Military Spy Robot with Intelligent Destruction

T. SWETHA [1], V. KEREN MELINDA [2], M. HANNAH SHARON[3], G. KAVIYA[4]

[1]Assistant Professor, Department of Electronics and Communication Engineering, Panimalar Institute of Technology Chennai, Tamil Nadu, India

[2,3,4]Department of Electronics and Communication Engineering, Panimalar Institute of Technology Chennai, Tamil Nadu, India

---***---

Abstract -*Nowadays, the surveillance of the military border areas is an arduous task. The border guarding forces are safeguarding the border seriously, but it is very difficult to watch the border at every moment and often leads to the terrible death of the army soldier, so to overcome these consequences we use a RPA robot which automatically detects the trespassers, that is placed on the surface plan the control areas. It encrypts a unique code via camera authorised for the trespassers and compares the unique id with the database that interprets and differentiate from the unauthorised trespassers. If this unique code mismatches, then the signal is sent to the Arduino through relay whereby it automatically activates the bomb and destructs the trespassers. The aim of this paper is to reduce the loss of army men at the line of control on the border areas by replacing with the intelligent destructible automated robots which also safeguard our country by not allowing the unauthorised trespassers and another source of any harmed army vehicle to pass through the targeted borders. This project is more compact so to make it cost efficient. The Robot's default instructions that are present in the database, set by the Military Force.*

Key Words: *Border security, Military spy robot, Line of control, Database, Relay, Camera.*

1. INTRODUCTION

In recent generations, it has been proved that the world is moving towards innovation with the automation of robots and they not only help in the day to day life needs but also play an essential role in the defence workforce by replacing humans. In-order to save mankind, they are really easy to implement and work at a much faster rate compared to a human with all its essential components .Robots are much better at surveillance and destruction especially in the army field. It is done by default preset programs on software with desired optimisations. Here the camera is used as main hardware as input to extract the trespasser view of the image. The camera installations are widely flexible and much purposeful in direction with all angles. With unstructured border line of control to survey the path of the borders to obtain the trespassers through image acquisition and comparing the set values of the default from the database finally interpreting as two platforms authorised and unauthorised. This type of combining software and hardware is involved in this thesis of Mil. Spy robot with intelligent destruction, so- called embedded system.

1.1 SYSTEMOVERVIEW

The proposed conformity is a smart border surveillance system which can prove to be helpful in the Line of Control. It can provide round the clock surveillance at the places at both, where the human deployment is possible and not possible due to geographical, climatic or some other reasons. Multiple responses are possible depending upon the position of the intruder concerning the border fence. as we have shown three different filters., (i.e. Gobar Filter, GLCM Filtering and also Histogram)in different responses. At first, we use the Gobar filter. The significance of this principle is that the accuracy with which one can measure a signal in one domain limits the attainable accuracy of the measurement in the other domain. In simple, it also attains the optimal (lower bound) compromise between the localization in the time and frequency domains; notice that the Gaussian function is an instance of a Gabor filter with centre frequency $\omega 0 = 0$.Secondly, we use the GLCM(Grey Level Co-Occurrence Matrix); they are the earliest techniques used for image texture analysis. The Analytical procedure of assessing texture that considers the spatial relationship of pixels; is the grey-level co-occurrence matrix, also called as the grey-level spatial dependence matrix. Thirdly, we use the Histogram. A good feature makes the classifier's job as easy as possible: It removes what is irrelevant to classification, such as the colors of clothing, shadows, and whether the person wears a hat, but keeps all that distinguishes a person from somethingelse.
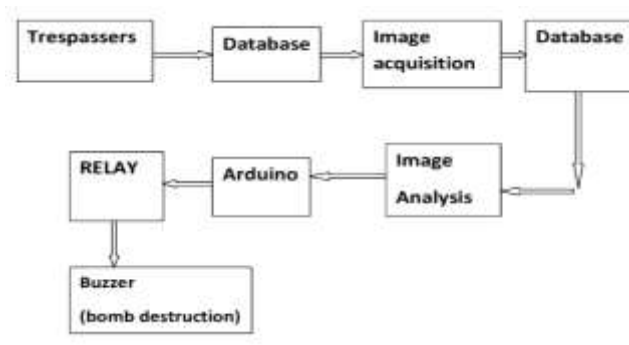
FIGURE1: Block Diagram of overall system

FIGURE 2: The design flow chart of Mil Spy Robot and intelligent destruction

2. LITERATUREREVIEW

Implementation of spy robot for a surveillance system using internet protocol of raspberry pi. 2017 2nd IEEE International Conference On Recent Trends In Electronics Information &Communication Technology, May19-20, 2017.

This spy robot system comprises the RaspberryPi (small single board computer),night vision pi camera and sensors. Here the information regarding the detection of living objects by a PIR sensor is sent to the users through the web server,and the pi camera captures the moving Object which is posted inside the webpage . This image then controls the user in the control room, able to access the robot with wheel drive control buttons on the webpage. Finally, the movement of a robot is also controlled automatically through obstacle detecting sensors to avoid the collision.

3. HARDWARE DESIGN ANDIMPLEMENTATION

Here in this project, we use the cost-efficient Arduino UNO R3. It is a microcontroller board which is based on the ATmega328 (datasheet). It is inbuilt with 14 digital input/output pins (of which six can be used as PWM outputs), six analogue inputs, a 16 MHz ceramic resonator, a USB connection. It also has a power jack, an ICSP header, and a reset button. It contains all the necessary components which support the microcontroller; USB cable is used to connect it to the computer with an AC-DC adapter or battery to get started. All other preceding boards differ from Arduino UNO in that it does not use the FTDI USB-to-serial driver chip. Instead, it was featured by the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. We also use here relay which is an electrically operated switch. It consists of a set of operating contactterminals and also set of input terminals for single or multiple control signals, Here in this project, once we find out whether it is authorised or unauthorised trespasser using unique code stored in Matlab, it sends a signal

to Arduino board through a relay. When it is unauthorised trespasser the relays switch indicates the Arduino to turn on thealerting Buzzer(here the buzzer in this project indicates the bomb destructor)

FIGURE 3: Arduino UNO R-3 front and back

4. SOFTWARE DESIGN ANDIMPLEMENTATION

A. MATLAB

MATLAB (matrix laboratory) is used in this thesis to implement software computation also considered as programming language. It is developed by MathWorks, always allows matrix manipulations, other plotting of functions and data, implementation of math algorithms, create user interfaces, and interfacing the output .It uses simulink to show and implement the sequence by programming Arduino.

B. Histograms of Oriented Gradients

In order to recognize the face and other possible image to detect the basic functions over the image the histogram of oriented gradients is used. These algorithms are called object detectors. Possible tight bound one of the instances of interest. For example, if you take detecting a pedestrian walking by a camera, you could start with a window that is 128pixelstall and 64 pixels wide enough: if the 2 to 1 aspect ratio of a rectangle is a literally a compromise between the exact aspect ratio of a person viewed from the front and one viewed from the side with legs fully extended during a step by step process. Getting the size of the window using many of 64 is a literally a convenience that reflects the assumption that if the image of the person is significantly smaller than that then resolution will be insufficient to detect it so it is not even worth trying it. The object detector then slides such a window over every image of the pyramid, perhaps in increments of a few pixels—the increment is called the stride of the detector. Here the feature is fed to the classifier, which tells whether the window contains a pedestrian. Where the answer is likely to be positive for a set of windows that overlap the person's image, so the detector then chooses a single pixel to represent each connected set of positive classifier outputs. Here this note describes one way to construct a feature vector from a fixed-size window [1]. Whereby the feature is specifically tuned to pedestrians. Where this leads to humans are important subjects in imagery, and is therefore natural that the detection of humans in still images and video has drawn much attention in the literature.

FIGURE 4: Histogram of an image

C. GREY LEVEL CO-OCCURRENCE MATRICES

Finally, here the results that indicate that trace features outperform Haralick features when applied to CBIR.
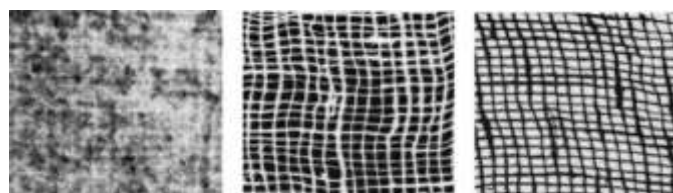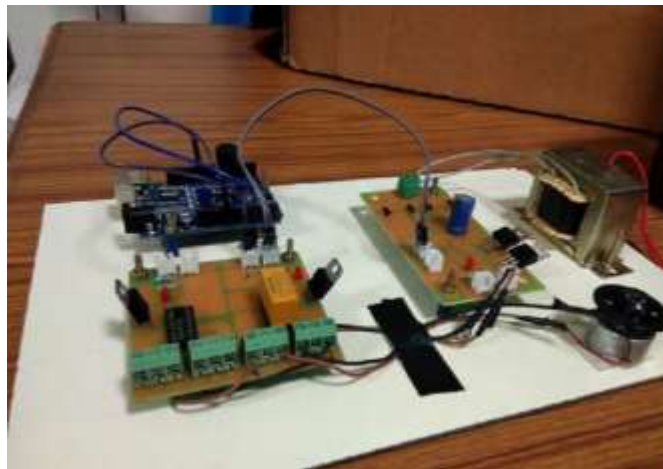

FIGURE 5: Grey level co-occurrence

Figure 6: Project Image

5. CONCLUSION

The proposed system would be a great help in enhancing the security of our border areas, especially the regions facing climatic or terrain conditions where human deployment is a major peril. Although the system may not be able to provide advanced border security, it can surely provide solutions to border security surveillance on a smaller scale. As the system detects intruders (unauthorised), it destructs an area around 100m. The smart border surveillance system, cannot only assist the defense forces in enhancing the security of border areas but also it can help to save the lifespan of a soldier. It involves the use of advanced technology; keeping in mind the cost effectiveness of the constituent modules of the system with a goal that any infiltration recognized at results can be destroyed immediately. Appropriate exploitation of the system may help our border security forces to control those unnecessary and suspicious activities in a better and accurate way. In future, we can design this system on a larger scale. As with the passing time, the technology is constantly improving; the system can be equipped with more advanced and sophisticated hardware. The camera, the object detection mechanism and response mechanism, if made using the state-of-the-art technology, can make the working of the proposed system even more exact and time-saving. As of now, this research will further be made longer to design and develop, the surveillance system based on the proposed architecture. Also, the experiments will be conducted, and the results will be recorded for furtherbetterment.

ACKNOWLEDGMENT

REFERENCES

1) J. Zhang, G. Song, G. Qiao, T. Meng and H. Sun, "An indoor security system with a jumping robot as the surveillance terminal," in IEEE Transactions on Consumer Electronics, vol. 57, no. 4, pp. 1774-1781, November2011.

2) G. Song, Z. Wei, W. Zhang and A. Song, "A Hybrid Sensor Network System for Home Monitoring Applications," in IEEE Transactions on Consumer Electronics, vol. 53, no. 4, pp. 1434-1439, Nov.2007.

3) W. Lao, J. Han and P. H. n. De With, "Automatic video-based human motion analyzer for consumer surveillance system," in IEEE Transactions on Consumer Electronics, vol. 55, no. 2, pp. 591-598, May2009.

4) C. Micheloni, G. L. Foresti, C. Piciarelliand L. Cinque, "An Autonomous Vehicle for Video Surveillance of Indoor Environments," in IEEE Transactions on Vehicular Technology, vol. 56, no. 2, pp. 487-498.

5) K. S. Kumar, S. Prasad, P. K. Saroj and R. C. Tripathi, "Multiple Cameras Using Real Time Object Tracking for Surveillance and Security System,"2010 3rd International Conference on Emerging Trends in Engineering and Technology, Goa, 2010, pp.213-218.

6) M. S. MukundaSwamy and G. L. Bhat, "Embedded controller based wireless power monitoring and controlling,"2015 International Conference on Emerging Research in Electronics, Computer Science and Technology (ICERECT), Mandya, 2015, pp.392-397.

7) R. Ikhankar, V. Kuthe, S. Ulabhaje, S. Balpande and M.Dhadwe, "Pibot: The raspberry pi controlled multi-environment robot for surveillance & live streaming,"2015 International Conference on Industrial Instrumentation and Control (ICIC), Pune, 2015, pp.1402-1405.

8) A. Imteaj, T. Rahman, M. K. Hossain and S. Zaman, "IoT based autonomous percipient irrigation system using raspberry Pi,"2016 19th International Conference on Computer and Information Technology (ICCIT), Dhaka, 2016, pp. 563-568.

9) A. Jaiswal, S. Domanal and G. R. M. Reddy, "Enhanced Framework for IoT Applications on Python Based Cloud Simulator (PCS),"2015 IEEE International Conference on Cloud Computing in Emerging Markets (CCEM), Bangalore, 2015, pp.104-108.

10) R. Karthikeyan, S. Karthik, Prasanna Vishal TR and S. Vignesh, "Snitch: Design and development of a mobile robot for surveillance and reconnaissance,"2015 International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS), Coimbatore, 2015, pp.1-4.

11) W. F. Abaya, J. Basa, M. Sy, A. C. Abad and E. P. Dadios, "Low cost smart security camera with night vision capability using Raspberry Pi and OpenCV,"2014 International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management (HNICEM), Palawan, 2014, pp.1-6.

12) A. U. Bokade and V. R. Ratnaparkhe, "Video surveillance robot control using smartphone and Raspberry pi,"2016 International Conference on Communication and Signal Processing (ICCSP), Melmaruvathur, 2016, pp.2094-2097.

13) S.Agamah and L.Ekonomou, "A PHP Application Library for Web- Based Power Systems Analysis,"2015 IEEE European Modelling Symposium (EMS), Madrid, 2015, pp.353-358.

14) A nest of Pythons," in Computing in Science & Engineering, vol. 7, no.6, pp. 81-84, Nov.-Dec.2005.

15) M.Arun, R.Prathipa, Priyanka S, AkshayaAnand, Chandrika, Smart Agriculture Robot, International Journal of Pure and Applied Mathematics,Volume 119 No. 15 2018, PP. 1901-1906,2018