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Autonomous Weapon based Security System for Border Surveillance

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***Abstract*—**
To enhance the security in sensitive areas of our national borders with autonomous weapon based security system for border surveillance. To provide an approach towards autonomous detection of intruders with the assistance of high resolution cameras supported with neural network images processing algorithms. To detain the intruders at the border the proposed autonomous weapon based security system could also be utilized. This project is based on requirement of both military and forest area purpose where there is a restricted citizen location. Now a day, there is great demand to enhance the security at military locations. So, this project would play a helpful role for military use. An ultrasonic autonomous weapon is imported in required zone such that if the sensor detects any species around it, the human detection camera attached to gun checks the image, based on appearance if the detected is human species, immediately anesthetic bullet is fired towards target and sends information to head.

Keywords--
Arduino Mega 2560, Gsm Module (Sim800a), Servomotor, Ultrasonic-Sensors.

1. INTRODUCTION

At present, the technology used at the military border is a camera proctored weapon based system like military vans, ADAPTIV camouflage etc. On merging all the technologies here comes the new idea titled autonomous weapon based security system.

An Autonomous based security system is used for emergency purposes and continuous action takes place. This technique consists of 8 ultrasonic sensors such that each sensor is placed at particular place with angle coverage of 45 degrees range for the purpose of sensing the object in front of it. These 8 sensor are placed circular outwards such that to cover 360 degrees. At middle or in the convenient place, a gun and a human detectable camera were placed to detect the human or vehicle based on necessity and also in gun we can use anesthetic bullets or granites. It totally depends on the requirements of the user. So, the operation is whenever the target is detected by ultrasonic sensor automatically the servo motor rotates the camera and gun. In this situation if the image detected is the target the gun will be fired automatically else it doesn't fire. This project would reduce the time and improves efficiency of security in emergencypurposes.

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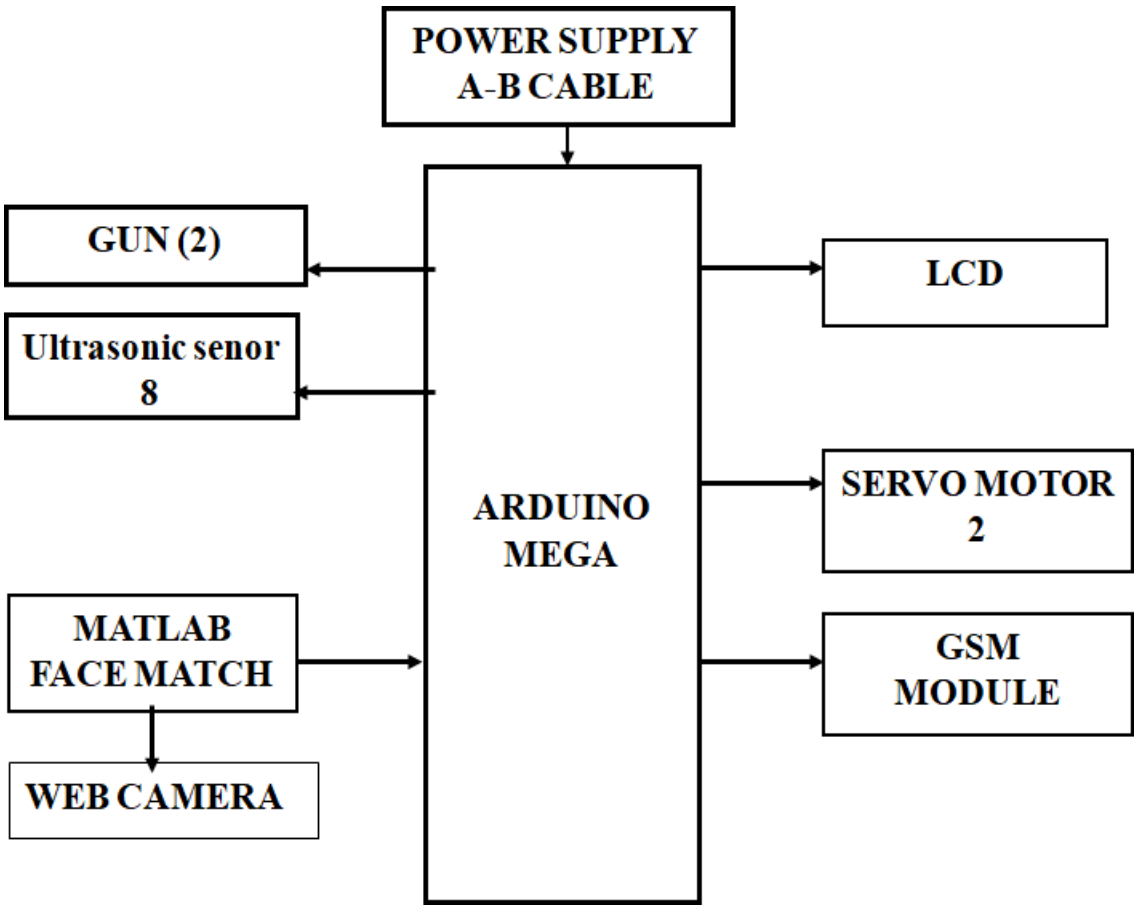
2. PROPOSED METHOD

- Here an ultrasonic gun is placed at specificplace.
- The device is arranged such that at center, the gun, camera and eight ultrasonic sensors or laser were placed aroundit.
- The load in gun depends on situation of usage of weapon. Based on necessity it may carry rocket propelled grenades or can carry anesthesia bullets (to make person unconscious).
- The device used in project consist of 8 ultrasonic sensor such that if any of sensor sense the objects, then automatically the servo motor rotates the human detection camera and gun to particular angle where the ultrasonic sensor detected thesignal.
- Then if the detected species is human, automatically the human detection camera detects and shoots the bullet and reports the image captured and process execution details to main headoffice.

3. BLOCKDIAGRAM



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4. METHODOLOGIES—

4.1 SENSINGINFORMATION:

Here an ultrasonic gun is placed at specific place. The device is arranged such that at center, the gun, camera and 8 ultrasonic sensors or laser were placed around it. The load in gun depends on situation of usage of weapon. Based on necessity it may carry rocket propelled grenades or can carry anesthesia bullets (to make person unconscious).

The device used in project consist of 8 ultrasonic sensor such that if an of sensor sense the object, then automatically the servo motor rotates with the human detection camera and gun to particular angle where the ultrasonic sensor detected the signal.

Each ultrasonic detected range will be displayed in LCD. When detected range is less than 15 cm it gives signal to the motor and human detection cam. The gun (laser) will be activated until all the ultrasonic sensor range is less than 10 automatically the gun (laser) get deactivated.

4.2 IMAGE PREPROCESSING(MATLAB):

The system of face detection and authentication plays an important role in many security systems. However, the vulnerability to presentation attacks limits its usability in unsupervised applications. Here whenever the unauthorized person accesses the system will take that person photo and save it into the database at the same time it will send the message by using GSM module. Firstly, we took a number of images of each person to create our own database by using webcam. In these images, Viola-Jones algorithm is used for faces detection and then these images have been standardized and obtained our own database.

The programs are implemented for modeling face recognition experiments by using the correlation between the trained images and non-trained images in MATLAB software environment. In this article, the statistical data processing method is used to improve the efficiency of facial recognition by using the CNN (convolutional neural network). As a result of these experiments, more accurate results were obtained and the comparison results of face recognition before and after using the statistical data processing method are shown in this article. One of the earliest successful systems is based on template matching techniques applied to a set of salient facial features, providing a sort of compressed face representation. Recognition algorithms can be divided into two main approaches, geometric, which look at distinguishing features, or photometric, which is a statistical approach that distills an image into values and compares the values with templates to eliminatevariances.

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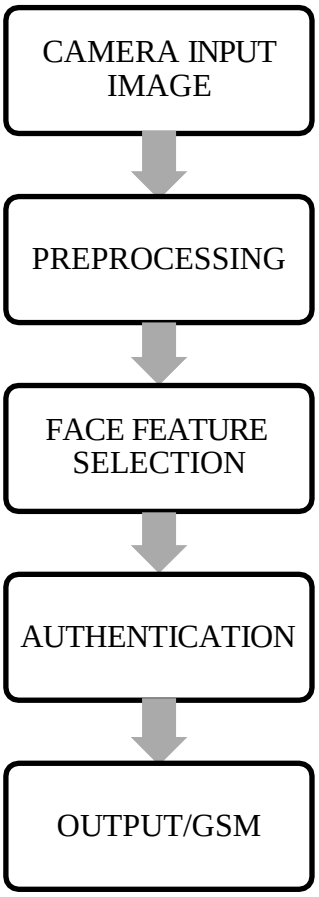
4.2.1. APPLICATION:

- Diagnosis, study of anatomicalstructure
- Surgeryplanning
- Virtual surgerysimulation
- Intra-surgerynavigation
- Objectdetection
- Pedestriandetection
- Facedetection
- Brake lightdetection
- Locate objects through satellite images (roads, forests, crops,etc.)

4.2.2 FLOW CHART FOR IMAGEPROCESSING:



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4.3 FIRING THETARGET:

Whenever the ultrasonic sensor gets activated (object comes before sensor), the motor rotates the gun and camera to the particular direction at which the sensor is activated. When the human detection software sends the target is unauthorized person to microcontroller, then the gun starts firing until the ultrasonic sensor gets zero targets. These sensors activates object comes below the range of 10cm (means no target is near).

4.4 SENDINGINFORMATION:

The information is send through cloud using gsm module. When the person get detected the cam sends information to the controller weather it is authorized ore unauthorized .From the controller the message will send to the head office in both conditions with help of gsm module .In the unauthorized situation after firing the target a message will be delivered to the headoffice.

The messages which are delivered and its condition:

1. When the person is authorized the message–Armyperson is beingsent.
2. When the person is unauthorized the message–Other person is beingsent.
3. When gun is in firingmodethe message–Fired will besent.

5. CIRCUITDIAGRAM:

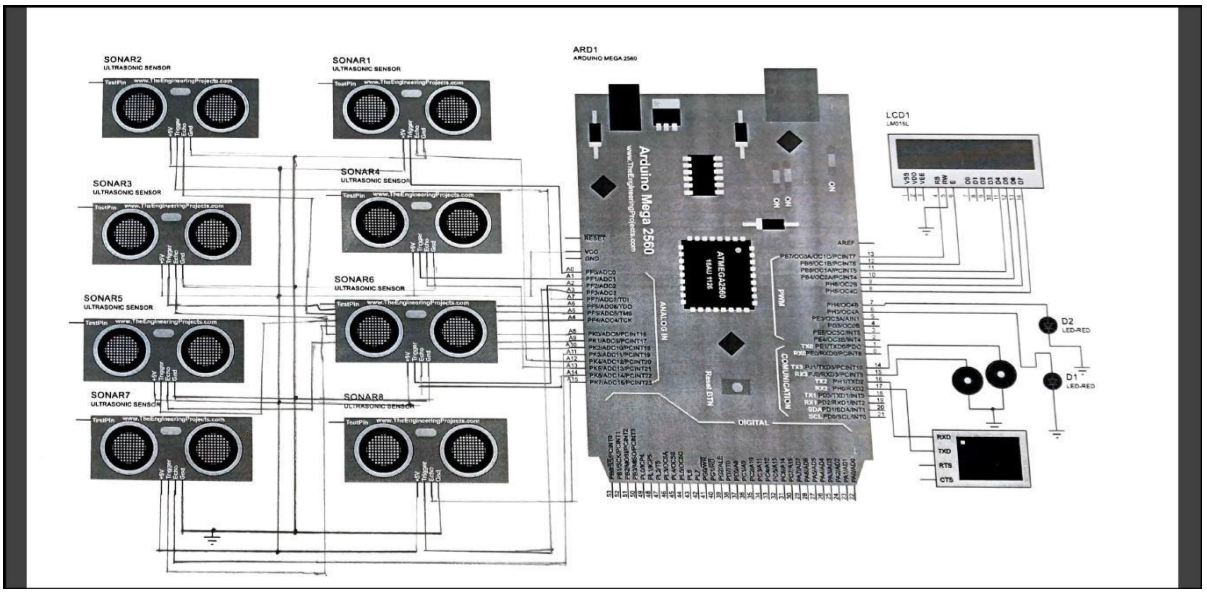

Fig: 5.1 circuit Diagram.

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6. Result andDiscussion:

Simulation is employed to guage the performance of the face recognition. Using MATLAB proposed system is meant, modeled, and simulated. The simulation and hardware result is as follows:

6.1 Performance of facerecognition:

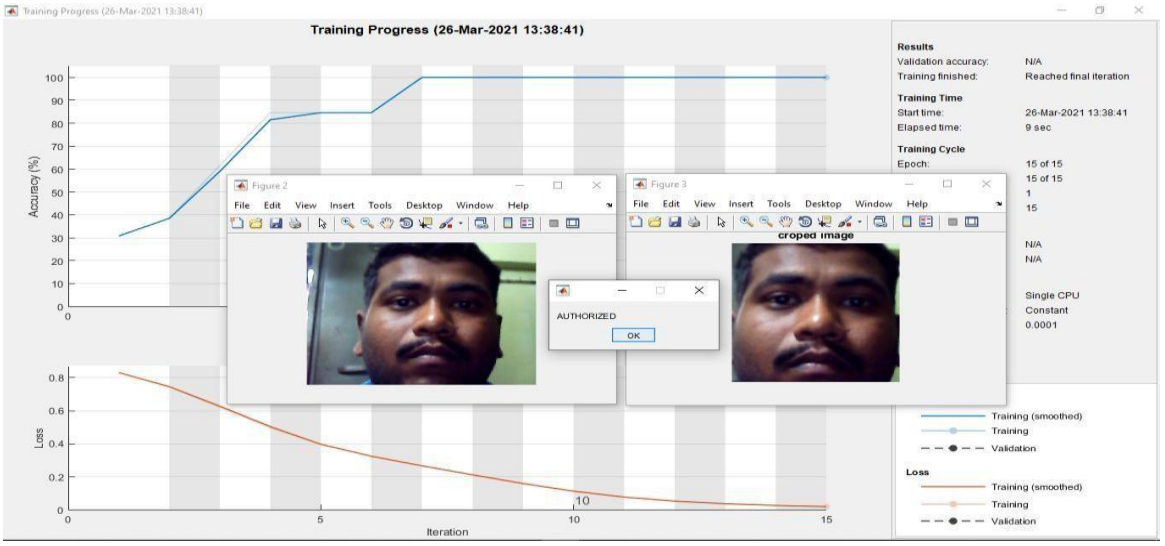

Fig: 6.1.1 Authorized output

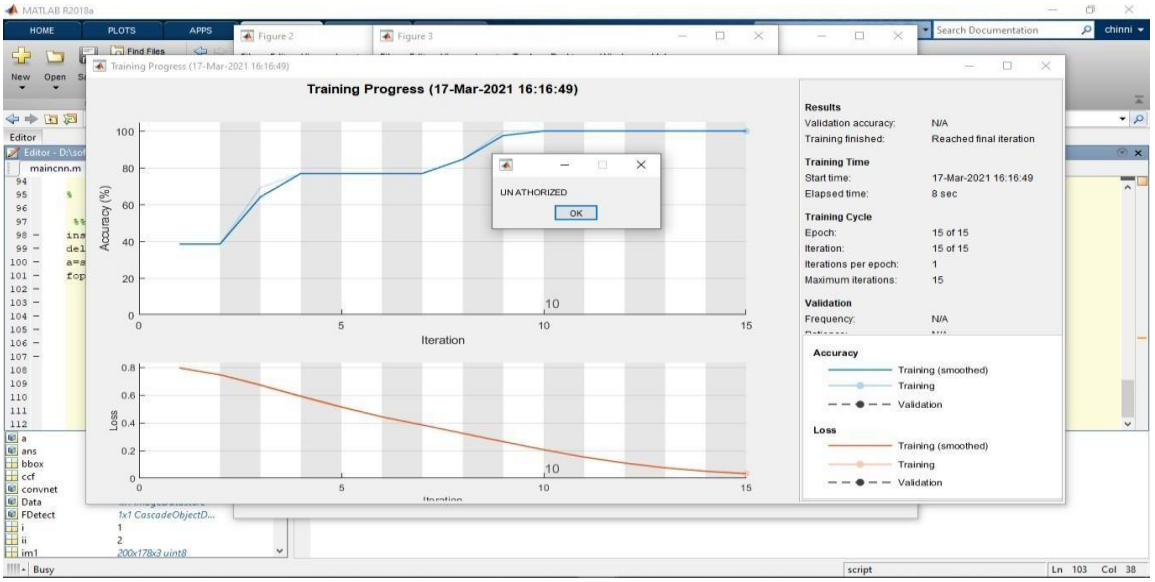

Fig: 6.1.2 Unauthorized output

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6.2 Performance ofHardware:

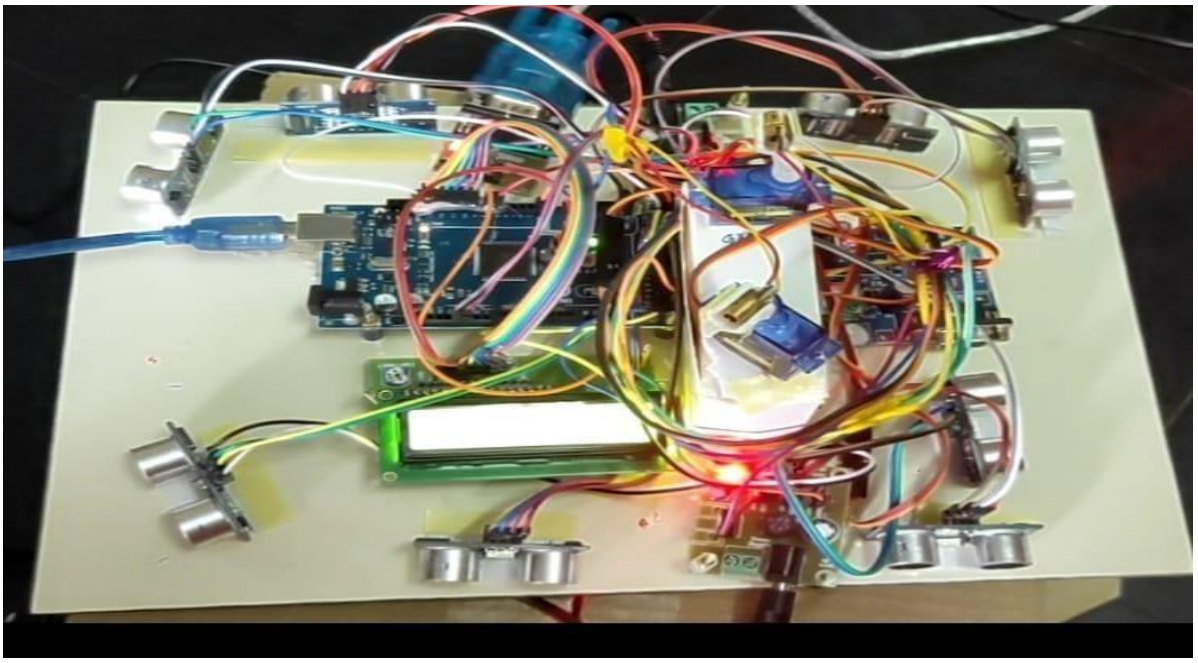

Fig: 6.2.1 Circuit Model

6.3 GSMOutput:

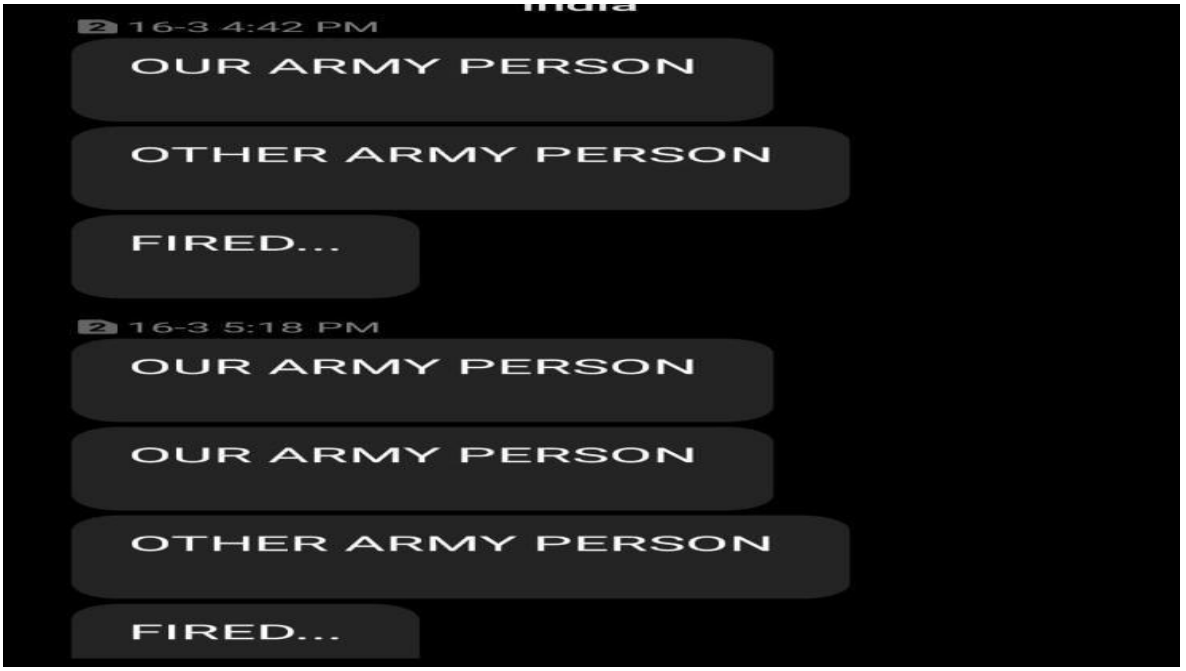

Fig: 6.3.1 Display Message

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7. CONCLUSION:

This security system is majorly used for human security. Also the process involved in this will save the time. Since it is automatic, there's no need for human interaction to continue the process. This security system gives the aware of the provider to be safe and do its achievability. Since we are using automatic weapon in the battle there will be no human loss and it is used to cover 360 degree surrounded area so this will be a serious advantage in over project. This system before using it should be authorized with a secure protocol so as to handle data loss and for authorized security purpose.

8. FUTURESCOPE:

1. The system security needs to be maintained based on the provider protocols in order to keep the data safe using cognitiveradio.

2. The further security level can be increased by improving the transceiver techniques through satelliteetc.

3. It should be mobilized so as to make a move to find a particular target for particular benefits.

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