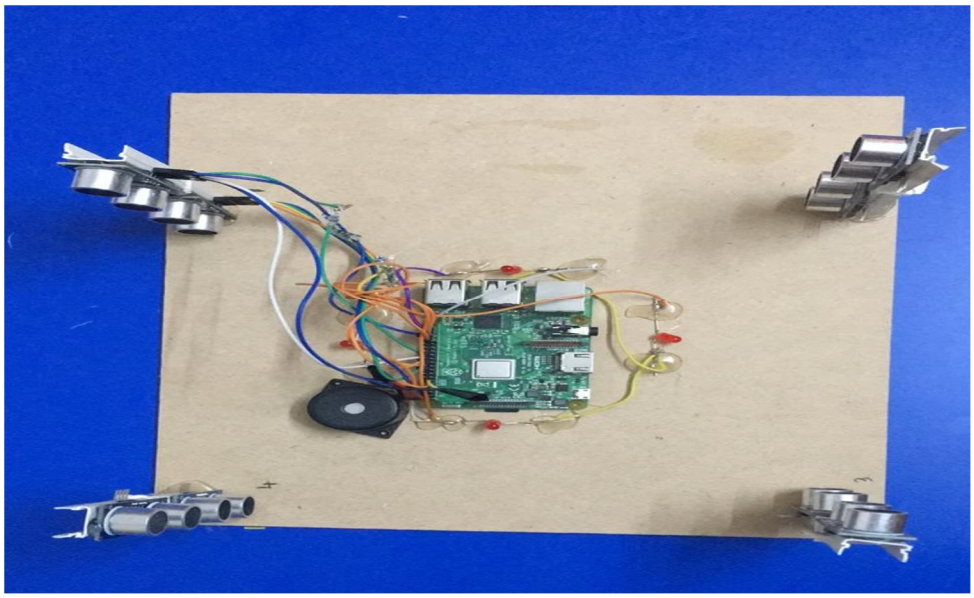


Figure 8: Hardware implementation using raspberry pi, ultrasonic sensors for virtual fencing kit

III. CONCLUSION

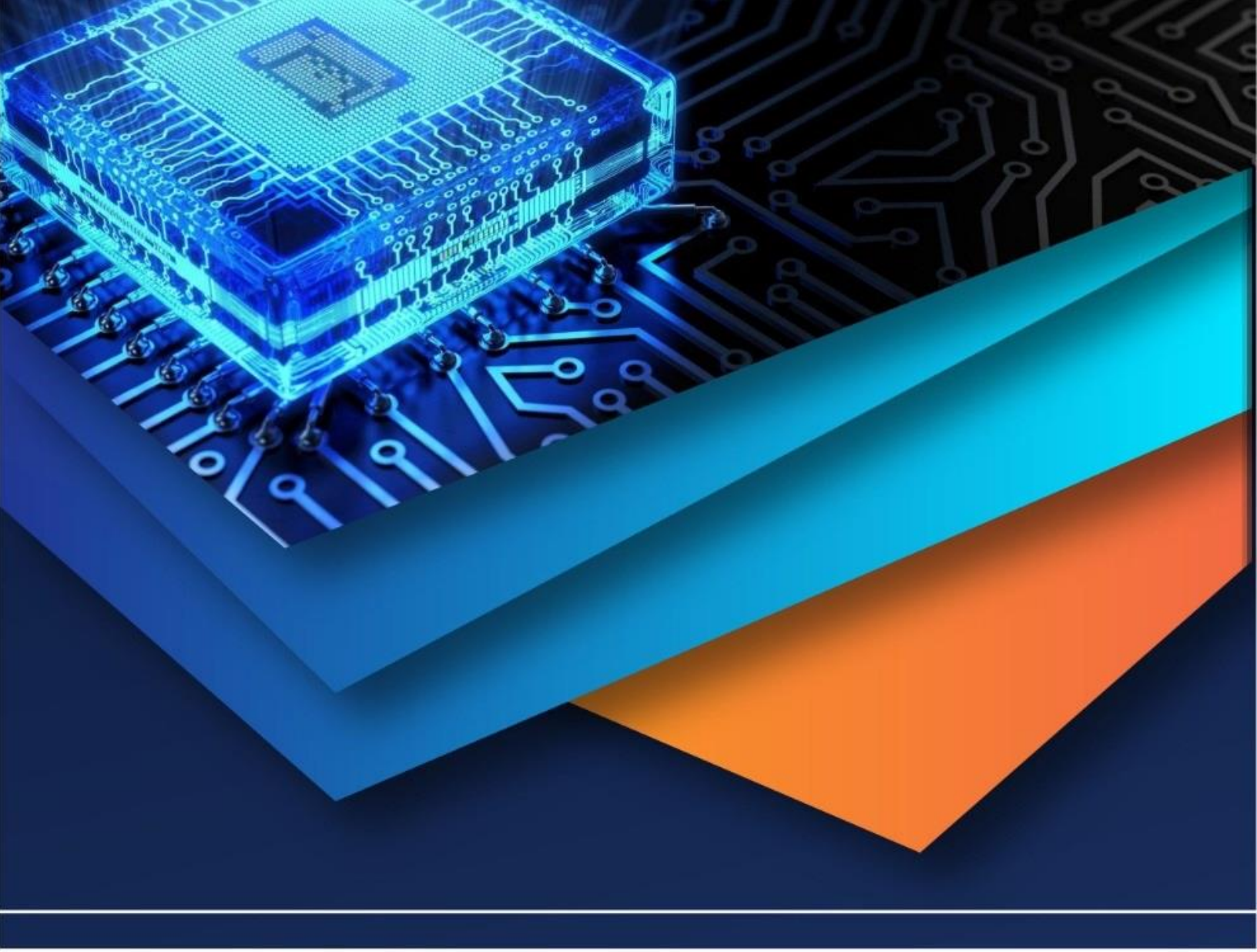
The project aims at providing an effective solution for monitoring children at schools, play areas and residential areas by using virtual fencing technique. The proposed system would be useful for its end users by providing effective security system in which children will be monitored in specified premises and parents will be alarmed by notifications. The proposed system will be intended to perform functionalities like notifying parents during their arrival time and once arrived if a child crosses the premises, through android application. System provide automated solution for data prediction. This system can also have its usage in border security system, home automation system, school zones, and in railway tracks and it has low cost and good performance.

©IJRASET: All Rights are Reserved

REFERENCES

[1] S. Chen, H. Xu, D. Liu, B. Hu, H. Wang, “a vision of iot: applications, challenges, and opportunities with china perspective,” IEEE internet of things journal, vol. 1, issue 4, pp. 349 - 359, aug 2014.
[2] Ashita Vermani, Vidhi Rana, Surabhi Govil, “Virtual Fencing for Animals Managment Using RF Module”, Conference on Advances in Communication and Control Systems 2013 (CAC2S 2013).
[3] COMPARATIVE STUDY ON VARIOUS SYSTEM BASED ON RASPBERRY-PI TECHNOLOGY by Mrs. Mikhal .
[4] Xiaohan Liu, Tao Yang, Baoping Yan, “Internet of Things for Wildlife Monitoring”, 2015 IEEE/CIC International Conference on Communications in China - Workshops (CIC/ICCC) .
[5] M. S. Nakandala, S. S. Namasivayam, D. P. Chandima, “Detecting Wild Elephants Via WSN For Early Warning System”, IEEE 2014.
[6] Mayank Yadav, Anmol Aggaewal, Nitin Rakesk, “Motion Based Attendance System In Real-Time En.
[7] Handte, S. Foell, S. Wagner, G. Kortuem, P. Marrón; “an internet-of-things enabled connected navigation system for urban bus riders,” IEEE internet of things journal, vol. 3, issue 5, pp. 735 - 744, oct 2016.
[8] B. Li, B. Tian, B. Yao, K. Wang, “a vehicle license plate recognition system based on analysis of maximally stable extremal regions,” 9th IEEE international conference on networking, sensing and control, pp. 399 - 404, 2012.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)