

Real Time Alert Message for Railways Using Deep Learning

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ABSTRACT: In today's society accidents are often caused by carelessness, whether knowingly or un-knowingly. This is especially the case with many accidents at railways. Such accidents are often caused by the negligence of the younger generation. This project is a joint project of computer intelligents and deep learning along with the ever-increasing performance of modern day computers have in abled the use of these technologies in developing to detect accident victims and pass a message to the railway authorities. This mentioned system emerged from image processing technology that applied in the real time intrusion detection system. In this paper we can applied to the real time detection to the railways and sent an alert message to the railway authorities. In this syst iques of deep learning techniques, YOLO technique and CNN algorithm

KEYWORDS: Convolutional Neural Network, You Look Only Once(YOLO),Deep Learning

I. INTRODUCTION

Due to the increasing number of railway accidents in the country today, railway authorities have been faced with the ever-increasing rush of railways and the difficulty of railway authorities to manage them all. Manually controlling everyone is a dirty thing. Most importantly, it would be possible to understand humans but it is not able to fully address these dangers, we can try to reduce this rate. The main objective of this project is to avoid common an uncommon dangers of railways. This is mainly to send an alert message to the railways to locate the accident victims on the railway tracks , whether human or animal, and to the locate them before the train arrives.

II. PROPOSED SYSTEM

In today's society accidents are often caused by carelessness, whether knowingly or unknowingly. This is especially the case with many accidents at railways. Such accidents are often caused by the negligence of the younger generation. This project is a joint project of computer intelligents and deep learning along with the ever-increasing performance of modern day computers have in abled the use of these technologies detect accident victims and pass a message to the railway authorities. This system is emerged from the "Real-time Intrusion - Detecting and Alert System by Image Processing Techniques ". The image processing technology applied in the intrusion detection system is uses object tracking and Image Segmentation and Extraction, which is able to capture the movement of objects when applied to security system via CCTV. When the system detects and sign of intrusion, it will signalize the intrusion through the internet to the security center and notify the security guards, so that they can investigate the situation immediately. Real time intrusion detection system is implemented by Kalman Filter Algorithm.

The system include :

- IR Sensor
- GSM
- ATMEGA 328
- CCTV

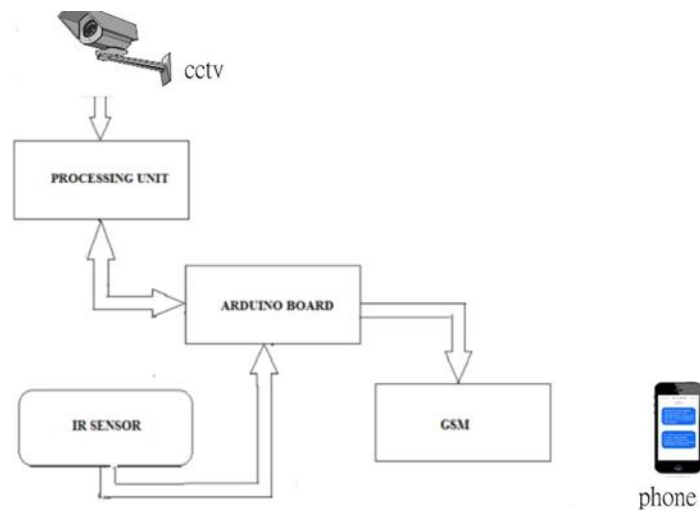


Figure 1: Overall System

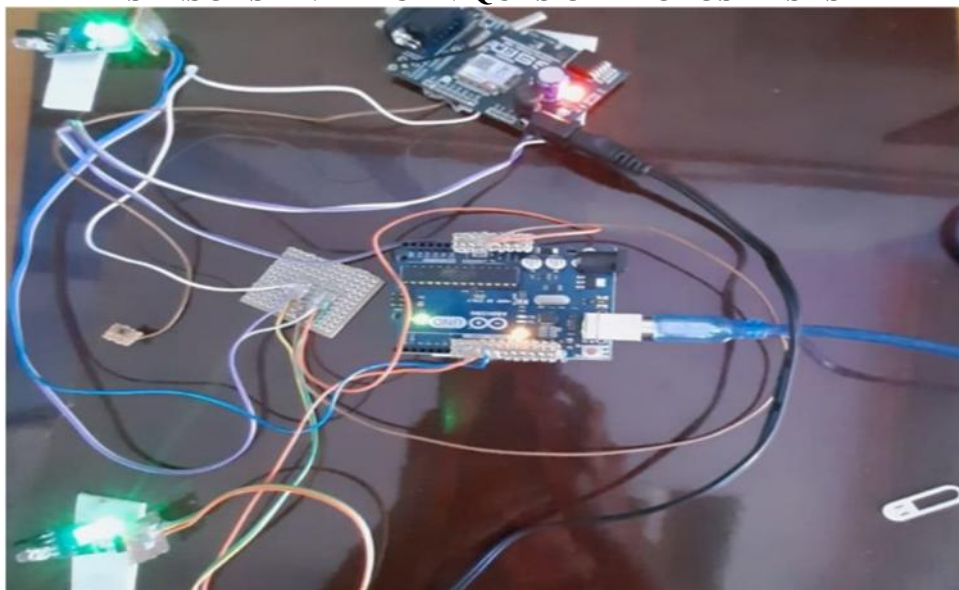
Characteristics

The key characteristics of proposed system is listed below :

- The system find the movements of person ,animals and train.
- Detect the obstacle, when its located in railway track or in a surrounding area for more than 5 minutes
- Protect the people and animals.
- Provide a Real Time Alert Message For Railway System that will work well in day and night irrespective of lighting condition.
- Provide for increased efficiency by avoiding frame loss.

III. SIMULATION MODEL

THE SENSORS AND TECHNIQUES OF PROPOSED SYSTEM



LIST OF TECHNIQUES AND MATERIALS

Qt Creator 5.12.1

Qt Creator is a cross-platform C++, JavaScript and QML integrated development environment which simplifies GUI application development. The editor has features such as syntax highlighting and auto-completion. Qt Creator uses the C++ compiler from the GNU Compiler Collection on Linux and FreeBSD. On Windows it can use MinGW or MSVC with the default install and can also use Microsoft Console Debugger when compiled from source code. Clang is also supported.

OpenCV

Open CV is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel. This library is cross-platform and free for use under the open source BSD license. Open CV supports some models from deep learning frameworks. It is mainly used to do all the operations related to images.

Arduino IDE 1.8.5

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software. This software can be used with any Arduino board.

ATMEGA328

ATmega328 is an 8-bit and 28 Pins AVR Microcontroller, manufactured by Microchip, follows RISC Architecture and has a flash-type program memory of 32KB. The ATmega328 is a low-power CMOS 8-bit microcontroller based on the AVR RISC (reduced instruction set computer) architecture. In order to maximize performance and parallelism, the AVR uses Harvard architecture – with separate memories and buses for program and data.

GSM

GSM (Global System for Mobile communication) is a digital mobile network that is widely used by mobile phone users in Europe and other parts of the world. GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot.

CCTV

CCTV camera used to detect person and animal when detecting the train and it is also used to capture the image of train.

IR Sensor

An infrared (IR) sensor is an IR is invisible to the human eye, as its wavelength is longer than that of visible light (though it is still on the same electromagnetic spectrum). Device that measures and detects infrared radiation in the surrounding environment.

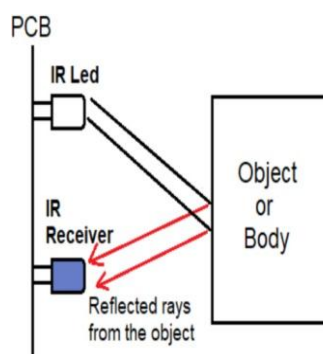


Figure 3: IR Sensor

Convolutional Neural Network

It is a deep learning algorithm. The pre-processing required in a Convolutional Neural Network is much lower as compared to other classification algorithms.

YOLO

Train this model for Train and accident victim detection using YOLO technique. YOLO trains on full images and directly optimizes detection performance. It is extremely fast and it learns generalizable representations of objects.

IV. SIMULATION RESULTS

The output is obtained as shown below.

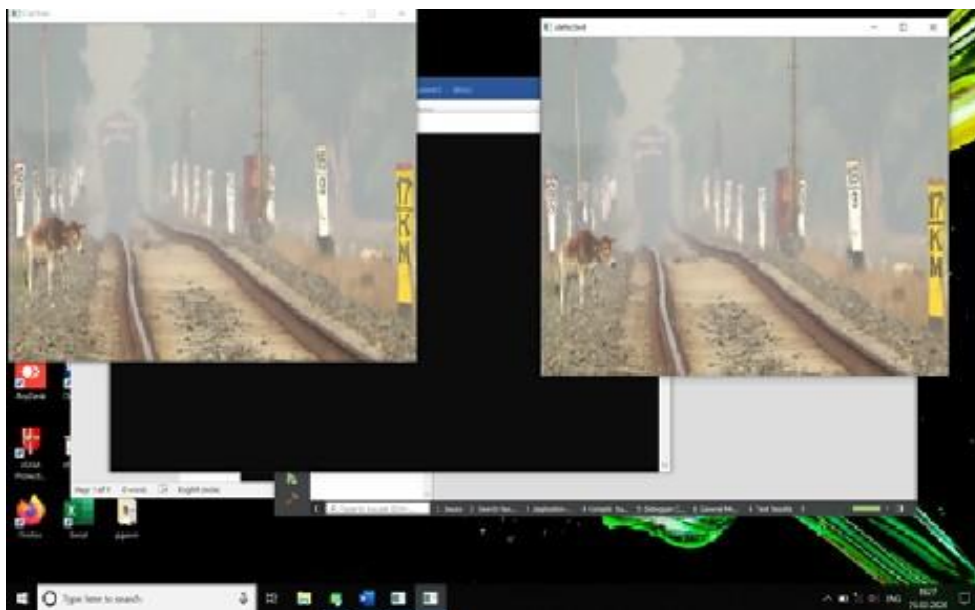


Figure 4: Before Animal Detection

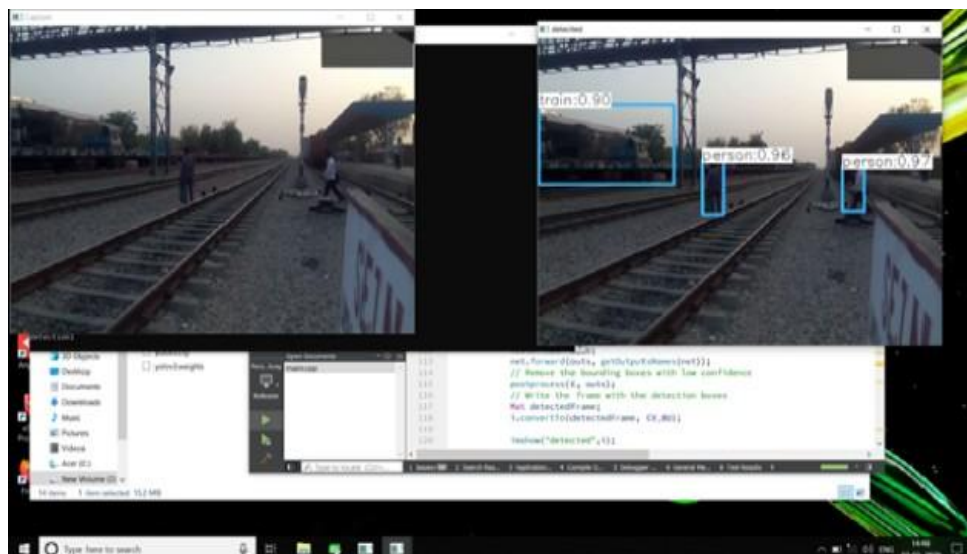


Figure 5: Person Detection

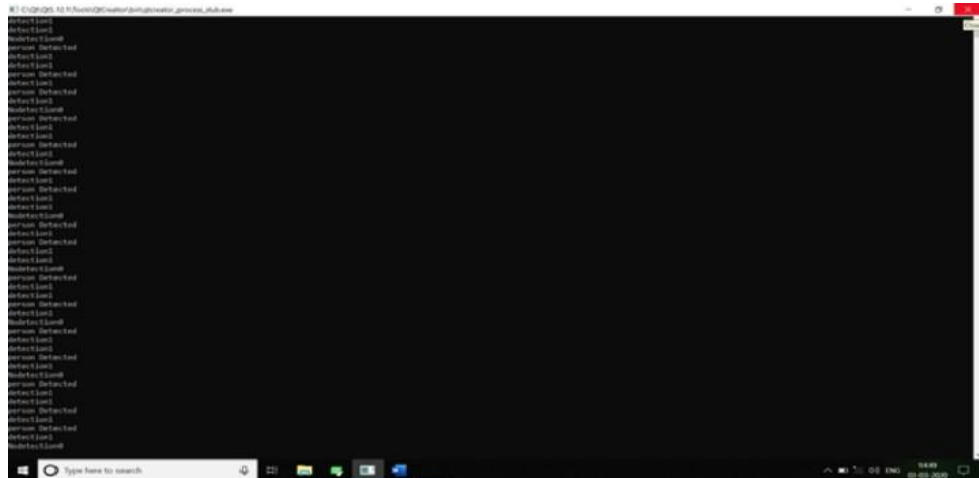


Figure 6: Console Window

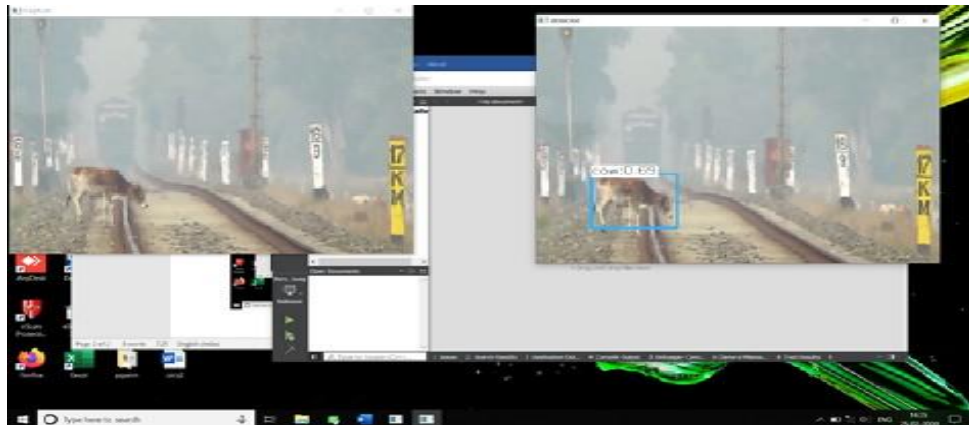


Figure 7: After Animal or Obstacle Detection



Figure 8: Alert Message

V. CONCLUSION

Due to the increasing number of railway accidents in the country today, railway authorities have been faced with the ever-increasing rush of railways and the difficulty of railway authorities to manage them all. Manually controlling every one is a dirty thing. Most importantly, it would be possible to understand humans but it is not able to fully address these dangers, we can try to reduce this rate. Here i provides an intelligent solution to control and reduce the railway accidents using deep learning model and hardware. Detection of person and animals when train arrives and sent alert message to railway authorities this systemwe can reduce the sudden railway accidents.

In future, we can include more classification like vehicle and more animals. We can use huge data set also, then we can increase the efficiency of that system. Then we detect the hazardous situations of railway tracks.

REFERENCES

1. Software Engineering : Roger S Pressman
2. System Analysis and Design : John Stubbe
3. <https://ieeexplore.ieee.org/document/8808836>
4. <https://machinelearningmastery.com/what-is-deep-learning/>
5. S. Molina-Giraldo, H. D. Insuasti-Ceballos, C. E. Arroyave-, J. F. Montoya, J. S. Lopez-Villa,
6. Alvarez-Meza, et al., "People detection in video streams using background subtraction and spatial-based scene modeling" in IEEE Processing and Recognition Group, Manizales, Colombia:Universidad Nacional de Colombia.
7. Pavlidis, V. Morellas, P. Tsaimyrtzis and S. Harp, "Urban surveillance system "from the laboratory to the commercial world", Proceeding of IEEE, vol. 89, no. 10, pp. 1478-1497, 2001.
8. M Harville, "Stereo person tracking with short and long term plan - view appearance models of shape and color", Proceeding IEEE Conference on Advanced Video and Signal Based Surveillance, pp. 521-528, 2005.
9. N. Chumuang and M. Ketcham, "Intelligent handwriting Thai Signature Recognition System based on artificial neuron network", TENCON 2014 – 2014 IEEE Region 10 Conference, pp. 1-6, 2014.1