

AUTOMATIC SOLDIER SELF PROTECTION SYSTEM USING IOT

N.P. Kamal Diana¹, P. Mallieswari², Kaneez Fathima³, V. Rajeswari⁴, G. Saikrishna⁵,
P. Sekhar⁶

^{1,2,3,4,5}B. Tech, Final Year Students, Dept. of ECE, D.M.S.S.V.H College of Engineering, Machilipatnam

⁶Assistant Professor, Dept. of ECE, D.M.S.S.V.H College of Engineering, Machilipatnam

Abstract - The proposed work aims to develop an automatic solution to detect the presence of an enemy in targeted places without loss of human life. This paper deals with the implementation and results of Smart surveillance monitoring system using Raspberry pi and web camera. It also checks for the presence of humans and then runs a face recognition algorithm. If the facial data of the person detected does not match with the pre-stored personal data of soldiers, the system recognizes him as an intruder and activates the motor to target him. It increases the usage of IOT technology to provide essential security to our soldiers in wars, homes and for other control applications. The credit card size Raspberry Pi (RPI) with Open Source Computer Vision (Open CV) software handles the image processing, control algorithms for the alarms and sends captured pictures to users Apps via Wi-Fi. This concept is much useful in military war applications. Camera is used here to recognize opponent persons and shoot without waiting for manual trigger action. Along with automatic shooting, our soldier conditions also can be measured by advanced temperature and heart beat sensors. One panic button is also presented here to alert if the soldier is in dangerous condition. A warning message will be sent to the major along with location, if any parameter exceeds its threshold value or he/she presses panic button. Voice alert is also produced if soldier is in dangerous condition.

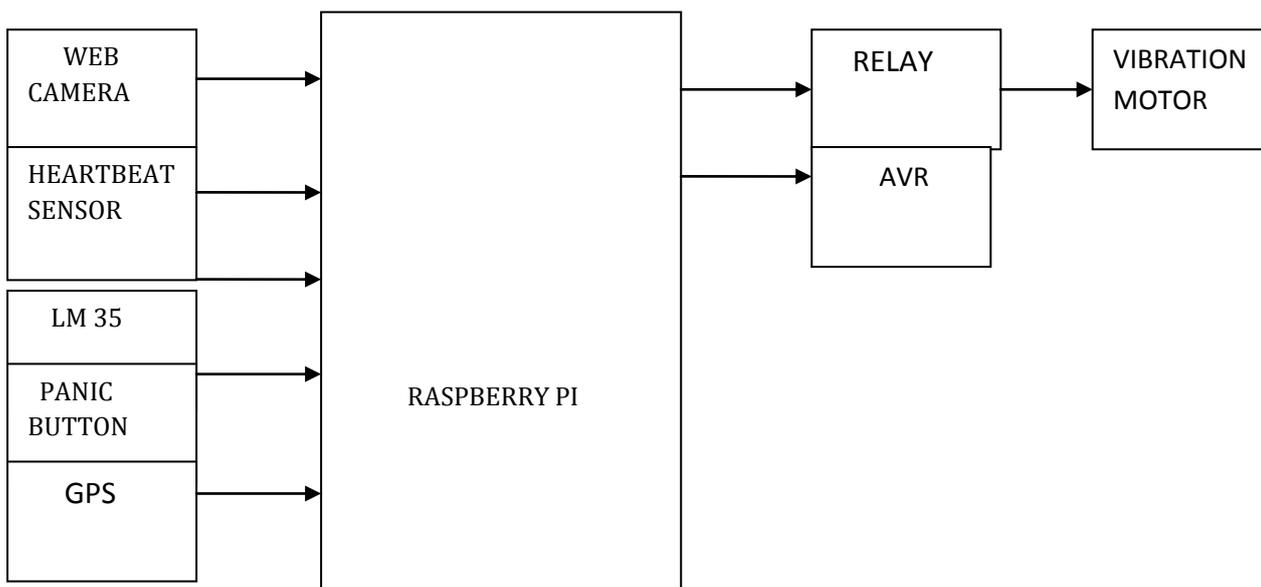
1. INTRODUCTION

Security is the primary objective to protect nations from terrorist attacks, infiltration, smuggling etc. Robotics systems with AI plays vital role in military applications to save solders life. In order to address these issues, an automated surveillance system with a AI equipped with various sensors at its core is to be introduced.

1.1 ADDITIONAL FEATURES

Providing security to soldiers by knowing the dangerous situation and record the temperature and heartbeat. Voice and text messages will be sent in danger condition and automatic triggering action will be performed towards enemy.

1.2 BLOCK DIAGRAM



2. EXPLANATION OF EACH BLOCK

2.1 RASPBERRY PI



The Broad com BCM2835 SoC used in the first generation Raspberry Pi includes a 700 MHz ARM1176JZF-S processor, Video Core IV graphics processing unit (GPU), and RAM. It has a level 1 (L1) cache of 16 KB and a level 2 (L2) Cache of 128 KB. The level 2 cache is used primarily by the GPU. The SoC is stacked underneath the RAM chip, so only its edge is visible. The ARM1176JZ (F)-S is the same CPU used in the original iPhone, although at a higher clock rate, and mated with a much faster GPU.

2.2 SD CARD

This resource explains how to install a Raspberry Pi operating system image on an SD card. You will need another computer with an SD card reader to install the image.

2.3 WEB CAMERA

Web camera is a video camera that feeds or streams an image or video in real time to or through a computer to a computer network such as internet. Web cameras are connected to raspberry pi with USB cable. Web cameras are used to recognize the opponent person. Pi Camera module is a camera which can be used to take pictures. Raspberry Pi Board has CSI (Camera Serial Interface) interface to which we can attach Pi Camera module directly.

2.4 LM 35

LM35 is an integrated analog temperature sensor whose electrical output is proportional to the degree centigrade. LM35 sensor does not require any external calibration or trimming to provide typical accuracies. LM35 temperature sensor which is a semiconductor based sensor.

2.5 HEARTBEAT SENSOR

The Heart beat sensor measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ. Heart beat sensor is designed to give digital output of heart beat when a finger is placed on it. In case of applications where heart pulse rate is to be monitored, the timing of the pulses is more important.

2.6 PANIC BUTTON

A Raspberry Pi based panic button written in Python with a Bash watchdog script. This Python script makes a phone call, plays a message, and sends email with an attachment when a button is pressed. There are many styles of panic buttons available. These can have a single pushbutton, two pushbuttons that must be pressed simultaneously, devices that must be squeezed, and devices that are activated by a foot or knee.

2.7 RELAY

A Relay is an electrically operated switch. The main function of the relay is to make or break the contact with the help of a signal without any human involvement in order to switch it ON or OFF. It is used to control a high powered circuit using a low power signal.

2.8 GPS AND AVR

The Global Positioning system (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, any where there is an unobstructed line of sight to four or more GPS satellites.

AVR stands for Audio/voice recording module. Voice alert is produced by the AVR module if soldier is in dangerous condition. AVR records media in a digital format to facilitate playback on a display with speakers.

2.9 SERVO MOTOR

A Servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. Servomotors are used in applications such as robotics, CNC machinery or automated manufacturing.

3. WORKING

This paper deals with the implementation and results of Smart surveillance monitoring system using Raspberry Pi and web camera. It increases the usage of IOT technology to provide essential security to our soldiers in wars, homes and for other control applications. Credit card size Raspberry Pi (RPI) with Open Source Computer Vision (OPENCV) software handles the image processing, control algorithms for the alarms and sends captured pictures to user's apps via Wi-Fi. This concept is much useful in Military war applications. Camera is used here to recognize opponent persons and shoot without waiting for manual trigger action. Along with automatic shooting, our soldier conditions also can be sensed by advanced temperature and heart beat sensors. One panic button is also presented here to alert the soldier dangerous condition. A warning message will be sent to the major along with location, if any parameter exceeds its threshold value or he/she presses panic button. Voice alert is also produced if soldier is in dangerous condition.

4. RESULT



Figure -1: Connections to Raspberry Pi



Figure 2- Camera is used to recognize the opponent person

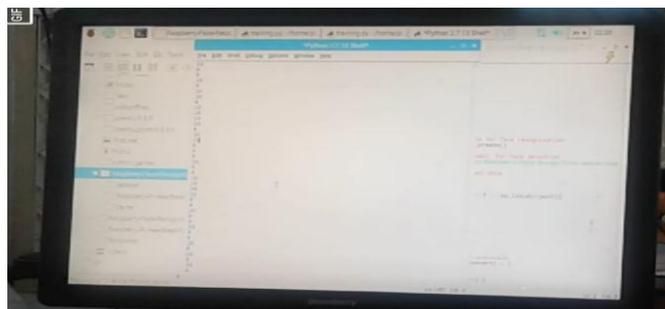


Figure 3- Temperature sensor output



Figure 4- Message sent

5. CONCLUSION

The proposed surveillance system with face recognition is continuously surveying the surrounding area. When the required person gets detected, the kit overcomes them and activates corresponding outputs. The kit is able to measure our solder body parameters like temperature and heart beat. The system continuously monitors the given area and is able to recognize whether the detected person is known or unknown. If the detected person is unknown, then the system activates motor. Hence, it is suitable for surveillance application in war field or borders.

6. FUTURE SCOPE

- Our future aim is to focus on artificial intelligence, an effort that could improve and other military function. This kit can be modifying by using number of sensors for multiple function. As the technology proliferates rapidly, IOT dimension to world of Information, communication.
- Currently, the use of Intern our daily life and it would lead to development which machines, RFID tags, Sensors and Thing communicate with each other through Internet of Things (IOT). IOT is emerging technology has certain challenges providing unique address to each thing, so access over has ubiquities the internet.

7. REFERENCES

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BIOGRAPHIES



K.P. KAMAL DIANA
B. Tech Final Year



P. MALLIESWARI
B. Tech Final Year



KANEEZ FATHIMA
B. Tech Final Year



V. RAJESWARI
B. Tech Final Year



G. SAI KRISHNA
B. Tech Final Year



P. SEKHAR., M. Tech
Assistant professor